WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 11, 1614-1700. Review Article ISSN 2277–7105

WILD ANACARDIACEAE TREES OF ISRAEL AND PALESTINE – COLOR, TASTE, MEDICINE AND UNIQUE CHEMISTRY

Abdullatif Azab*

*Eastern Plants Company, Box 868, Arara, Israel.

Article Received on
16 April 2024,

Revised on 05 May 2024,
Accepted on 26 May 2024

DOI: 10.20959/wjpr202411-32641

***Corresponding Author**
Dr. Abdullatif Azab
Eastern Plants Company,
Box 868, Arara, Israel.

ABSTRACT

The Anacardiaceae family is represented in the reviewed region by eight species, where one of them is of Brazilian origins. But despite this small number, these trees are among the most colorful, spice sources and with outstanding medicinal activities. The diversity of the known natural products that were isolated from these plants, is very large. This review is the most comprehensive that was ever published about these species in particular, and about the Anacardiaceae in general. The extensive ethnobotanical uses of these trees will be presented in the introduction of this article, followed by a summary of the published modern research publications about these eight trees. Due to great number of chemical compositions publications of these plants, we limited our presentation to carefully selected and limited number of natural products structures, that will be presented in several figures. An extensive discussion section will follow the presentation of modern research findings, and the article will end with very selected presentation of some activities of three domesticated species of this family. Most of the properties and activities will be presented in tables, for the convenience of readers.

KEYWORDS: chemical composition, plant extract, antimicrobial, antioxidant, nutrition, essential oil, Sumac, *Pistacia*, ethnomedicine, *Rhus*.

Abbreviations: ABTS 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid), ahc and her/his colleagues, AChE acetylcholine esterase, BHA butylated hydroxyanisole, BHT butylhydroxytoluene, BuChE butyrylcholine esterase, CUPRAC cupric reducing antioxidant capacity, DPPH 2,2-Diphenyl-1-picrylhydrazyl, DMSO dimethyl sulfoxide, EO essential oil, FRAP ferric reducing activity power, FTC ferric thiocyanate (method), GC-MS gas

chromatography mass spectrometry, HPLC high performance liquid chromatography, LPS lipopolysaccharide, LOX lipoxygenase, NMR nuclear magnetic resonance, ORAC oxygen radical absorbance capacity, ROS reactive oxygen species, STZ streptozotocin, TAC total antioxidant capacity, TBARS thiobarbituric acid reactive substances, TFC total flavonoid content, TPC total phenolic content.

1. Taxonomy and Archeology

Anacardiaceae (Sumac or Cashew family in English, البطميات Arabic, אלתיים Hebrew) is a medium species number family, consisting of 70-83 genera and 600-860 species.[1,2] The plants of this family inhabit all continents except Antarctica, but do not grow north of latitude line 50.[3]

Humans in our region used materials of the reviewed eight trees since very ancient times. Archeological studies from Turkey indicate that Neolithic humans used *Pistacia atlantica* fruits as food.[4] Ancient Cypriotes used six *Pistacia* species as firewood more than 8000 years ago, four out of the reviewed trees, *P. atlantica*, *P. khinjuk*, *P. lentiscus* and *P. terebinthus*, along with two other species, *P. eurycarpa* and *P. vera*.[5]

In ancient Egypt, resin of *P. lentiscus* (Mastic) was one of the embalming materials, according to a research published by T.M. Nicholson ahc (see list of abbreviations after **Keywords**).[6] They extracted the embalming material with *n*-hexane, analyzed the extracts (HPLC) and identified the compounds by GC-MS and NMR spectroscopy. They base their **conclusion mainly on the presence of several triterpenoid acids, but particularly on the concentrations ratio of oleanonic acid and moronic acid (Figure 1).**

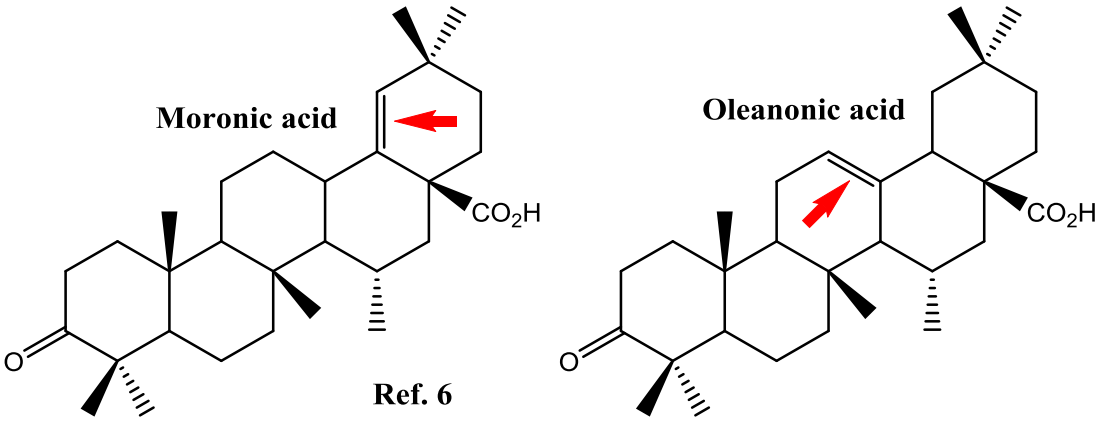


Figure 1. Oleanonic and moronic acids found in *P. lentiscus* resin used in ancient Egypt.

Ancient Egyptian culture was very colorful, and this can be clearly seen in almost all its remaining artifacts, especially textiles and texts. One of the colors that they used, ranges between very dark red and light black, was obtained by boiling aerial parts of Sumac, as reported by G. Festa ahc.[7] It is very important to notice that in the reviewed region the name Sumac refers to *Rhus coriaria*, but it may also refer to over 250 species included in this botanical genus.[8]

Finally, the Anacardiaceae trees of Israel and Palestine are *Pistacia atlantica*, *Pistacia khinjuk*, *Pistacia lentiscus*, *Pistacia palaestina* (Syn. *P. terebinthina*, *P. terebinthus*, *Lentiscus vulgaris*, *Terebinthus communis*, *T. vulgaris*), *Rhus coriaria* (Syn. *R. heterophylla*, *R. sumac*, *R. variifolia*, *Toxicodendron coriaria*), *Rhus tripartite*, *Schinus terebinthifolius*, *Searsia pentaphylla* (Syn. *Rhus pentaphylla*, *Toxicodendron pentaphyllum*).

2. Ethnobotany and Ethnomedicine

Trees of the Anacardiaceae family were and still being used in ethnobotany and ethnomedicine fashions in all their habitats. Firewood is still one of the major uses, along with powder of *Rhus* fruits, Sumac, as a spice. However, many other uses were documented and reported, and a summary of some of these is presented in **Table 1**.

Table 1: Selected Ethnobotanical uses of Anacardiaceae Trees of Israel and Palestine.

Species	Region*	Plant part, use objectives, reference
Pistacia atlantica	Iran	Fruits, seeds, leaves; memory enhancement, animal food, air freshener, firewood, dyeing colors.[9] Oil, gum, oral decoction, smoke; aphrodisiac, vaginal infections, back pain, anemia.[10] Gum; wound disinfection.[12] Seed, gum, leaves, fruits; bone and joint pains, burn healing, wounds, eczema, lung infections, stomach ulcers, toothache.[13]
	Kurdistan	Gum, fruits; stomach problems, wounds, diarrhea.[11]
	Pakistan	Flowers, leaves, all parts; stomachache, firewood.[14]
	Morocco	Leaves, bark; oral decoction, stomachache.[15]
	Libya	Whole plant; firewood.[38]
Pistacia khinjuk	Iran	Gum; wound disinfection.[12] Seeds, leaves; hemorrhoids, stomachache, tooth pains, memory enhancement, jaundice.[13] Fruits; Body reinforcement, joints and muscles pain.[16]
	Pakistan	Flowers, leaves, all parts; stomachache, firewood.[14]
	Turkey	Fruits, gum; inflamed wounds, gastric ulcer, aphrodisiac.[17] Fruits; eaten fresh, stomachache, antiparasitic.[18]
Pistacia lentiscus	Morocco	Leaves, bark; oral decoction, diarrhea, diabetes.[15]
	Algeria	Leaves, fruits, oil; respiratory-, digestive-, blood-system and skin-

		problems, allergies.[19,20] Leaves but mainly fruits oil; respiratory-, digestive-, genital-, nervous-, blood-system and skin-problems.[21] Leaves, fruits, aerial parts, resin; diabetes, headache, obesity, cholesterol reduction, ulcer, abdominal pain, liver diseases, sexual impotence, menstrual problems, mouth problems, muscle pain, scars and osteoarthritis.[22] Fruits, leaves; skin and gastric systems disorders.[23]
	Morocco	Leaves; decoction for digestive problems.[24] Leaves, flowers; gum diseases.[25] Leaves, seeds; digestive infections, diarrhea.[26] Leaves; digestive and skin problems.[27] Leaves, fruits; digestive problems, ulcer, gums pain.[28]
	Italy	Whole plant; firewood, making baskets.[29]
	Jordan	Unspecified; medicine (unspecified).[30]
	Palestine	Leaves; digestive and respiratory problems.[31]
	Libya	Fruits, leaves whole plant; food, firewood, industry, colic, gastritis, skin cracks, gingivitis, psoriasis, rash, colitis.[38]
Pistacia palaestina	Palestine	Leaves; joints pain, rheumatism, diabetes.[31]
	Turkey	Shoots; food.[32] Fruits; hair loss and care, skin care.[33]
	Jordan	Unspecified; food (unspecified).[30]
Rhus coriaria	Turkey	Fruits; appetizer, spice, digestive problems.[18] Shoots; food.[32] Fruits; mouth pain, diarrhea, antiparasitic, digestive problems.[33] Leaves, flowers; tea, spice, sour sauce.[34]
	Jordan	Unspecified; food (unspecified).[30]
	Palestine	Leaves, fruits; digestive and teeth problems.[31] Fruits; diarrhea.[36]
	Lebanon	Fruits, whole plant; spice, tanning of leather and textile, medicine (unspecified).[35]
Rhus tripartite	Morocco	Leaves, bark; stomachache, dyspepsia, heartburn, dysentery.[28]
	Palestine	Leaves, fruits; digestive problems.[31]
	Algeria	Bark, roots; gastritis.[37]
	Libya	Leaves, fruits whole plant: food, wood industry, gastritis, toothache, ulcer, eczema, skin problems, cystitis, feet problems.[38]
Schinus terebinthifolius	Brazil	Leaves, fruits, whole plant; food, firewood, medicine (unspecified).[39] Leaves; uterine and intestinal infections, gastritis, stomach cancer.[40]
Searsia pentaphylla	Morocco	Leaves; oral decoction, powder, diarrhea, diabetes.[15] Leaves; stomachache, burns.[26] Leaves; digestive and skin problems.[27] Fruits; diarrhea.[28]

* We preferred using “region” instead of “country” in order to avoid political controversies.

3. Selected Published Activities of Rhamnaceae Trees of Israel and Palestine

These properties and activities are summarized in **Table 2**.

Table 2: Selected Published Activities of Anacardiaceae Trees of Israel and Palestine.

Testing Method, Results and Reference/s
Pistacia atlantica
Fruits 80% aqueous methanolic extract was toxic to mice only in high dose of 1.66 g/kg and had antinociceptive activity tested with three tests (tail flick, hot plate, rotarod). The chemical composition was determined by GC-MS and the major components were α-pinene, limonene (**Figure 4a**) and β-myrcene (**Figure 2**).[41]
Aerial parts aqueous extract was toxic to rats in high dose of 2 g/kg. It had analgesic (tail immersion, acetic acid-induced writhing tests) and anti-inflammatory (carrageenan-induced) activities.[42]
Galls were doubly extracted with methanol, and this extract had AChE and BuChE inhibition activities, which were affected by plant gender and harvesting time. Extract was analyzed and molecular docking was performed for two of its major active components, methyl gallate and 4,5-digalloylquinic acid (**Figure 2**).[43]
Nanoemulsion of commercial fruits EO had anti-angiogenic (chick chorioallantoic membrane assay) and anticancer (against A549 human lung cancer cells) activities.[44]
Fruits 70% aqueous ethanolic extract was active against human KB cancer cells.[45]
Leaves 75% aqueous ethanolic extract was active against MCF-7 breast cancer cells.[46]
Fruits methanolic extract inhibited Ehrlich solid tumor that was induced by injection of cancer cells to mice.[47]
Leaves and stems were separately extracted with 80% aqueous methanol and both extracts were fractionized with chloroform, ethyl acetate and *n*-butanol. The six fractions were tested for AChE and BuChE inhibition, antioxidant (ABTS, CUPRAC, DPPH, FRAP methods, ethyl acetate was highest) and antiproliferative (HeLa cells) activities. The phenolic composition of the crude extract is provided.[48]
Leaves 70% aqueous ethanolic extract had antioxidant (DPPH method) and anticancer (human gastric cancer and HeLa cells) activities. TPC was determined.[49]
Resin was extracted with 0.2% aqueous polysorbate and the resulting extract had anticancer (COLO205 cancer cells) and antioxidant (ABTS, DPPH methods) activities. TPC and TFC are provided.[50]
Fruits ethanolic extract had activity against A549 human lung cancer cells. The major compounds of this extract were (%): limonene 10.92 (**Figure 4a**), β-pinene 4.98, β-myrcene 6.92, terpinolene 10.89, α-terpineol 13.28, caryophyllene oxide 4.01, ethyl pentadecanoate 6.15, sapthulenol 13.45 and isosapthulenol 14.63 (**Figure 2**).[51]
Leaves aqueous extract was active against RD and Hep2 human tumor cell lines. Qualitative general and partial phenolic compositions are presented.[52]
Gel that contained 10-20% fruits EO (*n*-hexane extract) and pure EO, had ameliorative effect on acetic acid-induced colitis in rats.[53]
Resin was extracted with 0.2% aqueous polysorbate and the resulting extract had alleviating effect against acetic acid-induced colitis in rats.[54]
Resin nanoparticles had positive effect against acetic acid-induced colitis in rats.[55]
Capsules containing fruits powder had blood glucose and cholesterol lowering effect in diabetic and hyperlipidemic patients.[56]
Gum aqueous solution had glucose lowering effect in diabetic patients.[57]
Leaves methanolic extract was prepared and fractionized with *n*-hexane, chloroform, ethyl

acetate and *n*-butanol. Crude extract was analyzed resulting mainly known phenolics. Fractions were tested for antioxidant (DPPH, FRAP and Fe^{+2} chelating methods) and antidiabetic (inhibition of α-amylase, α-glucosidase, pancreatic lipase, pancreatic cholesterol esterase) activities, showing significant results in both tests.[58]

Leaves EO (hydrodistillation) had antioxidant (FRAP method) and antidiabetic (STZ-induced in rats) activities. Antidiabetic and antihyperlipidemic activities were measured by several biomarkers including blood glucose and cholesterol concentrations.[59]

Leaves 70% aqueous methanolic extract was prepared and analyzed for general chemical composition. It was tested for anti-inflammatory (carrageenan-induced paw edema in mice), antimicrobial (against *S. aureus*, *L. monocytogenes*, *B. subtilis*, *E. coli*, *P. aeruginosa*, *K. pneumoniae*, *C. albicans*), antioxidant (DPPH, FRAP methods) and tyrosinase inhibition activities.[60]

Leaves 80% aqueous methanolic extract was prepared and analyzed resulting known phenolic compounds. It was tested for anti-inflammatory (carrageenan-induced paw edema in mice) and antioxidant (ABTS, DPPH, FRAP methods) activities.[61]

Seeds aqueous extract was dissolved in acetone or methanol and tested against *L. ivanovii*, *L. innocua*, *L. monocytogenes*, *E. coli* and *P. aeruginosa*, showing significant activity. Two other plants were studied in this research.[62]

Resin EO was prepared by hydro-alcoholic distillation, and it was active against *E. coli*, *S. aureus* and *S. pyogenes*.[63]

Fruits aqueous extract was active against *E.coli*, *P. aeruginosa* and *S. aureus*.[64]

Fruits and leaves were separately extracted with ethanol, and olive tree leaves were extracted as well. The three extracts were tested separately and combinedly against seven fungi species. The combination of the three extracts was most active.[65]

Leaves aqueous extract and fruits EO (hydrodistillation) were tested against six bacterial strains. EO was more active.[66]

Fruits, galls and leaves methanolic extracts were active against *S. aureus*, *B. cereus*, *E. faecalis*, *P. aeruginosa*, and *E. coli*.[67]

Gum EO (hydrodistillation) was active against *Trametes versicolor* fungus.[68]

Fruits aqueous ethanolic (ratio is not provided) extract was active against *S. aureus* that causes septic arthritis.[69]

Fruits powder and its aqueous extract were active against *Aspergillus flavus* and *Aspergillus niger*.[70]

Resin 70% aqueous ethanolic extract and its solution in DMSO (separately) were active against *Enterococcus fecalis*.[71]

Gum was analyzed for chemical composition and its major components were mentioned earlier. It had antioxidant (DPPH method) and antibacterial (six species) activities, and it extended the life of probiotics (*Saccharomyces boulardii* and *Lactobacillus acidophilus*) after encapsulation with sodium alginate in Kefir (milk drink).[72]

Leaves were successively extracted with *n*-hexane, ethyl acetate and methanol. The three extracts were tested against four bacteria species and one fungus, as well as antioxidant activity (DPPH method) with ascorbic acid as a reference. Chemical composition analysis revealed 2,3-Di-*O*-galloyl-D-glucose and 1,3-Di-*O*-galloyl-β-D-glucose.[73]

Fruits EO (hydrodistillation) had antioxidant (ABTS, DPPH methods) and antibacterial (*E. coli*, *S. entritidis*, *S. aureus*, *L. monocytogenes*) activities. Analysis of this EO resulted α-pinene and β-myrcene as major components.[74]

Leaves EO (hydrodistillation) had antioxidant (DPPH, FRAP methods) and antibacterial (six strains) activities. Analysis of this EO resulted terpinen-4-ol (**Figure 2**) as major component.[75]

Gum EO (steam distillation) was active against *S. aureus*, *E. Coli*, *S. enterica*, and *L.*

monocytogenes. Major compounds of this EO were (%): verbenone 26.19 and isobornyl acetate 29.53 (**Figure 2**).[76]

Seeds were separately extracted with water, 96% aqueous ethanol and 80% aqueous methanol. Extracts were tested for antioxidant (DPPH method) and antibacterial (15 species). In the second test extracts were active against most bacteria but were inactive against *E. coli* and *E. aerogenes*. Analysis of 80% aqueous methanolic extract revealed that germacyclopetene[a] is the major component, 38.12%.[77]

Leaves 90% aqueous ethanolic extract was tested for antioxidant (DPPH method) and antibacterial (six species) activities, showing significant results.[78]

Resin EO (hydrodistillation) had antioxidant (DPPH method), α-glucosidase inhibition and antimicrobial (seven bacterial and two fungal species) activities. Analysis of this EO resulted α-pinene as major compound.[79]

Bark, fruits and leaves were separately extracted with 70% aqueous ethanol, and the three extracts were tested for antioxidant activity with ABTS and DPPH methods.[80]

Bark from external and internal parts of the trunk, buds, fruits, leaves, roots and stem, were separately extracted with methanol, ethyl acetate and *n*-butanol (total of 21 extracts). These extracts were analyzed for TFC and TPC, and tested for antioxidant activity by DPPH, FRAP and β-carotene bleaching methods.[81]

Hulls EO (hydrodistillation) was tested for antioxidant activity with DPPH method and analyzed for chemical composition revealing α-pinene as major component. Extraction with 50% aqueous methanol and analysis afforded known phenolic compounds: ferulic acid, quercetin, naringenin and catechin.[82]

Seeds and their epicarp were extracted with methanol and extract was analyzed for phenolics resulting known compounds. TFC, TPC, TAC and nutritional composition were determined.[83]

Galls were doubly extracted with methanol and the extract antioxidant activity was tested with ABTS, DPPH and FRAP methods. Extract analysis yielded known phenolics.[84]

Fruits aqueous extract supplementation and exercise in rats improved antioxidant biomarkers superoxide dismutase and malondialdehyde.[85]

Fruits EO (hydrodistillation) addition to sunflower oil increased its stability by improving its antioxidant capacity. *t*-Butyl hydroquinone (TBHQ) was antioxidant reference in this research.[86]

Fruits EO was obtained by *n*-hexane extraction and it was used for preparation of wound healing gel (5%). Positive effect was confirmed in cuts that were done in rats, by healing time decrease and improvement of oxidant/antioxidant parameters.[87]

Mice were cut and wounds were infected with *Leishmania major*. Treatment with resin compared with standard drug of glucantime showed clear positive effect.[88]

Dry fruits, leaves and fresh fruits were combinedly extracted with 80% aqueous methanol, and this extract had antiparasitic effect in lamb livers with hydatid cysts.[89]

Fruits methanolic extract had protoscolicidal effect in mice. It was toxic for healthy animals in 2.43 g/kg. Major components of this extract were (%): *β*-myrcene 41.4, *α*-pinene 32.5 and limonene 4.7.[90]

Seeds EO (ready) combined with canola oil and physical exercise ameliorated oxidative stress in patients with metabolic syndrome. The effect was measured by several oxidant/antioxidant biomarkers such as blood glucose, total antioxidant capacity, total antioxidant status, malondialdehyde and five enzymes.[91]

Gum 70% aqueous methanolic extract combined with pomegranate peel 80% aqueous methanolic extract, had antiulcer (ethanol-induced) in rats. Omeprazole was reference drug in this research.[92]

Fruits 70% aqueous ethanolic extract had anxiolytic effect in intact and gonadectomized

rats that were exposed to five different stressors.[93]
Kernels oil was prepared by cold press and it had antihyperglycemic, antihyperlipidemic and anti-inflammatory activities in fructose-fed rats.[94]
Resin EO (steam distillation) analysis showed that α-pinene is the major component.[95]
EOs of resin, fruits and leaves were separately obtained by hydrodistillation. Analysis of these EOs showed that the major components were α-pinene in resin, bornyl acetate in fruits and terpinen-4-ol in leaves.[96]
Fruits (Algeria) were separately extracted with diethyl ether and chloroform-methanol 2:1 v/v. Both extracts were analyzed for nutritional components, fatty acids and lipids, mainly plant sterols. Results were compared with analysis of *Pistacia vera* (Turkey).[97]
Follow up of previous study but in this research the chemical composition of resin EO was compared with EOs from other regions and other species: *P. atlantica* from Iran and Morocco, *P. eurycarpa* from Turkey and *P. lentiscus* from Turkey, Greece and Morocco. In all cases, α-pinene is the major component.[98]
Leaves EO (hydrodistillation) analysis afforded α-pinene as major component.[99]
Seeds oil was prepared by cold press and was analyzed for fatty acids and lipids, resulting 14 acids and 7 phytosterols, where β-sitosterol (**Figure 2**) was 87.73%.[100]
Fruits oil was prepared by *n*-hexane extraction and it was analyzed for chemical composition. Fatty acids composition is also presented.[101]
Resin was analyzed for detailed nutritional, mono and polysaccharide and amino acids compositions. Its 90% aqueous ethanolic extract was analyzed for chemical composition and some thermal properties of the resin (for example, decomposition temperature range) were also studied.[102]
Fruits from four locations EOs were prepared by *n*-hexane extraction, their nutritional composition was analyzed and their TPC was determined by 80% aqueous ethanolic extract. The phenolic composition was analyzed by 80% aqueous ethanolic extract.[103]
Gum aqueous extract had cyto-genotoxicity against NIH-3T3, KB and HUVEC cell lines. Tests confirmed cells DNA fragmentation.[104]
Capsules containing 350 mg of resin and 150 mg of sugar were supplemented to patients with functional dyspepsia, resulting notable ameliorating effect.[105]
Fruits aqueous extract was orally supplemented to rats resulting hepatoprotective effect, measured by several biomarkers such as glutathione peroxidase, total oxidative capacity, cholesterol and triglycerides.[106]
Leaves 70% aqueous ethanolic extract had hepatoprotective effect in CCl_4-induced toxicity in rats, measured mainly by functioning of liver enzymes.[107]
Fruits oil obtained by cold press was used to treat rats with levothyroxine-induced (12 mg/L) hyperthyroidism. Positive effect was measured by serum leptin concentration.[108]
A follow up study: same oil in the previous research was used to treat propyl thiouracil-induced hypothyroidism. Same biomarkers were measured for effect observation.[109]
Fruits methanolic extract did not alleviate Cd(II) kidney toxicity in rats but improved antioxidant biomarkers such as lipid peroxidation.[110]
Mice with liver and kidney injury induced by busulfan were supplemented with diet that included 10% (plant part is not mentioned), resulting improvement of histological parameters, especially liver and kidney enzymes.[111]
Resin EO (hydrodistillation) was used to prepare a cream for treatment of patients with knee osteoarthritis. Compared with standard drug of diclofenac, results showed clear positive effect. Chemical compositions of EO and cream were analyzed resulting α-pinene as major component.[112]
Gum was used to prepare an ointment for treating old patients with knee osteoarthritis, resulting clear improvement expressed by patients and some biomarkers.[113]

Gum was used to prepare an ointment for treating patients with knee osteoarthritis, resulting clear improvement. α-Pinene was the major component of this ointment, and the reference drug was acetaminophen.[114]
Gum and its EO (hydrodistillation) were supplemented to ovariectomy-induced osteoporotic rats, directly or in their encapsulated form. Positive results were recorded in physical (three-point bending) and biochemical (serum calcium) tests. α-Pinene was the major component of this EO.[115]
Peeled seeds were extracted with 0.5 M $NaCl_{(aq)}$ solution, and the resulting extract was used to remove arsenic (Na_2AsO_4) from its aqueous solution.[116]
Same extract as in previous research was used by the same group for removal of organic pollutants.[117,118]
Resin EO (hydrodistillation) gel had healing activity of burn wounds of rats skin along with angiogenesis activity. α-Pinene was the major component of this EO.[119]
Resin 95% aqueous ethanolic extract was used to prepare an ointment that had healing activity of burn wounds of rabbits skin. Activity was physically observed and tested by biochemical parameters, mainly oxidant/antioxidant.[120]
Resin EO (hydrodistillation) ointment had healing activity of burn wounds of rats skin. Activity was physically observed and tested by biochemical parameters, oxidant/antioxidant, vasculoendothelial growth factor and hydroxyproline.[121,122]
Fruits 50% aqueous ethanolic extract had activity against five bacterial and three fungal species.[123]
Fruits EO was obtained by *n*-hexane extraction and had significant antioxidant activity, measured by DPPH and β-carotene bleaching methods. EO was analyzed for TFC, TPC and fatty acids composition resulting detection of nine compounds.[124]
Fruits EO (hydrodistillation) and 50% aqueous ethanolic extract were prepared. Major component of EO was α-pinene (93.2%). TFC, TPC and antioxidant (DPPH, TAC methods) activity of extract were determined.[125]
Dehulled seeds had beneficial effect when used as part of poultry diet.[126]
Leaves ethanolic extract was fractionized with ethyl acetate and *n*-butanol. The crude extract was active against eight bacterial and six fungi species. Its antioxidant activity was tested by FRAP and superoxide radical scavenging methods. Extract and fractions were analyzed for chemical compositions resulting mainly known phenolic compounds.[127]
Leaves and resin were separately extracted with 80% aqueous ethanol. Extracts were analyzed for TFC and TPC, and their antioxidant activities were determined with DPPH and FRAP methods. Their antifungal activities were tested against *P. digitatum*.[128]
a- to the best of our search efforts, germacyclopetene does not exist.

Pistacia khinjuk

Fruits 50% aqueous ethanolic extract had activity against five bacterial and three fungal species.[123]
Fruits EO was obtained by *n*-hexane extraction and had significant antioxidant activity, measured by DPPH and β-carotene bleaching methods. EO was analyzed for TFC, TPC and fatty acids composition resulting detection of ten compounds.[124]
Fruits EO (hydrodistillation) and 50% aqueous ethanolic extract were prepared. Major component of EO was α-pinene (78.71%). TFC, TPC and antioxidant (DPPH, TAC methods) activity of extract were determined.[125]
Dehulled seeds had beneficial effect when used as part of poultry diet.[126]
Leaves, roots, stems and germinated branches from seeds; were all extracted with ethanol, but only the last extract was tested for biological activities. It inhibited several enzymes (not AChE), was cytotoxic (against MCF-7 and HT-29 cancer cell lines) and had hypotensive activity measured by inhibition of angiotensin I-converting enzyme

(ACE).[129]
Dehulled fruits 70% aqueous ethanolic extract was administered (200 or 400 mg/kg) to rats, resulting reduction of blood glucose and lipids.[130]
Leaves 95% aqueous ethanolic extract had blood lipid lowering activity in high fat-fed rats, with standard drug of simvastatin as a reference.[131]
Leaves 95% aqueous ethanolic extract was tested for anti-inflammatory activity in rats (carrageenan-induced paw or ear edema) by testing several biomarkers. Extract was analyzed for chemical composition where seven major phenolics were detected, including three digalloyl-D-glucose derivatives [a] (**Figure 3**).[132]
Leaves EO (hydrodistillation) and chloroform, ethyl acetate, diethyl ether and ethanolic extracts were separately prepared. The four extracts were tested against six bacteria and two fungi species showing moderate to high activities. EO was analyzed for chemical composition resulting spathulenol as major component.[133]
Fresh leaves EO (hydrodistillation) was active against *C. albicans*, and γ-terpinene (**Figure 3**) was its major component.[134]
Fruits EO (cold press) and methanolic extract were separately prepared and tested against *S. aureus*, *E. coli* and *P. aeruginosa*. Fatty acid compositions were determined.[135]
Gum EO was obtained by conventional microwave-assisted hydrodistillation, and both were tested against eight bacteria species. Major component of these EOs was α-pinene.[136]
In vivo grown stocks ethanolic extract had antioxidant (ABTS, DPPH, CUPRAC methods) and antibacterial (against four bacteria and a fungal species) activities.[137]
Aerial parts EO (hydrodistillation) was active against *E. coli* and *S. aureus*, and γ-terpinene was its major component.[138]
Leaves EO (hydrodistillation) was active against *P. aeruginosa* and *B. subtilis*, and γ-terpinene was its major component.[139]
Hull EO (hydrodistillation) had anticancer (MCF-7 human cancer cells), antibacterial (against six species) and antioxidant (DPPH and β-carotene bleaching methods) activities. The major component of this EO was β-caryophyllene, 25.32%.[140]
Fruits were separately extracted with *n*-hexane, ethyl acetate, ethanol and methanol, and the general chemical compositions of the four extracts were determined. Extracts were tested for antioxidant (DPPH method) and antibacterial (against four species) activities.[141]
Gum EO (ultrasound-assisted hydrodistillation) was used to prepare a nanoemulsion that was active against ten bacterial strains. γ-Terpinene was the EO major component.[142]
Gum nanoparticles had activity against *P. aeruginosa* and *S. aureus* and β-TC3 cells. In both cases, the activities of the nanoparticles were higher than those of gum.[143]
Hull and kernels EOs were separately prepared by *n*-hexane extraction and were tested for antioxidant activity using peroxide value method. Chemical compositions were analyzed for fatty acids (seven in hull EO and eight in kernel EO) and tocopherol/tocotrienol (six in both, **Figure 3**).[144]
Fruits different parts were extracted with methanol and antioxidant activity (DPPH, FRAP, NO scavenging methods), TFC and TPC were determined.[145]
Fruits 60% aqueous ethanolic extract was used to prepare a nanoemulsion which extended shelf life of sunflower oil. The antioxidant (DPPH, FRAP methods) activity of this extract was determined.[146]
Aerial parts methanolic extract antioxidant activity was determined by TAC and FRAP methods.[147]
Fruits methanolic extract was fractionized with *n*-hexane, chloroform, ethyl acetate and *n*-butanol. TFC, TPC and antioxidant (TAC, lipid peroxidation inhibition methods) were

determined.[148]
Leaves 70% aqueous ethanolic extract had ameliorative effect of alkali-induced eye injury in rabbits. Effect was physically detected and by measurement of glutathione peroxidase and reduced glutathione concentrations.[149]
Fruits 70% aqueous ethanolic extract had antiparasitic activity against *Leishmania tropica* and *Leishmania major* in infected mice (*in vivo*) and against promastigotes (*in vitro*). Extract had cytotoxic activity against J774-A1 cells.[150]
Fruits 80% aqueous methanolic extract had activity against hydatid cysts protoscoleces. The toxicity of this extract was 2.8 g/kg in mice.[151]
Fruits major component was α-pinene.[152]
Fruits EO (*n*-hexane extraction) contained ten fatty acids.[153]
Growth under NaC*l* stress increased the production of the following triterpenoid acids in leaves, roots and shoots: ursonic, moronic, oleanonic, masticadienolic (**Figure 3**), oleanolic and ursolic.[154]
Seeds aqueous and methanolic extracts had cytotoxic activity against Rhabdomyosarcoma, AMN-3 and L20B cell lines. They also increased human blood lymphocyte proliferation (mitogenic activity).[155]
Leaves EO had insecticidal activity against *Agonoscena pistaciae*. The major components of this EO were (%): β-myrcene 18.7 (**Figure 2**), α-eudesmol 12.3, β-eudesmol 9.3, 1,7-di-epi-β-cedrene 7.3, bicyclogermacrene 5.6 and γ-eudesmol 4.9 (**Figure 3**).[156]
Leaves methanolic extract had insecticidal activity against *Tribolium confusum* and *Oryzaephilus surinamensis*. The major components of this extract were (%): 5-ethoxy-4-phenyl-2-isopropylphenol 29.02, phenyl ethyl alcohol 10.78, benzyl alcohol 7.8 and 1,2-benzenediol 6.67.[157]
Resin methanolic extract was cytotoxic to HUVEC and Y79 cells and had antiangiogenic effects against endothelial cells. α-Pinene was the major component of this extract. In this research, *P. vera* was also studied.[158]
Aerial parts ethanolic extract healing effect on skin incision of Achilles tendon in rabbits. Effect was physically observed and measured by oxidant/antioxidant biomarkers.[159]
a- In the names of two of these compounds it is indicated that the glucose epimer is β while the drawn structure is α.
b- Mistakenly written "δ-eudesmol".

Pistacia lentiscus

Leaves methanolic extract had high antioxidant activity measured by DPPH method. General chemical composition is presented.[22]
Leaves and stem 80% aqueous ethanolic extract had notable antioxidant activity tested by DPPH and β-carotene bleaching method. Leaves EO (hydrodistillation) was analyzed and the major components are shown in **Figure 4a**.[23]
Leaves ethanolic extract was fractionized with ethyl acetate and *n*-butanol. The crude extract was active against eight bacterial and six fungi species. Its antioxidant activity was tested by FRAP and superoxide radical scavenging methods. Extract and fractions were analyzed for chemical compositions resulting mainly known phenolic compounds.[127]
Leaves were extracted with 80% aqueous ethanol and extract was analyzed for TFC and TPC, and its antioxidant activity was determined with DPPH and FRAP methods. Its antifungal activity was tested against *P. digitatum*.[128]
Resin 60% aqueous methanolic extract had intracellular antioxidant glutathione (GSH) restoration activity in peripheral blood mononuclear cells that were exposed to oxidized low-density lipoprotein, that has atherogenic effect.[160]
Fruits and leaves EOs were separately prepared by hydrodistillation. Both EOs had anticancer (against RD and L20b cancer cells), antioxidant (ABTS, DPPH, FRAP

methods), antibacterial (against eight bacterial strains) and antiparasitic (against *Leishmania infantum*, *L. major*, *L. tropica*) activities. Major components of these EOs were (%): leaves, β-myrcene 33.46 and α-pinene 19.20; fruits, limonene 18.26 and α-pinene 20.46.[161]

Commercial aerial parts EO was analyzed and its major components were (%): β-myrcene 25.25 and α-pinene 18.64. It had anticancer (against CaCo-2, FTC-133, HeLa, HepG2, LNCaP, MDA-MB-231 and NCI-H1975 cell lines. AG-09429 were as control cells). Effect was measured by cell apoptosis and scavenging activity of ROS.[162]

Resin EO (hydrodistillation) contained α-pinene and β-myrcene as major ingredients. EO was more active against HT29 and Caco-2 cancer cells (*in vitro*) and against colon cancer (*in vivo*) in mice (oral administration).[163]

Gum supplementation to patients with diabetic gastroparesis resulted clear ameliorating effect, with levosulpiride as standard drug in the control group.[164]

Leaves 80% aqueous acetonic extract was analyzed for TFC, TPC and phenolic compounds, resulting catechin, gallic acid and quercetin 3-glucoside as major components. Extract had significant antioxidant activity measured with DPPH and β-carotene bleaching methods. A moderate α-amylase inhibition activity was recorded, compared with acarbose, gallic acid, catechin and quercetin.[165]

Fruits EO was analyzed for chemical composition resulting α-pinene and limonene as major components. Extract and both compounds had antioxidant (ABTS, DPPH, FRAP methos, with Trolox and ascorbic acid as references), antidiabetic (α-amylase and α-glucosidase inhibition with acarbose as a reference) and dermatoprotective (tyrosinase and elastase inhibition with quercetin as a reference) activities.[166]

Mature fruits EO was prepared by cold press, and it was analyzed for TFC, TPC and unsaponifiable (KOH/ethanol) fraction. Extract and fraction had antidiabetic (α-amylase and α-glucosidase inhibition with acarbose as a reference), neuroprotective (AChE and BuChE inhibition, with galantamine as a reference) and antioxidant (DPPH, CUPRAC methods, with BHA, BHT as references) activities.[167]

Fruits EO was prepared by cold press and it had antihyperlipidemic (egg yolk-fed *Oryctolagus cuniculus* rabbits) activity, measured by body weight and blood lipid biomarkers.[168]a

Resin dissolved in sesame oil had alleviating effect on acetic acid-induced colitis in rats. Effect was measured by several biomarkers, especially myeloperoxidase. Prednisolone was reference drug in this study.[169]

EO of young leaves and stems (hydrodistillation) was used to prepare a hydrosol, which was active against LPS- induced inflammation in human monocytes and U937 cells.[170]

Leaves were separately extracted with *n*-hexane, ethyl acetate, ethanol and water. These extracts were analyzed for TFC and TPC, and tested for antioxidant activity (DPPH, FRAP methods, ethanolic extract most active, BHA and ascorbic acid references) and anti-inflammatory activity (albumin denaturation method, voltarene reference, ethanolic extract most active).[171]

Fruits were extracted with a mixture of eleven solvents, including p-cymene, α-pinene, limonene; that are ingredients of the of the resulting oil. The resulting oil had high anti-inflammatory activity measured by inhibition of NO production in RAW 264.7 microphages.[172]

Leaves 80% aqueous methanolic extract was prepared and analyzed for TFC and TPC. It had anti-inflammatory activity tested with three methods: croton oil-induced ear edema in mice, acetic acid-induced vascular permeability in mice and carrageenan-induced pleurisy in rats. Extract immunomodulatory effect was tested in human neutrophils.[173]

Gum EO (hydrodistillation) was active against *P. fragi*, *S. enteritidis*, *S. aureus* and *L.*

plantarum.[174]
Leaves EO (hydrodistillation) and aqueous extract were active against nine bacteria and three fungi species: moderate against bacteria and weak against fungi.[175]
Fruits EO (cold press) was active against four *Streptococcus* species.[176]
EO was obtained by heating fresh fruits paste, and it was tested against six bacteria and four fungi species.[177]
Fruits and leaves were separately extracted with water and ethanol, and the four extracts had high activity against *E. coli*, *S. aureus* and *K. pneumoniae*.[178]b
Resin 96% aqueous ethanolic extract had activity against *S. aureus* and *E. coli*.[179]
Several formulation that contained gum and amoxicillin (standard antibiotic) were tested for swelling index and kinetics of active components release.[180]
Leaves and stems were extracted with 80% aqueous ethanol, and extract was fractionized with petroleum ether, chloroform, ethyl acetate, *n*-butanol and water. Extract and fractions had antimicrobial (four bacteria and two fungi species) and antioxidant (DPPH method) activities. General chemical composition was determined for each material.[181]
Leaves, resin and twigs EOs (steam distillation) were active against six bacteria and three fungi species. EOs were analyzed for chemical compositions, and the major components were β-myrcene and germacrene D (leaves, twigs), α-pinene and β-myrcene (resin).[182]
Gum EO was obtained by reduced pressure distillation starting from 20 °C and reaching 140 °C, obtaining four more fractions. Gum, EO, fractions and twelve of major gum components were tested for antibacterial activity against *E. coli*, *S. aureus* and *B. subtilis*. Chemical composition of gum, EO and fractions was analyzed and the results were (%): gum, α-pinene 40.9, *Z*,*Z*-farnesol 11.9 (**Figure 4a**); EO, α-pinene 63.3, β-myrcene 25.0; fraction1, α-pinene 66.3, β-myrcene 13.1; fraction2, α-pinene 52.6, β-myrcene 21.6; fraction3, *trans*-verbenol 9.6 (**Figure 4a**), β-myrcene 7.8; fraction4, β-myrcene 17.0, *trans*-verbenol 10.4.[183]
Leaves EO (hydrodistillation) was active against *K. pneumonia* and *P. aeruginosa*, and its major components (**Figure 4a**) were (%): germanicol 12.8, thunbergol 8.8.[184]
Commercial gum EO had activity against eight bacteria and two fungi species. The major components of this EO were α-pinene and β-myrcene.[185]
Commercial gum was analyzed to obtain 24*Z*-isomasticadienolic acid, oleanolic acid and oleanonic aldehyde (**Figure 4a**). These compounds were active against eleven bacterial species.[186]
Fresh ripe fruits EO (hydrodistillation) was active against three bacteria and two fungi species. The major components of this EO were (%): α-terpineol 23.78 and 2-undecanone 11.72.[187]
Gum EO (hydrodistillation) was active against five fungal and three bacterial species. Analysis of EOs from differently aged gums resulted different chemical compositions, but in average, major components were α-pinene and β-myrcene.[188]
Aerial parts EO (hydrodistillation) was active against *E. faecium*, *B. subtilis*, *S. aureus*, *E. coli*, *Y. enterocolitica* and *P. aeruginosa*. Major components (**Figure 4a**) of this EO were (%): linalool formate 28.86 and α-longipinene 16.13.[189]
Encapsulated resin EO (hydrodistillation) was active against *S. aureus*, *E. coli* and *P. aeruginosa*. Major components of this EO were α-pinene and β-myrcene.[190]
Leaves 85% aqueous methanolic extract was analyzed for TFC and TPC. It was fractionated with *n*-hexane, chloroform and ethyl acetate. The extract and fractions were tested for antioxidant activity with DPPH, hydroxyl scavenging, FRAP, β-carotene bleaching and FTC methods. BHT was reference in these tests.[191]
Aerial parts were separately extracted with diethyl ether, dichloromethane, ethyl acetate, methanol and water. Extracts were analyzed for phenolics families and tested for

antioxidant activity with DPPH and FRAP methods.[192]

EO was obtained from fruits powder with hot water extraction and had anti-bleomycin-induced lung fibrosis in rats. Activity was measured by physical parameters (body weight) and oxidant/antioxidant biomarkers (superoxide dismutase and catalase). The major components of this EO were (%): linoleic 70.6 and palmitic 24.7, acids.[193]

Shoots were separately extracted with ethyl acetate and water and the general compositions of extract were determined. The presence of cortisone (**Figure 4a**) is reported.[194]

Leaves EO was obtained by extraction with petroleum ether, and separately, methanolic extracts of fruits and leaves were prepared. EO and extracts were analyzed for TFC, TPC, anthocyanins, and were tested for antioxidant activity with DPPH, hydroxyl radical scavenging and FRAP methods. Procyanidin A2 (dimer) (**Figure 4b**) was detected in aqueous extract.[195]

Leaves from four locations (Morocco) were extracted with 80% aqueous methanol and TFC, TPC, condensed tannins and ascorbic acid contents were determined. Antioxidant activity of the extracts was determined with DPPH and TAC methods.[196]

Leaves ethanolic extract enhanced milk constituents in bovine mammary epithelial cells by modulation of their oxidative status.[197]

Gum and leaves were separately extracted with acetone, ethanol and methanol (6 extracts). Extracts cytotoxic activity was tested against CCD-34 LU, HEK293, HeLa, HepG2, MDA-MB-231, PANC-1, PC-3, A549, RAW 264.7 cell lines; and their antiviral activity was tested against bronchitis virus strain D274. The phenolic and fatty acid compositions of extracts were determined.[198]c

Aerial parts from three different locations (Morocco) were harvested at seven consecutive month (December-June) and their EOs (hydrodistillation) were prepared. All 21 EOs were analyzed revealing significant differences in their chemical compositions, but the major components were as shown in **Figure 4a**, by N. Souilah ahc (Ref. 23).[199]

Leaves EO (hydrodistillation) analysis resulted close results to those of previous study, from one location.[200]

Leaves EO (hydrodistillation) from two locations in Spain. Results are close to N. Souilah ahc (Ref. 23). Interesting table of comparison between many EOs compositions from different countries is presented.[201]

Seeds EO (*n*-hexane extraction) from high locations in Morocco. Fatty acids composition is presented.[202]

After heat extraction of leaves EO, the remaining powder was used as biosorbent for removal of rhodamine B and ethyl violet from their aqueous solutions. Kinetics of decolorization is reported.[203]

Leaves methanolic extract was fractionized with ethyl acetate and water, their TFC and TPC were determined. The antioxidant activity of the three materials was tested with DPPH and FRAP methods, with ascorbic acid as reference. Ethyl acetate fraction was used to prepare a dermatoprotective cream (5%, transdermal diffusion test). Same extract and its major components were tested for tyrosinase, elastase and B16 cells inhibition. Twenty-six known phenolics were isolated from ethyl acetate extract along with other compounds like lupeol and loliolide (**Figure 4b**).[204]

Leaves were extracted with supercritical-CO_2 and EO had ameliorative effect in carotid arteries in rats. The major components of this EO were (%): α-pinene 6.3, germacrene D 19.9, β-caryophyllene 6.6 (**Figure 4a**), γ-cadinene 8.7, sabinene 5.8 (**Figure 4b**).[205]

Fresh fruits paste was mixed with cold water and the floated oil was mechanically decanted. This EO was supplemented to mice for five days and testing the physical situation of the animals, as well as ten biomarkers, indicated that this EO is safe. Authors

suggest that treatments that include this EO in combination with other drugs should be examined carefully.[206]
Comprehensive analysis of leaves to the level of trace elements showed that use of these leaves for medicinal plants in traditional style is safe.[207]
Fruits EO was isolated from paste mixture with cold water and was analyzed for fatty acids composition, resulting the presence of five free acids. EO was safe to normal human dermal fibroblasts. EO contained five fatty salicylic acid derivatives (**Figure 4b**).[208]
Fruits EO was obtained by cold press and it was used to prepare and ointment that treated mechanical skin wounds in guinea pigs. Healing was tested by physical contraction of wounds and hematoxylin and eosin staining of granulation tissue.[209]
a- This article title includes a mistake: "Effets" (French) instead of "Effects" (English).
b- This article includes several notable mistakes. For example, in "preparation of the extracts" section it is written "planet material" instead of "plant material". And more important, in the "test organisms" section, two out of three names are mistaken: *E. coli, S. aereus* (*aureus*) and *Klebsilla* (*Klebsiella*) *pneumoniae*.
c- In table 1 in this article, "Phenolic and flavonoid content of different *P. lentiscus* leaves (mg kg−1 extract) from trees of different ages" is presented. Reading the table reveals that the compound with highest concentration is fumaric acid, which is not phenolic or flavonoid.

Pistacia palaestina

Comprehensive analysis of leaves to the level of trace elements showed that use of these leaves for medicinal plants in traditional style is safe.[207]
Resin extract caused apoptosis of MDA-MB-231 breast cancer cells with a dose of (IC_{50}) of 56.54 µg/mL.[210]
Seeds EO (hydrodistillation) was active against human leukemic K562 cells.[211]
Fruits EO (hydrodistillation) had activity against HCT116 cancer cells. The major components of this EO were (%):sabinene 29.8, α-pinene 19.8, β-pinene 13.1, α-terpineol 10.3.[212]
Fresh unripe fruits EO (hydrodistillation) was active against A549 cell lines. The major components of this EO were stearic acid (*n*-$C_{17}H_{35}CO_2H$) 21.86% and isopropyl palmitate (*n*-$C_{15}H_{31}CO_2CH(CH_3)_2$) 13.47%.[213]
Galls were successively extracted with methanol, dichloromethane and ethyl acetate. These extracts were analyzed for chemical compositions affording three compounds: masticadienolic acid (**Figure 3**, ref. 154), masticadienonic acid and morolic acid, (**Figure 5**). These compounds had anti-inflammatory activity, where inflammation was induced in rats with for methods.[214]
Leaves were separately extracted with ethyl acetate, methanol and water, and the extracts had weak activity against six bacteria and two fungi species.[215]
Methanolic extract of leaves, seeds and stems were used to prepare chitosan films for active packaging. These films had antioxidant (DPPH method), antibacterial (nine species) and anti-quorum sensing (*Chromobacterium violaceum*) activities. Extracts were analyzed for phenolics resulting 12 in leaves extract, 8 in seeds extract and 7 in stem extract.[216]
EOs (hydrodistillation) of ripe and unripe fruits, and methanolic extracts were prepared. The four materials were analyzed for ascorbic acid content, TFC, TPC and tested for α-glucosidase inhibition activity. Antioxidant activity was tested with ABTS, DPPH, FRAP and TAC methods; and antibacterial activity was tested against 13 bacteria species. Major phenolic components of these fruits methanolic extracts were syringic acid and rutin; while major components of EOs were α-pinene and α-terpinolene (unripe) and α-pinene, α-terpinolene and *cis*-β-ocimene (**Figure 5**) (ripe).[217]

EOs (hydrodistillation) of fruits, fruit pedicels, galls and leaves were prepared from plants in three different locations in Kosovo. These EOs were tested against *S. aureus* (galls most active), with tea tree oil and two standard antibiotics as references. The major components of these EOs were (average, %): α-pinene 39.4, D-limonene 30.1, *cis*-β-ocimene 21.3 and β-pinene 11.6.[218]

Aerial parts aqueous extract had activity against hydrogen peroxide-induced in rats. Effect was measured with TBARS method, amount of glutathione in tissues (seven organs), glutathione peroxidase enzyme activity and superoxide dismutase.[219]

Leaves 96% aqueous ethanolic extract was analyzed for TFC and TPC, and tested for antioxidant activity with ABTS, CUPRAC, DPPH and FRAP methods. Qualitative phenolics composition is presented.[220]

Fruits methanolic extract was tested for antioxidant activity (DPPH, FRAP methods) and analyzed for TPC.[221]

Fruits EO (petroleum ether extraction) and methanolic extract of the remaining powder were prepared. Extract was analyzed for TFC, TPC and tocopherols content, and its antioxidant activity was tested with DPPH method. The analysis of the EO composition resulted eleven fatty acids and eleven phytosterols, where β-sitosterol had highest concentration (85.6%), followed by campesterol (4.47%, **Figure 5**).[222]

Leaves methanolic and ethyl acetate extracts were prepared, analyzed for TPC and tested for antioxidant (ABTS, CUPRAC, DPPH, FRAP methods) and for enzyme inhibition (α-amylase, α-glucosidase, AChE, BuChE and tyrosinase) activities. Detailed qualitative phenolic compositions are presented.[223]

Resin was tested for antioxidant activity (DPPH) and had preservative effect on wine.[224]

Fresh fruits and leaves were separately extracted with 60% aqueous methanol and water (four extracts), and hydro-methanolic extract was analyzed for TFC, TPC, qualitative phenolic composition, and tested for antioxidant activity with DPPH method. It was used to prepare an ointment (5%) had healing effect of mechanical wounds in rats skin. Effect was measured by wound contraction.[225]

Fruits and leaves were extracted with 80% aqueous methanol and they were used to treat isoproterenol-induced cardiac ischemia in rats. Positive effect was measured by five tests: catalase, glutathione peroxidase, glutathione, superoxide dismutase and TBARS.[226]

EOs (hydrodistillation) were prepared from young shoots, flowers, unripe and ripe fruits, and their chemical compositions were analyzed. Notable differences were detected. For example, *p*-cymene was found only in young shoots (27.3%) while α-cadinol was present only in flowers (2.7%), see **Figure 5**. In addition, almost all compounds concentrations varied according to plant part. For example, the concentrations of D-limonene were (%): 3.0 young shoots, 9.4 flowers, 34.2 unripe fruits and 32.8 in ripe fruits.[227]

In principle, this study is similar to the previous research, where EOs (hydrodistillation) were obtained from leaves, galls, unripe and ripe fruits. Similar notable differences were detected in components content and concentrations. For example, the concentrations (%) of α-pinene were: 63.1, 49.4, 5.3 and 6.5, respectively.[228]

Fruits nutritional values were determined and EO (hydrodistillation) was analyzed for fatty acids (ten). Its physiochemical properties are also reported: relative density, refractive index, acidity, peroxide value, saponification number, unsaponifiable matter, carotenoid content and iodine value.[229]

Similar research to previous two studies with the following differences: leaves, fruits and fruitful twigs were the used plant parts, research was done using trees in Sardinia. For example, the concentrations (%) of α-pinene were: 16.4, 66.0 and 54.8, respectively.[230]

Follow up to studies cited in references 227 and 229, with more details and plants harvested in fourteen/fifteen locations.[231,232]

Seeds were separately extracted with *n*-hexane, *n*-heptane, petroleum ether and carbon tetrachloride. Nutritional values and fatty compositions of extracts were determined.[233]
Commercial EO had alleviative effect in female rats with ovarian ischemia and reperfusion injury.[234]
Seeds powder was included (10-50 g/kg) in laying hens diet resulting improvement of the quality of eggs: weight, shell breaking strength, egg protein and yolk color.[235,236]
Unroasted and/or roasted (different temperatures) fruits were included in cookies/noodles resulting improvement of their physical (sensory, color and others) and nutritional (total dietary fiber, phytic acid and others) properties. Cookies/noodles antioxidant activity was tested with DPPH method.[237,238]
Roasted fruits were used to prepare "coffee" Middle-Eastern style (boiling plant powder, stable sugar and water), and it had healing effect in thioacetamide-induced liver injury in rats. Effect was measured with several biomarkers concentrations such as transforming growth factor beta (TGF-β), nuclear factor kappa B (NF)-κB and tumor necrosis factor alpha (TNF-α).[239]
Fruits isopropyl alcohol extract had ameliorative effect against DMBA-induced [a] liver/brain cancer in rats. Positive effect was measured by several biomarkers such as superoxide dismutase, malondialdehyde, glutathione S-transferase and lipid peroxidation (TBARS method).[240,241]
a- DMBA 7,12-dimethylbenz[a]anthracene

Rhus coriaria

Fruits volatiles were obtained from fruits by micro-extraction, and the major components were (%): α-pinene 16.3, limonene 11.5, β-caryophyllene 15.4 (**Figure 4a**) and 3,7-dimethyl-1,3,6-octatriene 12.3 (**Figure 6**).[34]
Leaves were extracted with 80% aqueous ethanol and extract was analyzed for TFC and TPC, and its antioxidant activity was determined with DPPH and FRAP methods. Its antifungal activity was tested against *P. digitatum*.[128]
Resin methanolic extract was cytotoxic to HUVEC and Y79 cells and had antiangiogenic effects against endothelial cells. α-Pinene was the major component of this extract.[158]
Fruits isopropyl alcohol extract had ameliorative effect against DMBA-induced liver cancer in rats. Positive effect was measured by several biomarkers such as superoxide dismutase, malondialdehyde, glutathione S-transferase and lipid peroxidation (TBARS method).[240,241]
Unripe fruits 70% acetonic and 80% methanolic extracts were prepared and tested for anti-angiogenic effect with chorioallantoic membrane assay, with thalidomide as a reference. Acetonic extract was active individually and had a very strong synergetic effect with tannic acid (**Figure 6**), a natural product found in *Rhus* genus plants.[242]
Fruits 70% aqueous ethanolic extract was active against MCF-7, PC-3 and SKOV3 cancer cell lines, with clioquinol and acetazolamide as references. Partial qualitative chemical composition of the extract is presented.[243]
Fruits aqueous and ethanolic extracts were separately tested for anticancer (against MCF-7 and HT-29 cancer cell lines with 5-fluorouracil as a standard), antidiabetic (inhibition of α-amylase and α-glucosidase) and anticholinergic (AChE and BuChE inhibition) activities. Phenolic compositions of both extracts are presented.[244]
Commercial fruits powder (sumac) was extracted with 70% aqueous ethanol inhibited uterus cervix cancer cells migration, and had wound healing activity, tested with HeLa cells. Partial qualitative chemical composition of the extract is presented.[245]
Fruits 80% aqueous methanolic extract was analyzed for TPC and was not used for other purpose. Fruits powder was added to broilers diet resulting decrease of blood glucose and lipids but increased abdominal fat.[246]

Fruits powder (sumac) was supplemented to human diabetics resulting decrease of blood glucose and improvement of other biomarkers. In addition, TAC of patients blood increased from 2.45 to 3.30 μmol/L.[247]

Sumac aqueous extract had blood glucose lowering effect in alloxan-induced diabetic rats, and increasing antioxidant activity, measured with malondialdehyde concentration.[248]

Sumac 80% aqueous ethanolic extract had lipid lowering effect in high fat-fed rats. Examining heart tissue and injury biomarkers (serum aspartate aminotransferase and alanine aminotransferase) in liver, showed no adverse effects.[249]

Fruits 50% aqueous ethanolic, ethanolic and aqueous extracts were prepared and tested against TNF-α-induced inflammation in HaCat cells. Activity was measured with four biomarkers.[250]

A follow-up of previous research. Fruits were separately extracted with water, ethanol, 50% aqueous ethanol, acetone and ethyl acetate, and the TPC of each extract was determined. Extracts were tested for anti-inflammatory activity in *Helicobacter pylori* gastric epithelial cells.[251]

Aqueous extracts of ripe and unripe fruits had activity against twelve bacteria species.[252]

Fruits were separately extracted with 80% aqueous ethanol and 80% aqueous methanol. These extracts were active against *S. aureus*, *P. aeruginosa*, *E. coli*, *P. vulgaris*, *K. pneumoniae* and *B. subtilis*, with tetracycline as a reference.[253]

Sumac aqueous extract was added to ground sheep meat. It was active against *Listeria monocytogenes*, significantly reduced lipid peroxidation (TBARS) and controlled metmyoglobin formation.[254]

Sumac was successively extracted with *n*-hexane, chloroform, ethyl acetate, *n*-butanol, ethanol and water. These extracts were active against *Staphylococcus aureus*. in various concentrations.[255]

Sumac 80% aqueous ethanolic extract was active against *E. coli*.[256]

Sumac aqueous and ethanolic extracts were active against *S. aureus*, *E. faecalis*, *A. baumannii*, and *P. aeruginosa*. General chemical compositions are presented.[257]

Sumac (powder) was active against three bacteria species in fish aquariums.[258]

Sumac (from 22 locations) aqueous extract had activity against six bacteria species. It was analyzed for TFC and TPC, and its antioxidant activity was tested with DPPH method.[259]

Fruits were extracted with several solvents but only methanolic extract was used for antibacterial (six strains) and antioxidant (DPPH, β-carotene bleaching methods). Other extracts were used to determine general chemical composition.[260]

Fruits ethanolic extract had antibacterial (*S. aureus*, *B. cereus*, *E. coli* and *S. enteric*) and antioxidant (DPPH, method) activities. The major component (39.7%) of this extract was malic acid.[261]

Fruits EOs (hydrodistillation) from eight sources were tested for antibacterial (*S. aureus*, *E. coli*) and antioxidant (DPPH, β-carotene bleaching methods). In average, the major component of these EOs was β-caryophyllene.[262]

Fruits 80% aqueous and pure ethanolic extracts were tested against fourteen bacterial and fungal species, and their antioxidant activity was tested with DPPH method. In average, the major component of these extracts was fumaric acid.[263]

Fruits EO (hydrodistillation) and methanolic extract (ultrasonic-assisted) were prepared. Major component of EO was β-caryophyllene, while gallic acid was the major component of methanolic extract. Antioxidant activity of methanolic extract was determined with ABTS, DPPH and FRAP methods, its antimicrobial (ten bacteria and three fungi species) and its α-glucosidase inhibition activity were also reported.[264]

Fruits from five locations (Iraq) were analyzed for TPC and nutritional composition. Their EOs (steam distillation) were tested for antioxidant (DPPH method) and antibacterial (*E.*

coli) activities. In average, the major components of these EOs were *Z*,*E*-2,13-octadecadien, caryophyllene oxide, 2,4-decadienal, *E*-caryophyllene and nonanoic acid.[265]

Fruits were separately extracted with *n*-hexane, dichloromethane (DCM), 70% aqueous methanol and water. Extracts were tested for enzyme inhibition (AChE, BuChE, DCM extract inactive), antioxidant (DPPH method) and antimicrobial (*E. coli*, *S. aureus*, *P. aeruginosa* and *C. albicans*) activities.[266]

Fruits aqueous extract was prepared and analyzed for general chemical composition, total anthocyanin content and TPC. It was tested for antibacterial (six strains), wound healing (mechanical cut of rats skin, measured by wound contraction and histochemical biomarkers), and antioxidant (myeloperoxidase concentrations) activities.[267]

Fruits 80% aqueous methanolic extract had antibacterial (eight species), antiparasitic (*L. major*, amastigotes and promastigotes). TPC and tannins content are reported.[268]

Seeds 95% aqueous ethanolic extract was analyzed affording four new compounds (**Figure 6**). These compounds were tested against three fungi species (*A. flavus*, *C. albicans* and *P. citrinum*) resulting no to significant activity.[269]

Fruits were separately extracted with acetone, ethanol, methanol and water. These extracts were active against two bacteria species: *Pseudomonas syringae* and *Ralstonia solanacearum*. Aqueous extract was analyzed for active components and eight of these were tested for the same activity, revealing 2,5-furandione as most active followed by malic acid, then coumalic acid (**Figure 6**).[270]

Fruits methanolic extract and its major component methyl gallate (**Figure 2**) were active against *S. mutans*.[271]

Fruits EO (hydrodistillation) was active against *E. coli*, *P. aeruginosa*, *S. aureus* and *B. subtilis*. The major components of this EO were (%): β-caryophyllene 34.3 and cembrene 23.8 (**Figure 6**).[272]

Leaves 60% aqueous ethanolic extract was active against *B. subtilis*, *E. coli*, *K. pneumoniae*, *S. aureus* and *P. aeruginosa*. Nine phenolics were isolated from this extract and characterized, including theaflavin and baccatune (**Figure 6**).[273]a

Sumac was supplemented to overweight volunteers resulting weight loss and insulin resistance lowering.[275]

Sumac was defatted with petroleum ether then extracted with 80% aqueous methanol, then fractionated with *n*-hexane, ethyl acetate and water. Extract and fractions were analyzed for TPC, and their antioxidant activities were tested with DPPH, sunflower oil oxidation and β-carotene bleaching methods. BHA and BHT were references.[276]

Fruits 70% aqueous ethanolic extract was prepared and fractionized with *n*-hexane, dichloromethane and ethyl acetate. Extract and fractions were tested for antioxidant activities with DPPH, H_2O_2 (ROS against zebrafish embryos) and β-carotene bleaching methods. Crude extract and ethyl acetate fraction were most active.[277]

Fruits from fifteen genotypes were extracted with methanol and extracts were analyzed for general chemical compositions, TPC, total anthocyanin and tested for TAC. Analysis for organic acids resulted pentadecanoic and 9-octadecenoic acids as major components, and analysis for terpenes resulted β-caryophyllene and cembrene.[278]

Fruits were extracted with water in three different temperature and 50% aqueous ethanol. Extracts were analyzed for TFC, TPC, total anthocyanin content and tested for antioxidant activity with DPPH method. Analysis of extract showed that in average, gallic acid was the major component.[279]

Fruit powder inclusion in food of heat-stressed broilers had ameliorative effect, improved meat quality and increased meat antioxidant capacity (TBRAS method).[280]

Fruits 50% aqueous ethanolic extract was loaded into nanosheets that had wound healing

(deceasing wound closure time) and protection through antioxidant activity. The chemical composition of the extract included mainly organic acids and phenolics, where one of them was afzelin (**Figure 6**).[281]
Fruits powder supplementation (25 mg/d, 56 days) reduced blood pressure in patients with hypertension.[282]
Fruits 70% aqueous ethanolic extract had dose-dependent vasorelaxation activity on rat isolated aorta. A detailed mechanism of action is proposed.[283]b
Inclusion of fruits/seed powder in chicken/Fish diet improved their immune system, growth and egg/meat quality.[284-287]
Inclusion of seeds powder and exogenous fibrolytic enzymes, separately or combinedly (more active), increased wool length of male lambs.[288]
Adding fruits aqueous extract and lactic acid to commercial chicken wings increased their shelf life (storage time).[289]
Fruits aqueous extract had softening effect in cooked cattle chest meat.[290]
Inclusion of fruits powder in wheat bread improved its physical properties, antioxidant capacity (tested with DPPH method), and decreased salt amount needed to produce the same taste for humans.[291]
Fruits powder inclusion in stored fish meat extended its shelf life, physical properties and antioxidant activity (TBRAS method).[292]
Fruits 70% aqueous ethanolic extract supplemented to healthy mice had positive effect on their general health: body weight, blood sugar, blood lipids and blood triglycerides.[293]
Fruits powder supplementation to patients with non-alcoholic liver disease had positive effect on liver fibrosis, liver enzymes functioning, blood sugar, serum insulin and several other biomarkers.[294]
Fruits 70% aqueous methanolic extract was toxic to rabbits only in high dose of 5 g/kg. It had antidiarrheal effect against castor oil-induced fluid accumulation and diarrhea. In isolated jejunum, extract had relaxation effect of spontaneous and high K^+-induced contractions, with verapamil as a reference drug.[295]
Fruits 80% aqueous methanolic extract had analgesic effect in rats in three pain models (writhing test, tail flick test and formalin test). Aspirin and morphine were references.[296]
Fruits ethanolic extract had healing effect of wounds (mechanical cut) of rats. Effect was measured by wound contraction and biomarkers such as hydroxyproline and nitric oxide concentrations.[297]
a- The presented structure of theaflavin in the article of G. Joseph *et al*.[273] is incorrect, and the accurate name of "baccatune" is "baccatune A", according to the cited reference in the same article, namely T. Li *et al*.[274] in our article.
b- In the "Collection and Preparation of an Ethanolic Extract of *Rhus coriaria* Fruits" section of this article, it is said "The fruits of RC (Figure 1) were harvested …". But viewing Figure 1 reveals that it does not include a photo of these fruits, and it does include four graphs.

Rhus tripartite

Leaves were extracted with 80% aqueous ethanol and extract was analyzed for TFC and TPC, and its antioxidant activity was determined with DPPH and FRAP methods. Its antifungal activity was tested against *P. digitatum*.[128]
Leaves extract had allelopathic activity against several plants species.[298]
Leaves 70% aqueous acetone and 70% aqueous methanol extracts were prepared, and the second was fractionized with 50% aqueous *n*-butanol to obtain saponin-rich extract. Both extracts (acetonic and saponin-rich) had apoptotic effect in THP-1 cells.[299]
Roots 50% aqueous methanolic extract was active against castor oil-induced diarrhea in rats, and against diarrhea-causing bacteria (*S. aureus*, *E. coli*, *S. typhimurium*).[300]

Aerial parts were separately extracted with 70% aqueous acetone, 70% aqueous methanol and 70% aqueous ethanol. The following properties were determined using one or more of these extracts: analysis for TFC, TPC and general chemical compositions; antioxidant activity (DPPH, FRAP methods); antiproliferative activity (against CaCo-2, K-562 cells); anti-inflammatory activity (albumin denaturation method) and AChE inhibition. The major component of the aqueous-acetonic extract was rutin.[301]

Leaves, roots and stems were separately extracted with 50% aqueous methanol. The extracts were tested for antioxidant (ABTS, DPPH, FRAP, TAC methods), antimicrobial (five bacteria and two fungi species) and anti-inflammatory (carrageenan-induced paw edema in rats) activities. TFC, TPC and total anthocyanins content were determined.[302]

Leaves methanolic extract had activity against propylparaben-induced reproductive toxicity in male rats. Activity was measured by four antioxidant and two anti-inflammatory biomarkers.[303]

Leaves were separately extracted with *n*-hexane, chloroform, ethanol, methanol and water. Extracts were tested against twelve bacteria species where activity ranged from moderate to strong.[304]

Leaves 70% aqueous ethanolic extract was prepared and fractionated with ethyl acetate, *n*-butanol and water. Ethyl acetate was analyzed for chemical composition resulting several known saponins and phenolics. The crude extract was tested for antioxidant (DPPH method), antimalarial (against *Plasmodium falciparum*, with chloroquine as a reference) and antibacterial (against *S. aureus*) activities.[305]

Aerial parts were separately extracted (ultrasound-assisted) with 95% aqueous ethanol and chloroform. Extracts were tested for antioxidant (DPPH, β-carotene bleaching methods) resulting higher activity of hydroethanolic extract. Analysis of this extract obtained sakuranetin (**Figure 7**) as a major component. *Rhus retinorrhoea* which is not native to the reviewed region was also studied in this research.[306]

EOs (hydrodistillation) of aerial parts from seven locations (Algeria) were tested against five bacteria species. Analysis of these EOs revealed that in average, α-pinene was the major component.[307]

Stems 80% aqueous methanolic extract was prepared and fractionized with ethyl acetate, dichloromethane and *n*-butanol. The crude extract had protective activity against isoproterenol-induced cardiotoxicity in rats. Activity was observed by measurements of oxidative/antioxidative biomarkers. Analysis of the crude extract resulted in isolation of several known compounds, including 3′,8-binaringenin (**Figure 7**) that was isolated from this plant for the first time.[308]

Fruits were defatted with petroleum ether, then extracted with 70% aqueous ethanol and extract was fractionized with ethyl acetate. The remaining phase was considered aqueous extract. Extracts were analyzed for TFC, TPC, total tannins and tested for antioxidant activity (DPPH, FRAP, TAC methods). Qualitative phenolics composition of the hydroethanolic is presented.[309]

Aerial parts 70% aqueous methanolic extract was prepared and fractionated with ethyl acetate, *n*-butanol and water. Extract and fractions were analyzed for TFC, TPC and tannins content and were tested for antioxidant activity with ABTS, FRAP and DPPH methods. The crude extract was analyzed for phenolic composition resulting know compounds: myricetin-3-*O*-glucoside, myricetin-3-*O*-rhamnoside, quercetin-3-*O*-glucoside and quercetin-3-*O*-rhamnoside.[310]

Fruits and leaves were separately and successively extracted with petroleum ether, ethyl acetate, acetone and water; and their EOs were prepared by hydrodistillation. Extracts were analyzed for TFC, TPC and tannins contentment, and their antioxidant activity was tested with FRAP, DPPH and β-carotene bleaching methods. Analysis of extracts for

phenolics resulted known compounds (rutin as major in leaves and apigenin in fruits), and for fatty acids resulted seventeen in fruits and fourteen in leaves. For EOs, the major component of leaves was α-pinene (22.5%) and of fruits was (δ)-3-carene (18.1%, **Figure 7**).[311]

Stem bark 80% aqueous ethanolic extract was prepared and fractionized with ethyl acetate. Analysis of extracts for phenolics resulted in isolation of two active compounds (3,5,13,14-flavantetrol-catechin and epicatechin-3-*O*-rhamnoside)[a] that had HepG2 cells growth promotion and anti-hepatitis B virus activity.[312]

Stem bark neutral, basic and acidic aqueous extract were used to produces dyes for textile. The effect of various factors such as temperature, time and pH, was studied.[313]

Leaves general chemical composition is presented.[314]

Roots methanolic extract major components were 9Z,12Z-octadecadienoyl chloride and 9E,12E-octadecadienoyl chloride, each 46.89% (**Figure 7**).[315]b

Stem bark 80% aqueous methanolic extract was prepared and fractionized with water, dichloromethane, ethyl acetate and *n*-butanol. Crude extract was analyzed affording ten phenolics, one of them was novel, rhuspartin (**Figure 7**), and both materials had cytoprotective effect against methylglyoxal-induced endothelial cell apoptosis and were tested for antioxidant activity with DPPH method.[316]c

Stems 80% aqueous methanolic extract was prepared and fractionized with water, dichloromethane, ethyl acetate and *n*-butanol. Crude extract was analyzed resulting five active compounds where two of them were epicatechin and taxifolin (**Figure 7**). Extract, fractions and both compounds were tested for enzyme inhibition (cyclooxygenase, AChE) and antioxidant (NO radical scavenging, DPPH method, superoxide anion scavenging, TAC method, ascorbic acid and BHT were references) activities.[317]

Stems 50% aqueous methanolic extract was analyzed for TFC, TPC and anthocyanin content. It had ameliorating effect in ethanol-induced gastric ulcer in rats. Ranitidine was reference in this research.[318]

Fruits, leaves and stem bark (7 locations in Tunisia) were separately extracted with methanol, and extracts were analyzed for TFC and TPC. They were tested for antioxidant activity with DPPH and FRAP methods.[319]

a- In this article, it is written in the title that these two compounds are novel. This is incorrect. These compounds were previously reported several times and even from the same plant. See an earlier publication by the same group[316], and even there, they did not present them as new compounds.

b- In this article, chloroform was reported as one of the components of roots methanolic extract. To the best of our search efforts, we found no confirmation to this reporting in this plant or in any other plant of this family presented in our review article.

c- A mistake in the title “methylgloxal” instead of methylglyoxal.

Schinus terebinthifolius

Leaves aqueous extract had allelopathic effect on *Bidens alba* and *Rivina humilis*.[320]

Fruits, crushed or intact, had allelopathic effect on *Rhizophora mangle* and *Avicennia germinans*; *Sphaeroma quadridentata*, *Artemia salina*, *Ilyanassa obsoleta* and *Petrolisthes armatus* (very weak effect).[321,322]

Intact seeds had allelopathic effect on seed germination of *Pinus palustris*, *Pinus elliotii* and *Quercus virginiana*.[323]

Leaves 95% aqueous methanolic extract was analyzed for TFC and TPC and had activity against methyl methanesulfonate-induced DNA damages in in *Allium cepa* (onion) cells and in mice.[324]

Fruits EO (steam distillation) was tested for anticancer (MCF-7 cell lines) and antioxidant (ABTS, DPPH methods) activities. It was analyzed for chemical composition and the

major compounds were (%): *α*-phellandrene 35.16, *β*-phellandrene 10.81 (**Figure 8**) and *γ*-cadinene 18.26. In this research *Schinus molle* which is not native to the reviewed region, was also studied.[325]

Leaves ethyl acetate extract was analyzed for TPC and qualitative chemical composition. Its antioxidant activity was tested with DPPH and lipoperoxidation methods and it was tested for cytotoxicity in L929 fibroblasts. The anti-inflammatory activity was tested with 12-O-tetradecanoylforbolacetate-induced ear edema in mice, and with myeloperoxidase activity assay.[326]

Stem ethanolic extract was active against *C. tropicalis* with nystatin as a reference.[327]

Leaves lectin had activity against five bacteria and a fungal species. It was tested for carbohydrate-binding property (haemagglutinating activity) in glutaraldehyde-fixed rabbit erythrocytes.[328]

A follow up of the research cited in ref. 327, but in this the kinetics of the activity against *C. albicans* was studied.[329]

Stem 80% aqueous methanolic extract was active against *B. subtilis*, *E. coli*, *E. amylovora*, *R. solanacearum* and *P. carotovorum*.[330]

Leaves were separately extracted with *n*-hexane, toluene, ethanol, methanol, cold water and hot water. All extracts were tested against two different strains of *Agrobacterium tumefaciens*, resulting activity order of extracts: *n*-hexane ~ toluene < ethanol < cold water < methanol < hot water.[331]

Bark aqueous extract was active separately or combinedly (higher activity) with nystatin against four *Candida* ssp. (*C. albicans*, *C. krusei*, *C. glabrata*, *C. tropicalis*).[332]

Leaves 70% aqueous ethanolic extract had antiseptic effect on cows mammary quarters (udders) before and after milking, with commercial antiseptic iodine as a reference.[333]

Commercial ethylene glycol extract (plant part is not indicated) was active against for *Candida* ssp. (*C. albicans*, *C. dubliniensis*, *C. glabrata*, *C. Krusei*) in planktonic cultures and biofilms.[334]

Leaves EOs (fresh and dried, steam distillation), dichloromethane and 95% aqueous ethanolic extract were prepared and they were analyzed for TPC. Their antioxidant (DPPH, β-carotene bleaching methods) and antimicrobial (four bacteria and three fungi species) activity was tested. The chemical compositions of EOs were analyzed and many differences were detected, qualitatively and quantitatively. For example, the major component of fresh leaves EO was *cis*-β-terpineol 17.87% (3.56% in dried leaves EO), while the major component of dry leaves EO was geranyl-n-butyrate 12.21% (0.51% in fresh leaves EO). See **Figure 8**.[335]

Leaves EO (hydrodistillation) was tested for antioxidant (β-carotene bleaching method) and antimicrobial (twelve bacteria and four fungi species) activity was tested. The chemical composition of this EO was analyzed and the major components were sabinene 40.66% and α-pinene 30.27%.[336]

Fruits, leaves, stems and stem bark were separately extracted with ethanol and extracts were analyzed for TPC, and tested for antioxidant (DPPH method) and antibacterial (against *E. faecalis*). General chemical composition is presented.[337]

Leaves EO (hydrodistillation) and ethanolic extract was prepared in the traditional method and with ultrasonic assisted extraction, and the three materials were analyzed for TFC and TPC. Both extracts and five of their major phenolic components were tested for antioxidant activity by DPPH method, with BHT as a reference. EO and extracts were tested for antimicrobial (two bacteria and one fungus) activity, where ultrasonic extract was most active. EO major component was δ-3-carene (68.78%).[338]

Leaves EOs (hydrodistillation), chloroform and methanolic extracts were prepared, as well as twigs EO. Both EOs were analyzed for fatty acids resulting fourteen in leaves and

thirteen in twigs. EOs were tested against four bacterial species (reference: ampicillin) and for antioxidant activity using DPPH method, and in both tests leaves EO was more active. In both EOs, α-phellandrene was major component (33.06% leaves, 36.18% twigs).[339]

EOs (hydrodistillation) of fruits, leaves and twigs were prepared, analyzed for TPC, tested for antioxidant (DPPH, FRAP and β-carotene bleaching methods) and antibacterial (against five bacterial strains). The major components of these EOs were (%): γ-gurjunene 16.85 leaves (**Figure 8**), β-pinene 43.34 fruits and germacrene D 20.41 twigs.[340]

Leaves 80% aqueous methanolic extract was prepared and partitioned with n-hexane, dichloromethane, and ethyl acetate. Four active compounds against *Paraccocidioides brasiliensis* were isolated from this extract, with two standard antibiotics as references. One of these compounds is new (**Figure 8**).[341]

Fruits and leaves were separately extracted with 90% aqueous ethanol, and extracts were fractionized with *n*-hexane, dichloromethane, ethyl acetate and water. All ten materials were tested against *S. terebinthifolius*, *E. coli*, *S. aureus*, *C. neoformans* and *C. albicans*. Analysis of extracts and fractions for active compounds revealed the presence of nine fatty acids and other compounds that were previously presented.[342]

Industrial residues (mainly leaves and some fruits) were successively extracted with *n*-hexane, dichloromethane and methanol, and fruit peels were extracted with 54% aqueous ethanol. All extracts were tested against four bacteria species and analyzed for chemical compositions. Very detailed data is provided.[343]

Aerial parts EO (hydrodistillation) was tested against *E. coli*, *P. aeruginosa*, and *S. aureus* strains. The major components of this EO were (%): α-pinene 24.3, β-myrcene 13.7 and γ-muurolene 16.6 (**Figure 8**).[344]

Leaves EO (hydrodistillation) was tested against nine *Staphylococcus* isolates and tested for toxicity in mice. It is indicated that acute toxicity was low but accurate value is not provided. Major components of this EO were *p*-cymen-7-ol 22.5% and 9-epi-(E)-caryophyllene 10.1% (**Figure 8**).[345]

Green fruits EO (hydrodistillation) was prepared and tested for antimicrobial (against three bacterial and seven fungal species and ssp.), anticancer (eight cell lines, and one non-tumor cells) and cytotoxic (against RAW 264.7 macrophages) activities. The major components of this EO were α- and β-phellandrene.[346]

Dry leaves and their lipid extract were used to prepare a gel that had activity against *S. aureus*, *E. coli* and *A. niger*. In this gel, *Ziziphus jujuba* fruit powder was also used. In addition, aqueous and ethanolic extracts had the same activity.[347]

Fruits aqueous extract was prepared and fractionized with *n*-hexane, ethyl acetate and methanol. All materials were analyzed for active compounds against skin infections caused by *S. aureus*, resulting three previously presented triterpenoid acids.[348]

EOs (hydrodistillation) of ripe and unripe fruits, flowers and leaves from female and male trees were prepared (six EOs), and some of them were tested for antioxidant activity using DPPH and ORAC methods. The major components of these EOs were (%): terpinene-4-ol 24.1 female unripe fruits, sabinene 31.39 female ripe fruits, α-pinene 21.25 female leaves, β-caryophyllene 20.64 male leaves and α-pinene 32.49 male flowers.[349]

Fruits 10% aqueous methanolic extract was prepared, analyzed for TFC and TPC, and tested for antioxidant activity with DPPH method. One of its fractions that resulted from analysis for phenolics, had hypotensive effect in rotarod-induced hypertension in rats.[350]

EOs (hydrodistillation) of fruits and leaves were prepared and tested for antioxidant (DPPH method) and insecticidal (against *Sitophilus oryzae*) activities. The major components of these EOs were (%): limonene 23.22 in leaves EO and α- and γ-terpinene 6.7 for each, in fruits EO. In this research *Schinus molle* that does not grow in the reviewed region was also studied.[351]

Fruits EO (hydrodistillation) attenuated scopolamine-induced memory damage in zebrafish, and effect was measured by several behavioral tests and concentrations of AChE and other biomarkers (oxidant/antioxidant). The major components of this EO were (%): β-phellandrene 32.40, α-pinene 16.68 and terpinen-4-ol 11.10.[352]

Leaves methanolic extract was fractionized with *n*-hexane, dichloromethane, ethyl acetate and water, and all materials were analyzed for active phenolic compounds against *Meloidogyne incognita* (root-knot nematode). Nine known compounds were isolated.[353]

Aqueous bark extract alleviated immobilization-induced ulcer in rats/mice. Effect was measured with pH and volume of the gastric contents, gastric hemorrhage and decrease in intestinal transit. In this research, *Myracrodruon urundeuva* (Anacardiaceae) that does not grow in the reviewed region, was also studied.[354]

Leaves EO (hydrodistillation) major components were α-pinene, β-pinene, γ-carene and α-phellandrene.[355]

In addition to were α-pinene, β-pinene, α-phellandrene and β-phellandrene as major components, three spirocyclopropane-type sesquiterpenes (**Figure 8**) were isolated from fruits EO (hydrodistillation).[356]

Exocarp was extracted with ethanol/water/acetic acid : 70:25:5 (v/v/v) and the extract was analyzed for phenolic composition, resulting mainly anthocyanins, including a novel one, 7-*O*-methylpelargonidin 3-*O*-*β*-D-galactopyranoside (**Figure 8**).[357]

The kinetics of fruits and leaves EOs (hydrodistillation) preparation was studied revealing clear time dependent compositions. For example, α-pinene and β-caryophyllene were the major components after 6 h, respectively, while tricyclene (**Figure 8**) consisted 8.3% of leaves EO and was not detected in fruits EO. After 4h, tricyclene consisted 24.1% of leaves EO and was the major component. As for fruits EO, if the preparation is ended after 1h, α-*trans*-bergamotene (**Figure 8**) will not be detected, but after 6h it will consist of 5%.[358]

Fresh leaves from nine locations were extracted with 80% aqueous ethanol and extracts were analyzed for chemical compositions. Major components varied according to location but in average, four compounds were with highest concentrations: α-pinene, D-limonene, γ-carene and α-phellandrene.[359]

General chemical composition of hulls ethanolic extract is presented.[360]

Phenolic compositions of bark 70% aqueous extracts (10 locations) are presented.[361]

Fruits (5 locations) EOs (hydrodistillation) were analyzed and in average, the major components were α-pinene, D-limonene, β-pinene and α-Copaene (**Figure 8**).[362]

Fruits (two locations) EOs (hydrodistillation) was analyzed and in average, the major components were α-pinene, *dl*-Limonene, *ρ*-cymene, *l*-phellandrene, sylvestrene (**Figure 8**). EOs had cytotoxic activity against HL-60 and SK-MEL-28 cell lines.[363]

Fruits commercial EO was used in lambs diet as a substitute for antibiotic monensin. It also improved meat quality.[364,365]

Fruits were separately extracted (microwave-assisted) with ethanol and acetic acid and extracts were analyzed for TPC and qualitative compositions. They had positive effects of color preservation of caned sardines and metmyoglobin reducing activity.[366]

Bark ethanolic extract had alleviating effect against stomach incision in rats.[367,368]

Leaves aqueous extract synergistically with linoleic acid, reduced melanin synthesis in B16 cells and reconstituted epidermis (anti-hyperpigmentation).[369]

Fruits EO (hydrodistillation) had insecticidal activity against *Stegomyia aegypti* and antifungal activity against *Salmonella typhimurium*. The major components of this EO were (%): δ-3-carene 55.43%, a-pinene 16.25 and sylvestrene 10.67.[370]

Leaves aqueous extract had insecticidal activity against *Aedes aegypti* larvae.[371]

Leaves 92% aqueous ethanolic extract had insecticidal activity against *Sitophilus* ssp.[372]
Unripe fruits EO (hydrodistillation) and mixtures of some of its major components had insecticidal activity against *Rhyzopertha dominica*. The pure compounds that were used are (*E*)-nerolidol (**Figure 8**), limonene, α-terpineol, β-terpineol, terpinolene, α-pinene and β-pinene.[373]
Bark 70% aqueous ethanolic extract had insecticidal activity against female ticks of *Rhipicephalus Boophilus microplus* and their larvae hatchability.[374]
Fruits and leaves EOs (hydrodistillation) were applied against *Aedes aegypti*. The EOs were analyzed and the major components were bicyclogermacrene (27.57%) for leaves and β-pinene (30.32%) for fruits.[375]
Bark 70% aqueous ethanolic extract was not toxic for rats, administered in a single dose, indicated by measurement of many biomarkers.[376]
Bark aqueous extract had toxic potential in rats if administered chronically.[377]
Lectin isolated from leaves had healing activity of *S. aureus* infected wounds in rats by reduction of inflammation. Effect was measured by wound contraction, cell debris and several inflammatory biomarkers.[378]

Searsia pentaphylla

Fruits, leaves and stem bark (2 locations in Tunisia) were separately extracted with methanol, and extracts were analyzed for TFC and TPC. They were tested for antioxidant activity with DPPH and FRAP methods.[319]
Fruits 80% aqueous methanolic or acetonic extracts had anticorrosion activity in carbon steel that was found in 1 M HC*l* solution. Methanolic (contains 1% HC*l*) extract was analyzed and eleven phenolics were detected, where two of them are not specified isomers of kaempferol hexose malic acid. An isomer of this structure is presented in **Figure 9**.[379]
Ripe and unripe fruits were separately ultrasonic-assisted extracted and extracts were analyzed for TFC, TPC and condensed tannins contents. The antioxidant (DPPH, FRAP methods) and antimicrobial (four bacteria and a fungi species) activities are reported.[380]
Fruits and leaves were separately extracted with ethanol and extracts were analyzed for TPC. Their antioxidant (DPPH, FRAP methods, BHT and quercetin were references) and antinociceptive (hot plate, writhing and formalin tests, in mice, morphine was reference) activities were tested.[381]
Fruits and leaves aqueous extracts were prepared and analyzed for general chemical composition, TFC and TPC. Their antioxidant (DPPH, FRAP, β-carotene bleaching methods) and *in vitro* anti-platelet aggregation (isolated from rats blood) activities.[382]
Aerial parts EO (hydrodistillation) and the hydrosol were tested for antioxidant activity using DPPH and FRAP methods. They were analyzed for TFC, TPC and chemical compositions, resulting hexadecanoic acid (31.5%) and spathulenol (14.9%) in EO, and spathulenol (14.2%) in the hydrosol.[383]
Aerial parts ethyl acetate and methanolic extracts were prepared and tested for antioxidant (DPPH, FRAP, β-carotene bleaching, hydroxyl radical scavenging methods) and AChE inhibition activities. They were analyzed for phenolic compositions resulting known compounds (10 for ethyl acetate extract and 9 for methanolic) like the glycoside epimers astragalin and hyperoside (**Figure 9**).[384]
Bark aqueous extract was used as efficient wool colorant.[385]
Leaves aqueous extract was found non-toxic for mice, had hypotensive effect in rats and vasorelaxant effect on aorta isolated from rats. Mechanisms of action are presented.[386]

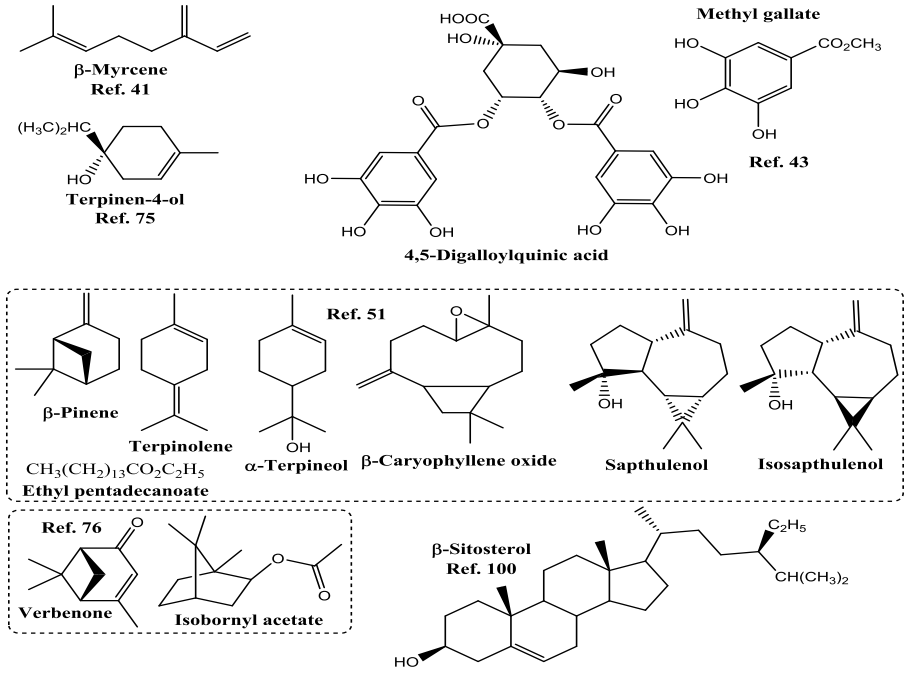


Figure 2: Natural products isolated from *Pistacia atlantica*.

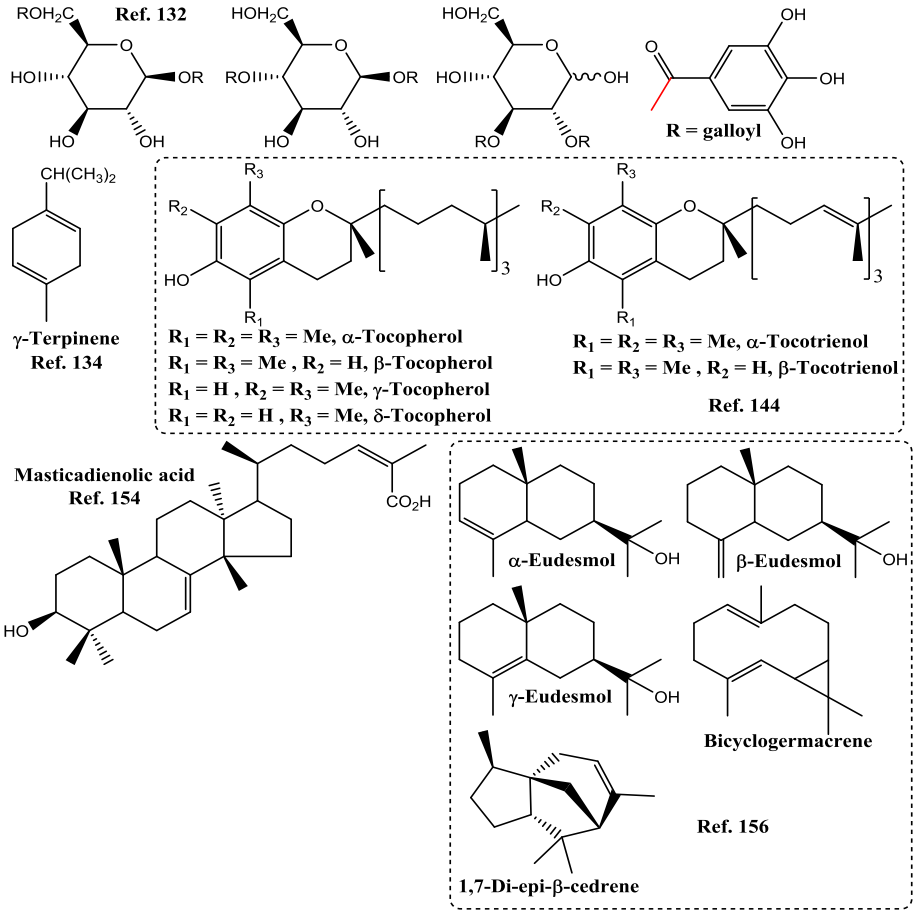


Figure 3: Natural products isolated from *Pistacia khinjuk*.

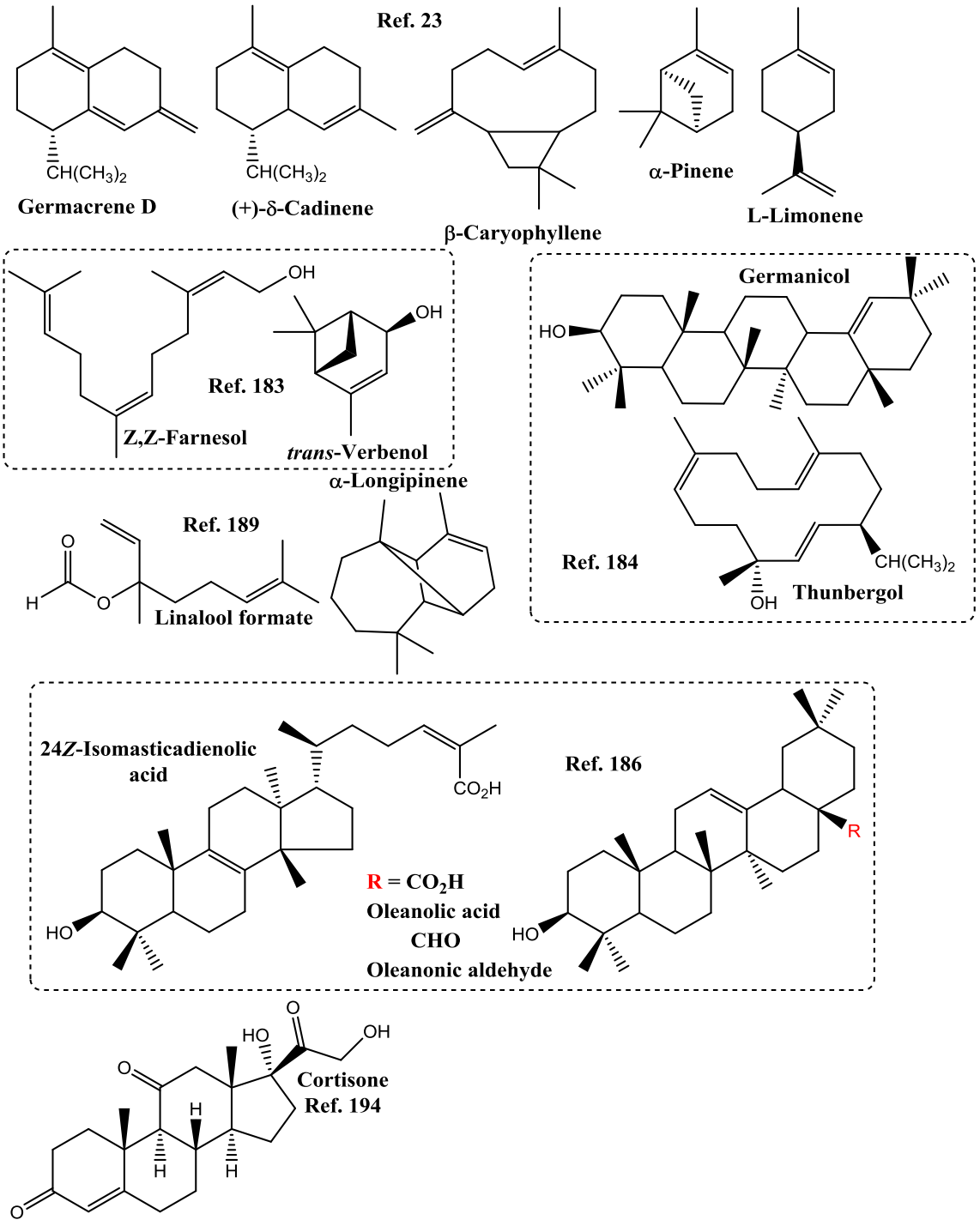
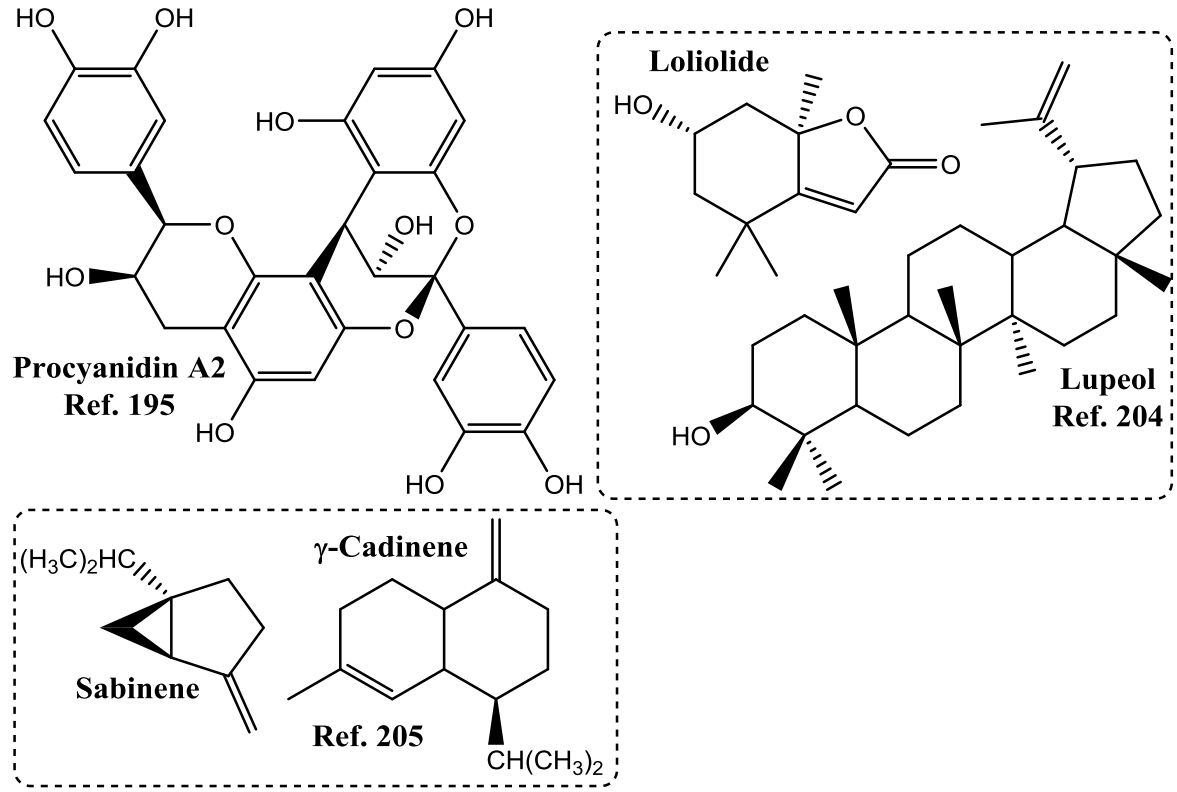
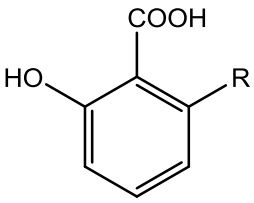


Figure 4a: Natural products isolated from *Pistacia lentiscus*.





Slicylic acid , R = H

1) R = $CH_2(CH_2)_{11}CH_3$

2) R = $CH_2(CH_2)_{13}CH_3$

3) R = *cis*-$CH_2(CH_2)_6CH{=}CH(CH_2)_5CH_3$

4) R = *cis*-$CH_2(CH_2)_6CH{=}CH(CH_2)_7CH_3$

5) R = *cis*,*cis*-$CH_2(CH_2)_6CH{=}CHCH_2CH{=}CH(CH_2)_4CH_3$

Ref. 208

Figure 4b. Natural products isolated from *Pistacia lentiscus.*

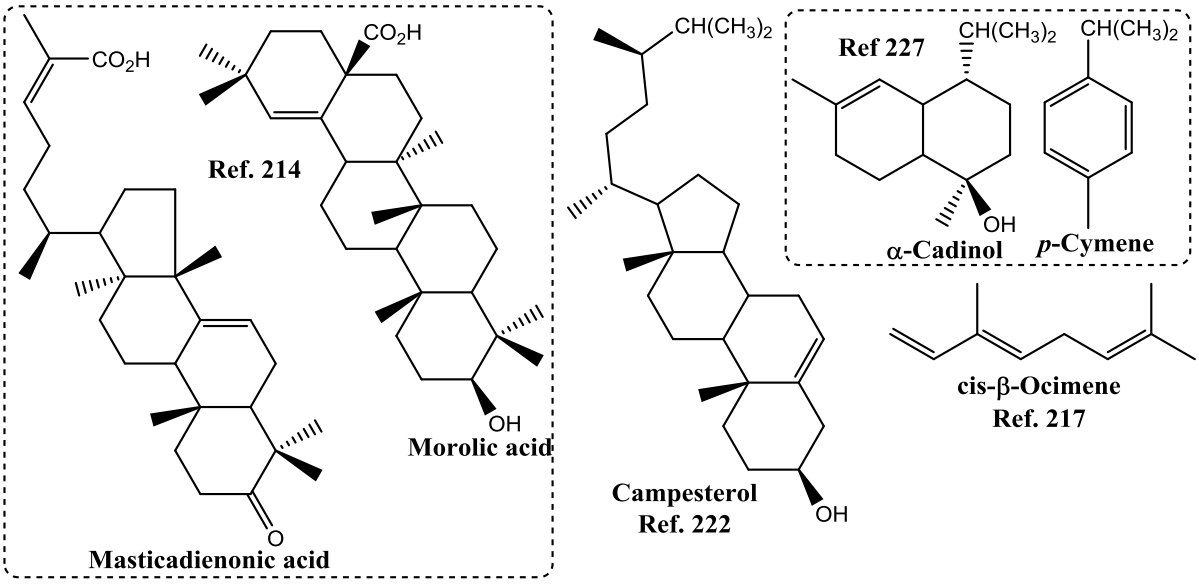


Figure 5: Natural products isolated from *Pistacia palaestina.*

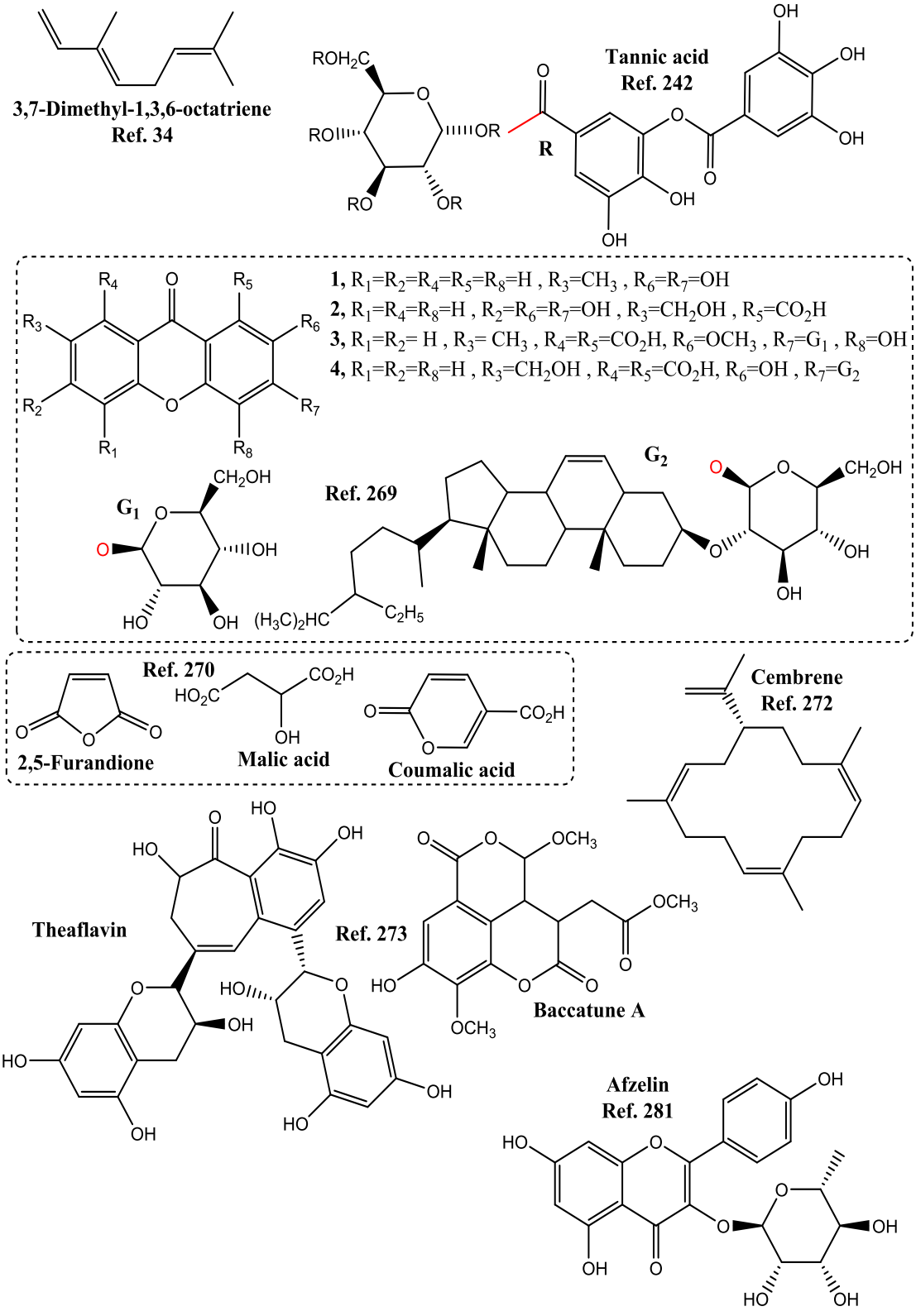


Figure 6: Natural products isolated from *Rhus coriaria.*

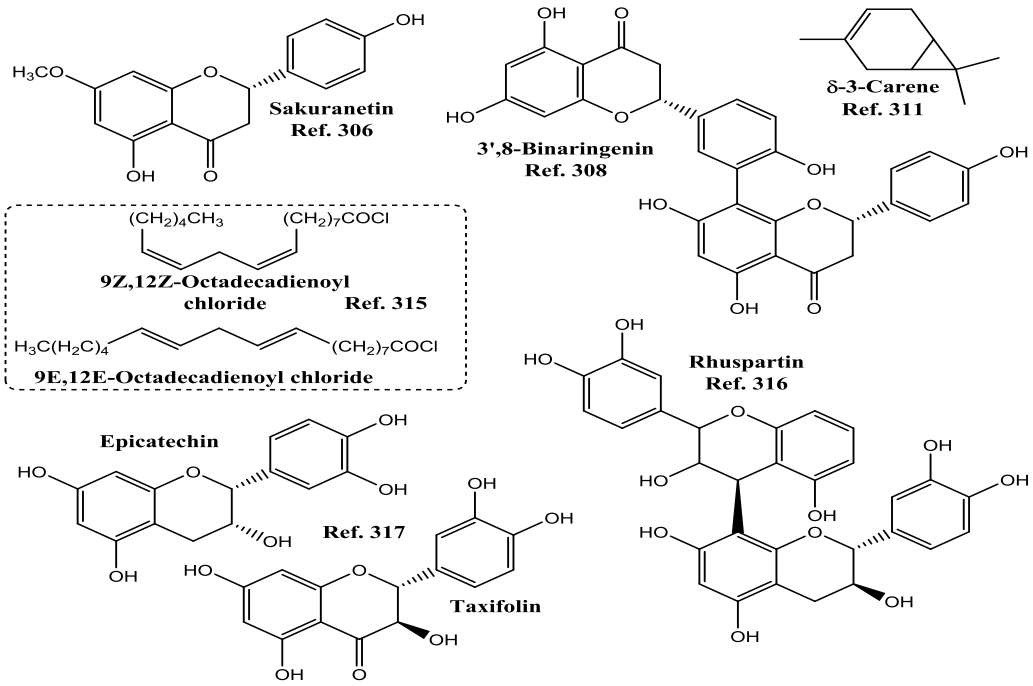


Figure 7: Natural products isolated from *Rhus tripartite*.

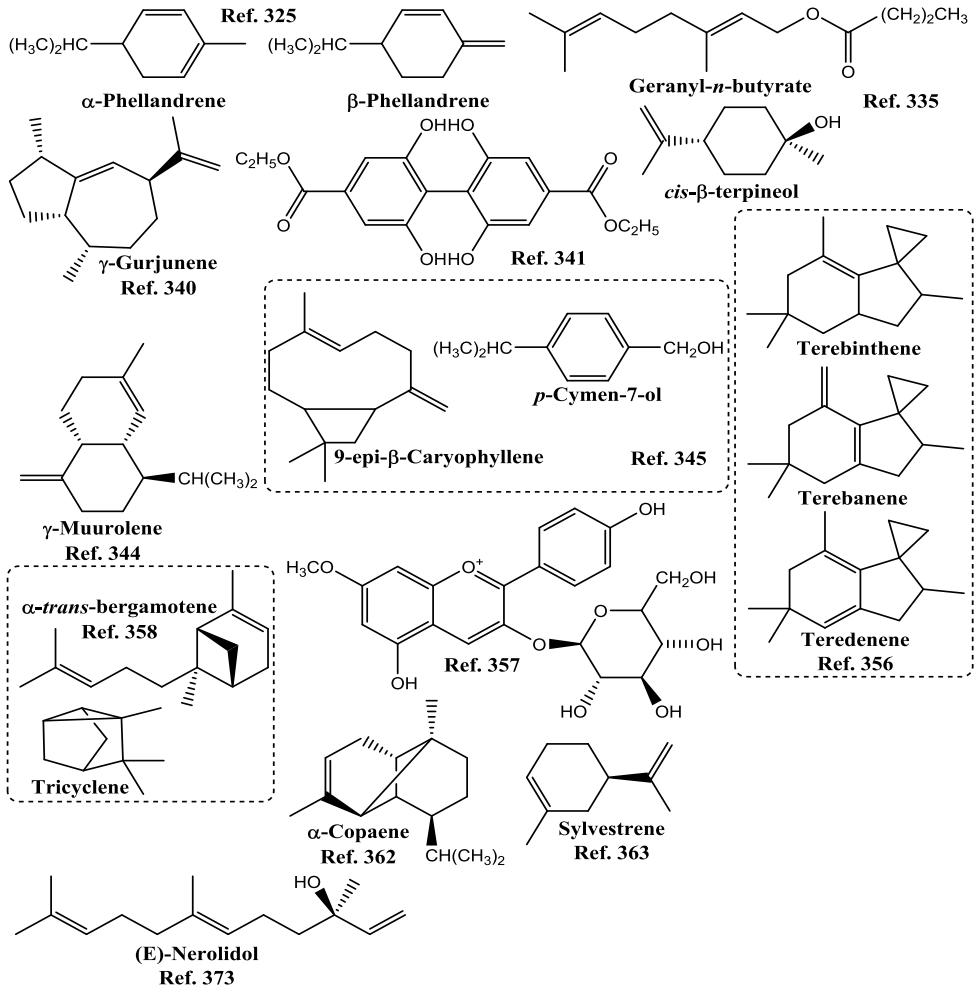
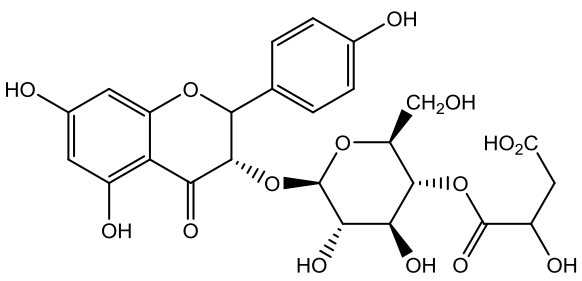
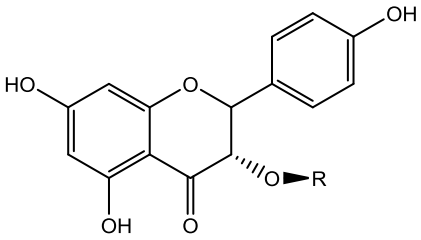


Figure 8: Natural products isolated from *Schinus terebinthifolius*.



Kaempferol hexose malic acid
(Example isomer) Ref. 379



R = 1-β-D-glucosyl , astragalin
R = 1-β-D-galactosyl , hyperoside
Ref. 384

Figure 9: Natural products isolated from *Searsia pentaphylla.*

4. DISCUSSION

In the introduction of this article, we mentioned that in the reviewed region, the landscape between the Mediterranean sea and the Jordan river, eight wild plants of the Anacardiaceae are found: *Pistacia atlantica*, *Pistacia khinjuk*, *Pistacia lentiscus*, *Pistacia palaestina*, *Rhus coriaria*, *Rhus tripartita*, *Schinus terebinthifolius* and *Searsia pentaphylla*. All these trees are known to the regions peoples since ancient times except *Schinus terebinthifolius*, that there is no controversy that its origin is South America. It is known in Israel and Palestine as well as all the world by the common name of "Brazilian pepper tree". It is agreed among most scholars that this tree was introduced to the reviewed region after its introduction in Europe, but it is not clear how and when the introduction from Europe occurred.[387] In many regions such as the USA and South Africa, *S. terebinthifolius* is considered invasive problematic plant.[388] However, this is not the case in our reviewed region where its wild distribution is relatively limited but it can be easily found in gardens as ornamental plant.

Pistacia atlantica is one of the most studied among the eight species of this family in the reviewed region. In addition to numerous studies of its chemical composition, that we will furtherly discuss here, this species has a special economic importance as turpentine source.[389] This mixture of volatile compounds such as α-pinene, is prepared by extraction of the tree gum, which is obtained by making wounds in the tree trunk. The turpentine prepared from *P. atlantica* is achieved in lower amounts compared to pine trees, but is chemical composition is richer and it is more aromatic.

This richness was extensively investigated for gum, resin, essential oils of all parts as well as their extracts, and this was extensively presented in **Table 2**. But this research still has major interest of researchers. One of the very recent examples was published by N. Belyagoubi-Benhammou ahc, who studied obtained EOs and 60% aqueous methanolic extracts of male

buds, female buds, male roots, female roots, ripe and unripe fruits from three locations in Algeria.[390] In this comprehensive publication, they reported the chemical compositions, TFC, TPC and antioxidant activity of these materials. All detected compounds, phenolics and EOs components are previously known, but some findings should draw additional attention. In average, the major detected phenolic compound was hydroxytyrosol, and in EOs, after major fatty acids, anacardol (3-(8-pentadecenyl)phenol) and *n*-tetradecanol were observed (**Figure 10**). They conclude that these materials have nutritional, industrial and cosmetic values.

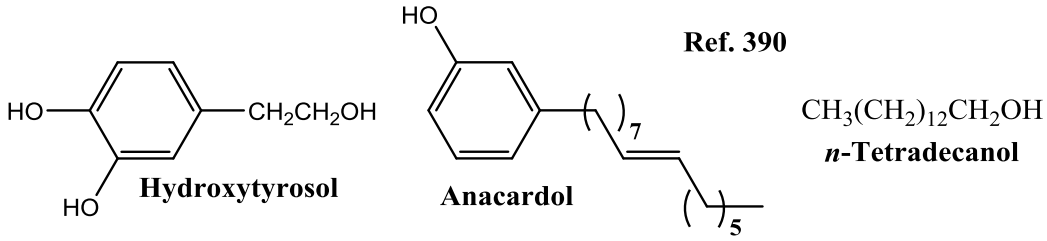


Figure 10: Natural products isolated from *Pistacia atlantica*.[390]

Most extracts and EOs are prepared from dried plant matter. So, as it has been published in very large number of studies, the drying process has major influence of the quantity and the quality of the resulting materials. N. Yaramadi ahc investigated the effect of different drying conditions of *P. atlantica* on many properties of the plant matter.[391] After drying, the extraction process has a crucial effect on the resulting EOs and extracts. M. Salhi ahc studied the influence of three EO preparation methods on several properties of these Eos.[392] They prepared seeds EOs by cold press, *n*-hexane extraction and by super-critical-CO_2 extraction and analyzed general chemical compositions (many compound families), TPC and tested their antioxidant activities (three methods). They found significant differences in all these properties. For example, α-tocopherol was the major components of this compound family (α-, β-, γ- and δ-tocopherol were detected), and its concentrations in the three EOs were (mg/kg): 69.04 cold press, 64.9 *n*-hexane extraction and 73.52 super-critical-CO_2 extraction. It is also important to mention that the quality and quantity of plant products are also a result of circumstances that sometimes humans have no control of them, especially for wild plants. In this context, H. Benhassaini ahc showed that salt stress on *P. atlantica* has clear influence on proline and soluble sugar accumulation in the plant.[393] In this case, experiments were performed with cultivated plantlets.

Many of the active ingredients of *P. atlantica* were studied for biological-medicinal activities *in silico*, *in vitro* and *vivo*, in animal and human models. One of the recent works was published by N. Taib ahc, where they performed molecular docking of some of these compounds against main protease of SARS-CoV2 virus.[394] These compounds were β-eudesmol, (*trans*)verbenol, both shown in previous figures, and elemol, pinocarvone, myrtenal, *trans*-carveol, and *trans*-pinocarveol was found inactive (**Figure 11**). Interestingly, in the abstract of this publication and in two tables, verbenol is mentioned but the docking image shows verbenone.

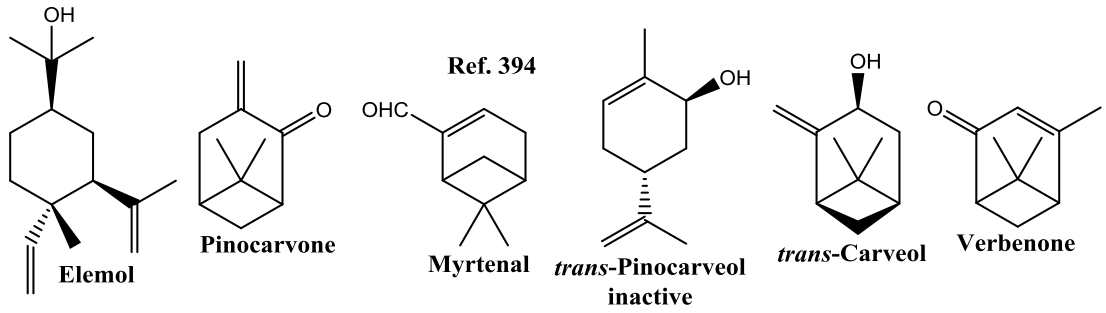


Figure 11: Natural products in *P. atlantica* with anti-SARSCoV2 potential.[394]

Nanoparticles gained great importance almost in all fields of science and industry, and their importance for drug development and therapy was published in a very large number of articles.[395] For the purpose of this review article, there are four types of nanoparticles that plant materials are related to: nanoparticles of plant materials themselves, plant materials are loaded on/in nanoparticles, metal/metal-oxide nanoparticles that were obtained via "green synthesis" using plant materials, in the vast majority of cases, these are aqueous extracts. In **Table 3**, a summary of published nanoparticles and their activities, that are related to Anacardiaceae species of the reviewed region.

Table 3: Activities of nanoparticles (NPs) related to Anacardiaceae species.

Species/Plant Material	NP	Activities/Reference
P. atlantica, bark aqueous extract	Ag	Anti-gastric cancer[396]
P. atlantica, EO loaded on	Solid lipid	Anti-breast cancer[397]
P. palaestina, fruits aqueous extract	Ag	Wound healing[398]
R. coriaria, fruits aqueous extract	Ag	Anticancer, MCF-7 cells[399]
R. coriaria, fruits aqueous extract	Ag	Antimicrobial, DNA protective[400]

The scientific name of *Pistacia khinjuk* originates from the tree name in Balochi language spoken in Baluchistan region, which is generally an arid habitat. Even though this species is well adapted to this environment, controlled studies by A. Ranjbarfordoei revealed that under

drought stress, there is an increase of chlorophyl production by the plant.[401] The research included *P. atlantica* that they name as *P. mutica*, which was less adaptable to these conditions. In a follow-up study, the same group investigated the effect of drought and salinity (NaC*l*) combination of the two species and reached the same result: *P. khinjuk* is more adapted that *P. atlantica*.[402]

Compared with other *Pistacia* species reviewed in this article, seeds EO of *P. khinjuk* was not reported so far. M. Ahmadi and F. Karimi published an enzyme-assisted extraction method, where they used composite design with protease and α-amylase, separately.[403] After optimization of extraction conditions (incubation time, temperature and pH), they achieved high yields. Three years later, the same group published a follow-up research with improved methods supported by theoretical analysis.[404]

F.K. Hammoud ahc prepared activated carbon from the fruit hulls of *P. khinjuk* which had high adsorption capacity, low density, low ash content and low humidity.[405] S. Asif ahc used nonedible seeds EO that was prepared by extraction with *n*-hexane, to synthetize biodiesel by ultrasonic-assisted methylation.[406] In a similar EO preparation method, V. Karthickeyan ahc esterified this EO to produce biodiesel, and they studied its chemical composition and combustion qualities.[407] To conclude this part, we will present the work of B. Hosseinzdeh Samani ahc that prepared biodiesel from EO of *P. atlantica* in the same method of S. Asif, but this research was performed two years earlier and reported higher yields.[408] This is probably a result of higher EO content in seeds of *P. atlantica* compared with *P. khinjuk*.

A very interesting work was recently published by A.L. Stefi ahc about changes that occur in the compositions of *Pistacia lentiscus* young trees, as a result of external parameters: heat and cold stresses.[409] In addition to morphological changes, this research showed that the differences between the effects of heat and cold are very significant, compared to each other, and compared to control trees that were not under stress. These changes are summarized in **Table 4**.

Table 4: Effects of heat and cold stresses on *P. lentiscus*, A.L. Stefi ahc.[409]

Measured Change	Heat Stress	Cold Stress
Cumulative biomass	slight decrease	large decrease
Oxidative stress	very large increase	large increase
Leaf pigments absorbance	no change	no change
Dopamine concentration	very large increase	large increase

Phenethylamine concentration	slight decrease	slight decrease
Phenylalanine concentration	very large increase	slight decrease
Tryptophan concentration	large increase	slight increase
Tyramine concentration	slight increase	slight decrease
Tyrosine concentration	very large increase	no change

The stage of ripening or maturity has a vital role in determining the chemical composition of plants materials, especially the fruits, and **Table 1** includes many examples. K. Boudieb ahc analyzed the chemical compositions and tested antioxidant activities of ripe and unripe fruits EOs (cold extraction with *n*-hexane) and methanolic extracts of *P. lentiscus*.[410] They discovered significant differences in TPC, total anthocyanins content, color and antioxidant activity (DPPH, FRAP methods) of extracts. The compositions of EOs were also clear. For example, ripe fruits EO contained oleic acid-3-hydroxy-*n*-propyl ester and unripe EO did not, while unripe fruits EO contained methyl cholate (**Figure 12**) but ripe fruits EO did not.

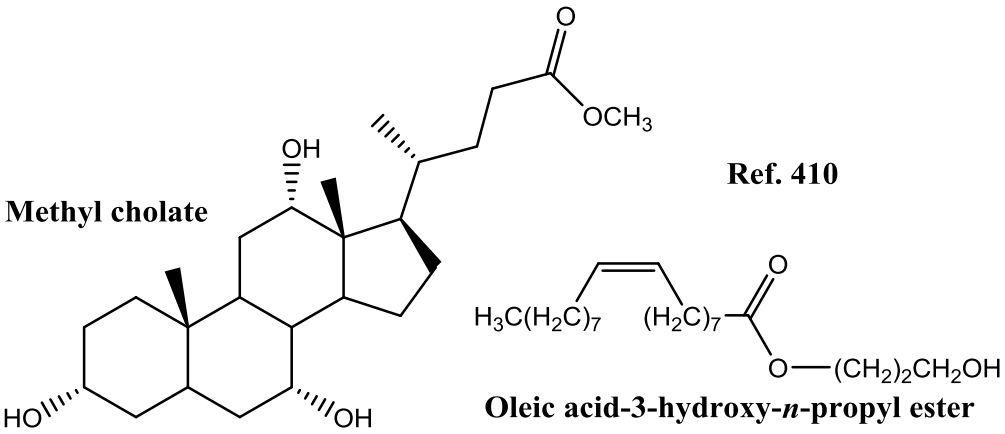


Figure 12: Natural products in *P. lentiscus* ripe and unripe fruits Eos.[410]

A more comprehensive work was published by S. Dragovic ahc where they tested the effects of climate conditions, growth location, maturity stage and extraction solvent on 80% aqueous methanolic and aqueous ethanolic extracts, and they report some differences.[411]

Sustained release is a very important method in drug delivery, and R.M. Goda and M.M. Shohayeb used it in preparation of silicon urinary catheters.[412] This was done for the treatment of bacterial colonies with benzoic acid or cholesterol, that were sustain-released from coatings prepared with *P. lentiscus* resin extracts (aqueous, ethanolic and ethyl acetate). *Pistacia palaestina*, that has many synonym scientific names, was thoroughly investigated for the effect of various factors on its composition and products, like extracts and EOs. These include growth conditions, maturity stage and extraction method. S. Gülsoy ahc studied the

effect of locality (environment, 17 locations) on the chemical composition of ripe fruits Eos.[413] Considering the concentrations of the four major components (α-pinene, myrcene, limonene and β-caryophyllene), the differences between these locations are notable, even though α-pinene is the major component in all of them. But reading all the data carefully reveals some great differences. For example, germacrene D is found only in the fruits EO from one location. In a very comprehensive research, W. Zam ahc studied the effect of drying methods, extraction temperature, extraction time and maturity stage on leaves extracts, prepared using 40, 60, and 80% aqueous methanol, ethanol and acetone.[414], see a note after this reference]. They analyzed these extracts these extracts for TPC and tested their antioxidant activity with DPPH, resulting clear differences. For example, using 40% aqueous acetone to extract mature leaves in four extraction times (T = 40 °C), 15, 30, 45 and 60 min, TPC was (g/100 g) 18.21, 19.19, 18.85 and 17.61, respectively. M. Inan focused on the effect of seasonality (four stages) on the fatty acid composition of fruits petroleum ether extract.[415] Oleic acid was the major components of all these extracts that differed in their yields, but the second and third components were not the same in all four extracts. F. Kaya and A. Ozer studied, theoretically and experimentally, the effects of extracting solvent, extraction time and extraction temperature of the yields of seeds extracts.[416] They used *n*-hexane, *n*-heptane, petroleum ether and carbon tetrachloride, 20-40 min and 40-98 °C, according to the solvent boiling point. In some cases, they found significant differences. For example, using CCl_4 as extraction solvent for forty minutes, 56 or 76 °C, yields were 95.2 and 98.1%, respectively, compared with the theoretical expected yield.

K. Rand ahc found out that the chemical composition of leaves galls of *P. palaestina* produced by the effect of *Baizongia pistaciae* insect, is notably different of the intact leaves.[417] They found large differences in the total concentrations of mono- and sesquiterpenes, and also very large differences in the concentrations of single compounds. For example, the average concentration (µg/g) of α-pinene in intact leaves of five trees was 0.772, while in galls of the same trees leaves it was 103.24. In a follow-up study, this group found that not only the accumulation of monoterpenes is different in intact leaves and galls, but also the monoterpene synthase enzyme activity was entirely different: way higher in galls.[418] The group investigated the relationship between genes involved in the biosynthesis of natural products and the concentration changes in galls compared with leaves and calculated the fold increase, in two locations.[419] For example, the concentration of (+)-β-pinene was 1.5 folds in one location and 45 folds in another. But the concentrations do not

always increase: the concentrations of (-)-α-cubebene are 0.06 folds in one location and 5 folds in the second; and for β-ylangene 0.12 and 0.3 folds, respectively (both compounds are shown in **Figure 13**).

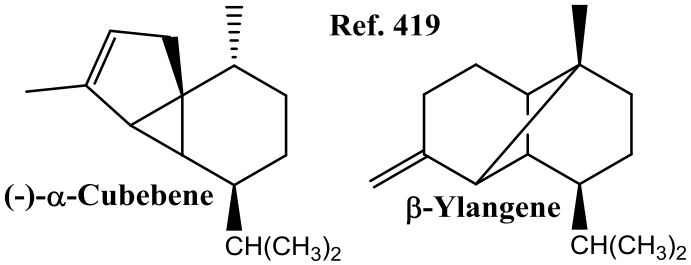


Figure 13: Natural products in *P. palaestina* leaves and galls.[419]

Rhus coriaria is one of the most important among the Anacardiaceae trees because of the spice prepared from the fruits, sumac. It is important to clarify that this name is given sometimes to the tree itself and even to other *Rhus* genus trees, but in the region between the Mediterranean sea and the Jordan river, the name sumac refers to the spice with crimson red color.

The chemical composition of *R. coriaria* has been extensively studied and published but there are still a few points to discuss. I.M. Abu-Reidah ahc from the Palestinian Authority, published a comprehensive investigation of the chemical composition of fruits 80% aqueous methanolic extract.[420] G. Lo Vecchio ahc separately extracted fruits from Sicily with *n*-heptane for fatty acids and with methanol for phenolic composition.[421] The first group reported qualitative very detailed composition while the second group reported quantitative composition of major compounds only. Although both groups used the same plant material and close polar solvents, their findings include major differences. G. Lo Vecchio ahc reported that the major component was hyperoside (quercetin 3-O-galactoside, **Figure 9**) with 160.54 mg/g, but in the publication of I.M. Abu-Reidah ahc this compound is not mentioned. This difference highlights the importance of locality in preparation and using plant materials. In addition to the mentioned extracts, G. Lo Vecchio ahc prepared several other extracts, tested antibacterial (seven strains) and zebrafish embryo acute toxicity.

N. Nayebpour and H.A. Asadi-Gharneh prepared petroleum ether extracts of fresh fruits from six different locations in Iran and analyzed them for fatty acids compositions.[422] Oleic acid was the major component in all samples but the concentrations of second and third acids, linoleic and palmitic, notably exchanged. M.A. Farag ahc used solid-phase microextraction to

analyze the chemical compositions of fresh fruits from Egypt, Jordan, Palestine and roasted fruits from Palestine.[423] The differences were very significant, in compound families and single compounds, and these were presented in a very detailed fashion. For example, the concentration of α-humulene (**Figure 14**) in these extracts was (%): 0.93, 1.48, 1.49, 1.29, respectively.

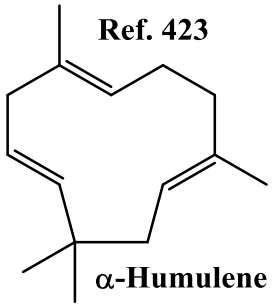


Figure 14: α-Humulene from *Rhus coriaria* fruits.[423]

M. Grassia ahc prepared *R. coriaria* fruits 50% aqueous methanolic extract and analyzed it for qualitative chemical composition. A very detailed list is presented.[424] They also tested the suitability of this extract for microencapsulation and discovered that this process was most successful when it was done with maltodextrin, where the bioavailability of the active ingredients was highest. Finally for this part, R. Kossah ahc analyzed fruits for nutritional ingredients and fatty acids composition and their findings were very close the results of N. Nayebpour and H.A. Asadi-Gharneh.[422],[425] In this research *Rhus typhina* was also studied, and a follow-up article was published a year later by the same group where they optimized the extraction processes.[426]

M.M. Feuereisen ahc performed pressurized liquid extraction of anthocyanins and biflavonoids from *Schinus terebinthifolius*, where they optimized temperature, time, solvent (ethanol) amount and acid concentration.[427] This resulted high yields of extracts. A research that was carried out by R. Acácio ahc found that microencapsulation of seeds EO, enhanced its stability and increased its bioavailability.[428] Finally, J. Wang ahc found out that inhalation of fruits EO by students, resulted was related physical sensations such as relaxation, sedation and improvement of breathing, but also discomfort in the respiratory system, such as nose stinging, in addition to psychological effects like memories and various positive feelings.[429]

5. Selected Activities of *Pistacia vera*

Among domesticated Anacardiaceae plants, *Pistacia vera* is the only tree that is very limitedly cultivated in the reviewed region of this article, but it is widely cultivated in neighboring Middle Eastern countries like Turkey and Iran. Compared with another globally cultivated tree of the Anacardiaceae family, Cashew (*Anacardium occidentale*), the global market of *P. vera* is significantly smaller: USDB 8 and 4.133, respectively [430,431]. Cashew is consumed in the region between the Mediterranean sea and the Jordan river but it is not cultivated there. Archeological studies found out that *P. vera* was used by humans as early as 300000 year ago[432] and was domesticated around 8000 years ago.[433]

Numerous articles were published about the chemical composition of *P. vera* and its biological activities. But since this article presents wild trees of Anacardiaceae family in the reviewed region, we will cite just two publications. M. Elakremi ahc studied the chemical composition, TPC and the antioxidant (ABTS, DPPH, FRAP methods) of 50% aqueous ethanolic extracts of female and male leaves and hulls.[434] They reported 42 compounds including 1-methyl-1H-pyrrole (**Figure 15**) as a major component, in average. S. Safdar ahc prepared fresh fruits *n*-hexane, chloroform and ethanolic extracts and tested them for antibacterial (against *E. coli*, *K. pneumoniae*, *P. vulgaris*, *P. aeruginosa*, *S. aureus*, *S. epidermidis*) and anticancer (MCF-7, A2780 cell lines) activities.[435] The chemical composition that they published is qualitative and it included some interesting compounds like 4,5-diamino-2-hydroxypyrimidine, *threo*-4-hydroxy-l-lysine lactone, N-methylpyrrole-2-carboxylic acid, 4-hydroxy-2-methylpyrrolidine-2-carboxylic acid, isosorbide dinitrate and 9-oximo-2,7-diethoxyfluorene (**Figure 15**).

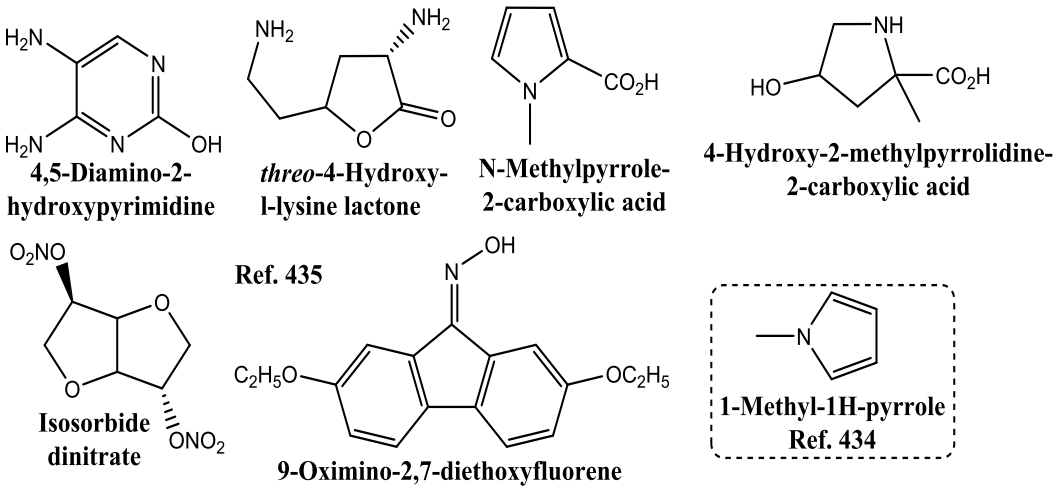


Figure 15: Natural products isolated from *Pistacia vera* extracts.[434,435]

6. CONCLUSIONS

1) Anacardiaceae trees of Israel and Palestine possess important biological activities.

2) These plants contain natural products with unique structures.

3) These natural products should be studied for drug development and discovery.

4) The research of some of these species should be expanded.

5) Research should be done to extend products of these trees in cosmetics industry.

7. REFERENCES

1. Wannan, B.S., Analysis of generic relationships in Anacardiaceae. *Blumea*, 2006; *51:* 165-195. DOI: 10.3767/000651906X622427
2. Christenhusz, M.J., Byng, J.W., The number of known plants species in the world and its annual increase. *Phytotaxa*, 2016; *261:* 201-217. DOI: 10.11646/phytotaxa.261.3.1
3. Weeks, A., Zapata, F., Pell, S.K., Daly, D.C., Mitchell, J.D., Fine, P.V., To move or to evolve: contrasting patterns of intercontinental connectivity and climatic niche evolution in "Terebinthaceae"(Anacardiaceae and Burseraceae). *Front. Genet*, 2014; *5*: 108225. DOI: 10.3389/fgene.2014.00409
4. Fairbairn, A., Asouti, E., Near, J., Martinoli, D., Macro-botanical evidence for plant use at Neolithic Çatalhöyük south-central Anatolia, Turkey. *Veget. Hist. Archaeobot*, 2002; *11:* 41-54. DOI: 10.1007/s003340200005
5. Rousou, M., Parés, A., Douché, C., Ergun, M., Tengberg, M., Identification of archaeobotanical *Pistacia* L. fruit remains: implications for our knowledge on past distribution and use in prehistoric Cyprus. *Veget. Hist. Archaeobot*, 2021; *30:* 623-639. DOI: 10.1007/s00334-020-00812-z
6. Nicholson, T.M., Gradl, M., Welte, B., Metzger, Pusch, C.M., Albert, K., Enlightening the past: Analytical proof for the use of *Pistacia* exudates in ancient Egyptian embalming resins. *J. Sep. Sci*, 2011; *34:* 3364–3371. DOI: 10.1002/jssc.201100541
7. Festa, G., Christiansen, T., Turina, V., Borla, M., Kelleher, J., Arcidiacono, L., Cartechini, L., Ponterio, R.C., Scatigno, C., Senesi, R., Andreani, C., Egyptian metallic inks on textiles from the 15th century BCE unravelled by non-invasive techniques and chemometric analysis. *Sci. Rep*, 2019; *9:* 7310. DOI: 10.1038/s41598-019-43655-z
8. Rayne, S., Mazza, G., Biological Activities of Extracts from Sumac (*Rhus* spp.): A Review. *Plant Foods Hum. Nutr*, 2007; *62:* 165-175. DOI: 10.1007/s11130-007-0058-4

9. Khajoei Nasab, F., Khosravi, A.R., Ethnobotanical study of medicinal plants of Sirjan in Kerman Province, Iran. *J. Ethnopharmacol,* 2014; *154:* 190-197. DOI: 10.1016/j.jep.2014.04.003
10. Sadeghi, Z., Mahmood, A., Ethno-gynecological knowledge of medicinal plants used by Baluch tribes, southeast of Baluchistan, Iran. *Rev. Bras. Farmacogn,* 2014; *24:* 706-715. DOI: 10.1016/j.bjp.2014.11.006
11. Ahmed, H.M., Traditional uses of Kurdish medicinal plant *Pistacia atlantica* subsp. *kurdica* Zohary in Ranya, Southern Kurdistan. *Genet. Resour. Crop Evol*, 2017; *64:* 1473-1484. DOI 10.1007/s10722-017-0522-4
12. Delfan, B., Bahmani, M., Eftekhari, Z., Jelodari, M., Saki, K., Mohammadi, T., Effective herbs on the wound and skin disorders: a ethnobotanical study in Lorestan province, west of Iran. *Asian Pac. J. Trop. Dis,* 2014; *4:* S938-S942. DOI: 10.1016/S2222-1808(14)60762-3
13. Hosseini, S.H., Bibak, H., Ghara, A.R., Sahebkar, A., Shakeri, A., Ethnobotany of the medicinal plants used by the ethnic communities of Kerman province, Southeast Iran. *J. Ethnobiol. Ethnomed,* 2021; *17:* 31. DOI: 10.1186/s13002-021-00438-z
14. Ul Haq, A., Saeed, S., Ahmed, A., Species diversity and ethnobotanical inventory of wild flora used by the folk community of Shinghar Balochistan, Pakistan. *Nusantara Biosci,* 2021; *13:* 148-157. DOI: 10.13057/nusbiosci/n130203
15. Zouhri, A., Aarab, L., Ethnobotanical Survey of Medicinal and Aromatic Plants Used by the People of Targuist in the North of Morocco. *Der Pharm. Chem,* 2018; *10:* 11-18. [ResearchGate]
16. Dolatkhahi, M., Dolatkhahi, A., Bagher Nejad, J., Ethnobotanical Study of Medicinal Plants Used in Arjan – Parishan Protected Area in Fars Province of Iran. *Avicenna J. Phytomed,* 2014; *4*: 402-412. [ResearchGate]
17. Demir, I., An Ethnobotanical Study of Medicinal Plants Used in Hizan District (Bitlis-Turkey). *Yuzuncu Yil University J. Agric. Sci,* 2020; *30:* 732-741. DOI: 10.29133/yyutbd.730202
18. Bulut, G., Doğan, A., Şenkardeş, I., Avci, R., Tuzlaci, E., The medicinal and wild food plants of Batman City and Kozluk District (Batman-Turkey). *Agric. Conspec. Sci,* 2019; *84:* 29-36. [Google Scholar]
19. Boudieb, K., Kaki, S., Amellal-Chibane, H., Traditional uses, phytochemical study and morphological characterization of *Pistacia lentiscus* L. fruits from three areas of northern Algeria. *J. Appl. Biosci,* 2019; *135:* 13788-13797. DOI: /10.4314/jab.v135i1.5

20. Beldi, M., Merzougui, H., Lazli, A., Etude ethnobotanique du Pistachier lentisque *Pistacia lentiscus* L. dans la wilaya d'El Tarf (Nord-est algérien). *Ethnobot. Res. Appl,* 2021; *21:* 1-18. DOI: 10.32859/era.21.09.1-18
21. Blama, A., Fedjer, Z., Mahdeb, A., Mazari, A., Ethnobotanical Study on the Traditional Use of *Pistacia lentiscus* L. Among the Local Population of Northern Central-East Region of Algeria. Turk. J. Agric, 2024; *12*: 252-258. DOI: 10.24925/turjaf.v12i2.252-258.5896
22. Bourroubey, B., Chelli, N., Tir Touil, A., Boumediene, M., Ethnobotanical Survey, Phytochemical Screening and Antioxidant Activity of Methanolic Extracts of *Pistacia lentiscus* L. Growing in Northwestern Algeria. *Fr. Ukr. J. Chem,* 2023; *11:* 1-16. DOI: 10.17721/fujcV11I1P1-16
23. Souilah, N., Benabdallah, A., Bendif, H., Miara, M.D., Daoud, N., Mustafa, A.M., Yilmaz, M.A., Öztürk, M., Caprioli, G., Maggi, F., Ethnobotanical investigation of *Pistacia lentiscus* L. grown in El Kala (Algeria), and phytochemical study and antioxidant activity of its essential oil and extracts. *Nat. Prod. Res,* 2023; *37:* 1583-1588. DOI: 10.1080/14786419.2021.2024825
24. Hafsé, M., Benbrahim, K.F., Farah, A., Ethnobotanical survey on the use of Pistacia lentiscus in northern MOROCCO (Taounate). *Int. J. Innov. Appl. Stud,* 2015; *13:* 864-872. [ResearchGate]
25. Zougagh, S., Belghiti, A., Rochd, T., Zerdani, I., Mouslim, J., Medicinal and Aromatic Plants Used in Traditional Treatment of the Oral Pathology: The Ethnobotanical Survey in the Economic Capital Casablanca, Morocco (North Africa). *Nat. Prod. Bioprospect,* 2019; *9:* 35-48. DOI: 10.1007/s13659-018-0194-6
26. Jaadan, H., Akodad, M., Moumen, A., Baghour, M., Skalli, A., Ezrari, S., Belmalha, S., Ethnobotanical survey of medicinal plants growing in the region of "Oulad Daoud Zkhanine" (Nador Province), in Northeastern Morocco. *Ethnobot. Res. Appl,* 2020; *19:* 1-12. DOI: 10.32859/era.19.39.1-12
27. Chaachouay, N., Douira, A., Zidane, L., Herbal Medicine Used in the Treatment of Human Diseases in the Rif, Northern Morocco. *Arab. J. Sci. Eng,* 2022; *47:* 131-153. DOI: 10.1007/s13369-021-05501-1
28. Idm'hand, E., Msanda, F., Cherifi, K., Medicinal plants used for gastrointestinal disorders in Morocco. *Ethnobot. Res. Appl,* 2023; *26:* 1-29. DOI: 10.32859/era.26.70.1-29
29. La Rosa, A., Cornara, L., Saitta, A., Salam, A.M., Grammatico, S., Caputo, M., La Mantia, T., Quave, C.L., Ethnobotany of the Aegadian Islands: safeguarding biocultural

refugia in the Mediterranean. *J. Ethnobiol. Ethnomed,* 2021; *17:* 47. DOI: 10.1186/s13002-021-00470-z

30. Nawash, O.S., Al-Assaf, A., El-Oqlah, A., Omari, M., 2014. Floristic features, distribution, and ethnobotany of plants gathered and used by local people from the Mediterranean forest in Northern Jordan. *Ethnobot. Res. Appl,* 2014; *12*: 385-396. DOI: 10.17348/era.12.0.385-396
31. Ali-Shtayeh, M.S., Jamous, R.M., 2006. Ethnobotany of Palestinian herbal medicine in the northern West Bank and Gaza Strip: review and comprehensive field study. *Biodiver. Environ. Sci. Stud. Ser,* 2006; *4:* 1-122. [ResearchGate]
32. Bulut, G., Medicinal and wild food plants of Marmara Island (Balikesir – Turkey). *Acta Soc. Bot. Pol,* 2016; 85: 3501. DOI: 10.5586/asbp.3501
33. Yesil, Y., Inal, I., Ethnomedicinal Plants of Hasankeyf (Batman-Turkey). *Front. Pharmacol,* 2021; *11:* 624710. DOI: 10.3389/fphar.2020.624710
34. Sarikaya, A.G., Kaytanlioğlu, E.T., Fakir, H., Determination of volatile components and ethnobotanical properties of *Rhus coriaria* L. in Isparta province of Turkey. *Int. J. Biol. Chem,* 2023; *16*: 4-15. DOI: 10.26577/IJBCh2023v16i2a1
35. Baydoun, S.A., Kanj, D., Raafat, K., Aboul Ela, M., Chalak, L., Arnold-Apostolides, N., Ethnobotanical and Economic Importance of Wild Plant Species of Jabal Moussa Bioreserve, Lebanon. *J. Ecosys. Ecograph,* 2017; *7*: 1-10. DOI: 10.4172/2157-7625.S7-001
36. Al-Ramahi, R., Jaradat, N., Zaid, A.N., Vincieri, F.F., Asmaa, M., Medicinal herbs and methodologies for their pharmaceutical compounding in the West Bank/Palestine. *Complement. Ther. Clin. Pract,* 2014; *20:* 280-284. DOI: 10.1016/j.ctcp.2014.06.001
37. Kefifa, A., Saidi, A., Hachem, K., Mehalhal, O., An ethnobotanical survey and quantitative study of indigenous medicinal plants used in the Algerian semi-arid region. *Phytothérapie,* 2020; *18*: 204-219. DOI: 10.3166/phyto-2018-0077
38. El-Mokasabi F. Survey of Wild Trees and Shrubs in Eastern Region of Libya and Their Economical Value. *Alq. J. Med. App. Sci*, 2022; *5:* 48-55. DOI: 10.5281/zenodo.5838203
39. Fonseca-Kruel, V.S., Araujo, D.S., Sá, C.F., Peixoto, A.L., Quantitative ethnobotany of a *Restinga* forest fragment in Rio de Janeiro, Brazil. *Rodriguésia,* 2009; *60:* 187-202. DOI: 10.1590/2175-7860200960110
40. Cardoso Palheta, I., Tavares-Martins, A.C., Araújo Lucas, F.C., Gonçalves Jardim, M.A., Ethnobotanical study of medicinal plants in urban home gardens in the city of

Abaetetuba, Pará state, Brazil. *Bol. Latinoam. Caribe Plantas Med. Aromat*, 2017; *16:* 206-262. [ResearchGate]

41. Nadri, S., Mahmoudvand, H., Mahmoudvand, H., Rashnoo, M., Khaksarian, M., Chemical composition, antinociceptive and acute toxicity of *Pistacia atlantica* fruit extract. *Entomol. Appl. Sci. Lett*, 2018; *5*: 8-12. [Google Scholar]
42. Hajjaj, G., Bahlouli, A., Tajani, M., Cherrah, Y., Zellou, A., *In vivo* analgesic and anti-inflammatory properties of the aqueous extract of *Pistacia atlantica* Desf. from Morocco. *J. Ayurvedic Herb. Med*, 2017; *3*: 196-199. DOI: 10.31254/jahm.2017.3405
43. Ben Ahmed, Z., Hefied, F., Mahammed, T.H., Seidel, V., Yousfi, M., Identification of potential anti-Alzheimer agents from *Pistacia atlantica* Desf. galls using UPLC fingerprinting, chemometrics, and molecular docking analyses. *J. Food Process. Preserv*, 2022; *46:* e16916. DOI: 10.1111/jfpp.16916
44. Vakili Karkanrood, M., Homayouni Tabrizi, M., Ardalan, T., Soltani, M., Khadem, F., Nosrat, T., Moeini, S., *Pistacia atlantica* fruit essential oil nanoemulsions (PAEO-NE), an effective antiangiogenic therapeutic and cell-dependent apoptosis inducer on A549 human lung cancer cells. *Inorg. Nano-Met. Chem*, 2022; *52*: 1-11. DOI: 10.1080/24701556.2022.2034008
45. Jaafari-Ashkvandi, Z., Shirazi, S.Y., Rezaeifard, S., Hamedi, A., Erfani, N., Cytotoxic effects of *Pistacia atlantica* (Baneh) fruit extract on human KB cancer cell line. *Acta Med*, 2019; *62:* 30-34. DOI: 10.14712/18059694.2019.43
46. Ahmadirad, H., Mahmoodi, M., Rahmatian, F., Bakhshi, M., Hajizadeh, M., Mirzaei, M.R., Ahmadinia, H., Rezaei, M., Dini, A., Flahati-Pour, S.K., The hydroalcoholic extract of baneh leaves (*Pistacia atlantica*) induces apoptosis in the breast cancer cells. *World Cancer Res. J.*, 2020; *7*: e1458. DOI: 10.32113/wcrj_20201_1458
47. Albalawi, A.E., Althobaiti, N.A., Alhasani, R.H., Alnomasy, S.F., Anti-tumor effects and cellular mechanisms of *Pistacia atlantica* methanolic extract against Ehrlich solid tumor in mice. *Asian Pac. J. Trop. Biomed*, 2022; *12:* 69-77. DOI: 10.4103/2221-1691.335695
48. Achili, I., Amrani, A., Bensouici, C., Gül, F., Altun, M., Demirtas, I., Zama, D., Benayache, F., Benayache, S., Chemical Constituents, Antioxidant, Anticholinesterase and Antiproliferative Effects of Algerian *Pistacia atlantica* Desf. Extracts. *Recent Pat. Food Nutr. Agric*, 2020; *11:* 249-256. DOI: 10.2174/2212798411666200207101502
49. Hashemi, L., Asadi-Samani, M., Moradi, M-T., Alidadi, S., Anticancer Activity and Phenolic Compounds of *Pistacia atlantica* Extract. *Int. J. Pharm. Phytopharmacol. Res*, 2017; *7*: 26-31. DOI: 10.24896/eijppr.2017725

50. Rahman, H.S., Phytochemical analysis and antioxidant and anticancer activities of mastic gum resin from *Pistacia atlantica* subspecies *kurdica*. *OncoTargets Ther*, 2018; *11*: 4559-4572. DOI: 10.2147/OTT.S170827
51. Kaskoos, R.A., Ahamad, J., Uthirapathy, S., Chemical Composition and Cytotoxic Activity of *Pistacia atlantica var. kurdica* Fruits. *ARO Sci. J. Koya Univ*, 2021; *9*: 10868. DOI: 10.14500/aro.10868
52. Benahmed, F., Mehrab, E., Kharoubi, O., Phytochemical analysis and antiproliferative properties of *Pistacia atlantica* leaves. *J. Drug Deliv. Therap*, 2021; *11:* 21-25. DOI: 10.22270/jddt.v11i6-S.5209
53. Tanideh, N., Masoumi, S., Hosseinzadeh, M., Safarpour, A.R., Erjaee, H., Koohi-Hosseinabadi, O., Rahimikazerooni, S., Healing Effect of *Pistacia Atlantica* Fruit Oil Extract in Acetic Acid-Induced Colitis in Rats. *Iran. J. Med. Sci*, 2014; *39:* 522-528. [ResearchGate]
54. Farokhi, S., Bahrami, G., Babaie, A., Farzaei, M.H., Protective and Therapeutic Effect of Oleoresin of *Pistacia atlantica* in Acetic Acid-induced Colitis in Rat. *J. Med. Plants*, 2019; *18*: 135-148. DOI: 10.29252/jmp.4.72.135
55. Naseri, M., Delfani, H., Mirzaeei, S., Bahrami, G., Farzaei, M.H., Mohammadi Pour, P., Protective Effect of Nanoparticles of Oleoresin of *Pistacia atlantica* var. *mutica* against Acetic Acid-Induced Ulcerative Colitis in Rats. *Trad. Integr. Med*, 2022; *7*: 161-170. DOI: 10.18502/tim.v7i2.9915
56. Majd, F.S., Talebi, S.S., Ahmad Abadi, A.N., Poorolajal, J., Dastan, D., Efficacy of a standardized herbal product from Pistacia atlantica subsp. Kurdica in type 2 diabetic patients with hyperlipidemia: A triple-blind randomized clinical trial. Complement. Ther. Clin. Pract, 2022; *48:* 101613. DOI: 10.1016/j.ctcp.2022.101613
57. Raziani, Y., Qadir, S.H., Hermis, A.H., Nazari, A., Othman, B.S., Raziani, S., *Pistacia atlantica* as an effective remedy for diabetes: a randomised, double-blind, placebo-controlled trial. *Aust. J. Herb. Naturop. Med*, 2022; *34*: 118-124. DOI: 10.33235/ajhnm.34.3.118-124
58. Pekacar, S., Deliorman Orhan, D., Investigation of Antidiabetic Effect of Pistacia atlantica Leaves by Activity-Guided Fractionation and Phytochemical Content Analysis by LC-QTOF-MS. *Front. Pharmacol*, 2022; 13: 826261. DOI: 10.3389/fphar.2022.826261
59. Hosseini, S., Nili-Ahmadabadi, A., Nachvak, S.M., Dastan, D., Moradi, S., Abdollahzad, H., Mostafai, R., Antihyperlipidemic and Antioxidative Properties of *Pistacia atlantica*

subsp. *kurdica* in Streptozotocin-Induced Diabetic Mice. *Diabetes Metab. Syndr. Obes,* 2020; *13:* 1231-1236. DOI: 10.2147/DMSO.S250417

60. Benmahieddine, A., Belyagoubi-Benhammou, N., Belyagoubi, L., Amari, N.O., Zerey-Belaskri, A.E., Gismondi, A., Di Marco, G., Canini, A., Habi, S., Atik Bekkara, F., Djebli, N., Leaf-buds of *Pistacia atlantica*: a novel source of bioactive molecules with high anti-inflammatory, antioxidant, anti-tyrosinase and antimicrobial properties. *Physiol. Mol. Biol. Plants,* 2023; *29:* 209-219. DOI: 10.1007/s12298-023-01290-z
61. Amri, O., Zekhnini, A., Bouhaimi, A., Tahrouch, S., Hatimi, A., Anti-inflammatory activity of methanolic extract from *Pistacia atlantica* Desf. leaves. *Pharmacog. J.,* 2018; *10:* 71-76. DOI: 10.5530/pj.2018.1.14
62. Hammami, R., Zouhir, A., Ben Hamida, J., Neffati, M., Vergoten, G., Naghmouchi, K., Fliss, I., Antimicrobial properties of aqueous extracts from three medicinal plants growing wild in arid regions of Tunisia, Pharm. Biol, 2009; *47:* 452-457. DOI: 10.1080/13880200902822604
63. Ghalem, B.R., Mohamed, B., Bactericidal activity of *Pistacia atlantica.* Desf *mastic* gum against certain pathogens. *Afr. J. Plant Sci*, 2009; *3*: 13-15. DOI: 10.5897/AJPS.9000034
64. Azizian, M., Pakzad, I., Azizian, R., Azizi Jalilian, F., Taherikalani, M., Sadeghifard, N., Mahmadi Kartalaie, M., Shirani, R., Delpisheh, A., Abassi, N., Havasian, R., Panahi, J., Hasanvand, A., Antibacterial Effect of Hydro-extract of Pistacia atlantica on Bacteria *In vitro*. *Biomed. Pharmacol. J.,* 2013; *6:* 133-136. DOI: 10.13005/bpj/395
65. Shialy, Z., Zarrin, M., Sadeghi Nejad, B., Yusef Naanaie, S., *In vitro* antifungal properties of *Pistacia atlantica* and olive extracts on different fungal species. *Curr. Med. Mycol,* 2015; *1:* 40-45. DOI: 10.18869/acadpub.cmm.1.4.40
66. Abdenbi, A., Touati, B., Bouazza, M., Tail, N., Boutercha, M., Antibacterial activity and physicochemical characteristics of *Pistacia atlantica* extracts. *Der Pharm. Chem,* 2016; *8*: 162-168. [ResearchGate]
67. Darakhshandeh-Ghahferokhi, G., Mohammadi-Sichani, M., Tavakoli, M., Antibiofilm and Antibacterial Activity of *Pistacia Atlantica* against some Pathogenic Bacteria. *J. Isfahan Med. Sch,* 2018; *36:* 594-600. DOI: 10.22122/jims.v36i482.9549
68. Kia, M.M., Tarmian, A., Karimi, A.N., Gholamiyan, H., Abdulkhani, A., Mastri Farahani, M.R., The efficiency of *Pistacia atlantica* gum for increasing resistance of rapeseed oil-heat treated wood to fungal attacks. *Maderas Cie. Tecnol,* 2020; *22:* 457-466. DOI: 10.4067/S0718-221X2020005000404

69. Namazi, H., Emami, M.J., Dehghani Nazhvani, F., Nazifi, S., Dehghanian, A., Kazemi-Moghaddam, E., Clinical and Pharmacological Evaluation of *Pistacia atlantica* Nut Extract on Septic Arthritis Caused by *Staphylococcus aureus*: An Experimental Study. *Shiraz E-Med J.*, 2020; *21:* e98911. DOI: 10.5812/semj.98911
70. Shahdadi, F., Dumari, H., Nejad Sajadi, S.H., Rafieepour, A., Mahdavinia, A., Dezyani, M., Ezzati, R., Effect of *Pistacia atlantica* Powder and Extract on the Growth of *Aspergillus flavus* and *Aspergillus niger* in Lactic Cheese. *Food Sci. Technol,* 2020; *16:* 53-62. DOI: 10.29252/fsct.16.95.5
71. Barzinji, A.H., Dzaye, K., Antimicrobial Effect of *Pistacia Atlantica Kurdica* as an Intra Canal Medicament in Root Canal Treatment on Enterococcus Fecalis. *Ann. Rom. Soc. Cell Biol,* 2021; *25:* 8485-8492. [ResearchGate]
72. Khoramdareh, N.B., Hamedi, H., Sharifan, A., *Pistacia atlantica* (Bene) Oleoresin Gum: The Antioxidant and Antimicrobial Activity, and Potential Encapsulation of Saccharomyces boulardii and Lactobacillus acidophilus in Kefir with Sodium Alginate/Bene Gum Polymer. *Research Square,* 2022. DOI: 10.21203/rs.3.rs-2234440/v1
73. Othman, S.O., El-Hashash, M.A., Hussein, S.A., El-Mesallamy, A.M., Rizk, S.A., Elabbar, F.A., Phenolic Content as Antioxidant and Antimicrobial Activities of *Pistacia atlantica* Desf. (Anacardiaceae) Extract from Libya. *Egypt. J. Chem,* 2019; *62:* 21-28. DOI: 10.21608/ejchem.2018.4577.1403
74. Fathollahi, M., Aminzare, M., Mohseni, M., Hassanzadazar, H., Antioxidant capacity, antimicrobial activities and chemical composition of *Pistacia atlantica* subsp. *kurdica* essential oil. *Vet. Res. Forum,* 2019; *10:* 299-305. DOI: 10.30466/vrf.2018.83910.2103
75. Khiya, Z., Oualcadi, Y., Zerkani, H., Gamar, A., Amine, S., EL Hamzaoui, N., Berrekhis, F., Zair, T., EL Hilali, F., Chemical Composition and Biological Activities of *Pistacia atlantica* Desf. Essential Oil From Morocco. *J. Essent. Oil-Bear. Plants,* 2021; *24:* 254-265. DOI: 10.1080/0972060X.2020.1870574
76. Ellahi, H., Khalili Sadrabad, E., Hekmatimoghaddam, S.H., Jebali, A., Sadeghizadeh-yazdi J., Rastiani F., Akrami Mohajeri, F., Antimicrobial Activity and Chemical Composition of *Pistachia Atlantica* Gum Sub Sp. *Kurdica*. Essential Oil. *J. Nutr. Food Secur,* 2019; *4:* 186-190. DOI: 10.18502/jnfs.v4i3.1310
77. Alamholo, M., Amraie, Y., Evaluation of Susceptibility and Resistance of Human Infectious Bacteria and Identification of Bioactive Compounds in *Pistacia atlantica*, *Cassia absus*, and *Quercus persica*. Pharm. Biomed. Res, 2021; *7*: 105-114. DOI: 10.18502/pbr.v7i2.7363

78. Alhajali, O., Ali-Nizam, A., Phytochemical Screening and Antibacterial Activity of *Pistacia atlantica* and *Pinus canariensis* Leaf Extracts. *J. Turk. Chem. Soc. A.*, 2021; *8:* 403-418. DOI: 10.18596/jotcsa.836074
79. Elyasi Ghahfarrokhi, A., Saeedi, M., Khanavi, M., Mojtabavi, S., Kobarfard, F., Faramarzi, M.A., Chemical composition and biological effects of *Pistacia atlantica* Desf. oleoresin essential oil. *Res. J. Pharmacogn*, 2022; *9*: 25–33. DOI: 10.22127/RJP.2022.326106.1830
80. Zerkani, H., Tagnaout, I., Khiya, Z., Boutahiri, S., Amalich, S., Fadili, K., Cherrat, A., Mouradi, A., Benhlima, N., Zair, T., Comparative Study of the Antioxidant Power of Polyphenols of Leaves, Fruits, and Bark of *Pistacia atlantica* Desf. from Morocco. *J. Chem*, 2022; 7432169. DOI: 10.1155/2022/7432169
81. Toul, F., Belyagoubi-Benhammou, N., Zitouni, A., Atik-Bekkara, F., Antioxidant activity and phenolic profile of different organs of *Pistacia atlantica* Desf. subsp. *atlantica* from Algeria. *Nat. Prod. Res*, 2017; *31:* 718-723. DOI: 10.1080/14786419.2016.1217205
82. Nachvak, S.M., Hosseini, S., Nili-Ahmadabadi, A., Dastan, D., Rezaei, M., Chemical Composition and Antioxidant Activity of *Pistacia Atlantica Subsp. Kurdica* from Awraman. *J. Rep. Pharm. Sci*, 2018; *7:* 222-230. DOI: 10.4103/2322-1232.254799
83. Labdelli, A., Rebiai, A., Tahirine, M., Ahmed Adda, A., Merah, O., Nutritional Content and Antioxidant Capacity of the Seed and the Epicarp in Deferent Ecotypes of *Pistacia atlantica* Desf. Subsp. *atlantica*. *Plants*, 2020; *9:* 1065. DOI:10.3390/plants9091065
84. Ben Ahmed, Z., Hefied, F., Yousfi, M., Demeyer, K., & Vander Heyden, Y., Study of the antioxidant activity of *Pistacia atlantica* Desf. Gall extracts and evaluation of the responsible compounds. *Biochem. Syst. Ecol*, 2022; *100:* 104358. DOI: 10.1016/j.bse.2021.104358
85. Farzanegi, P., Ghanbari-Niaki, A., Mohseni, A., Haghayeghi, M., *Pistacia Atlantica* Extract Enhances Exercise-Mediated Improvement of Antioxidant Defense in Vistar Rats. *Ann. Appl. Sport Sci*, 2014; *2:* 13-22. DOI: 10.18869/acadpub.aassjournal.2.2.13
86. Sadeghi, E., Akbari, M., Khanahmadi, M., Azizi-Lalabadi, M., Karami, F., Effect of *Pistacia atlantica* (Bane) essential oil on oxidative stability of sunflower oil. *J. Food Qual. Hazard. Control*, 2023; *10:* 21-28. DOI: 10.18502/jfqhc.10.1.11985
87. Hamidi, A.R., Naeini, A.T., Tanideh, N., Nazifi, S., Effects of *Pistacia atlantica* (subsp. *Mutica*) oil extracts on antioxidant activities during experimentally induced cutaneous wound healing in rats. *Vet. Sci. Dev*, 2015; *5:* 5672. DOI: 10.4081/vsd.2015.5672

88. Taran, M., Mohebali, M., Esmaeli, J., *In vivo* efficacy of gum obtained *Pistacia atlantica* in experimental treatment of cutaneous leishmaniasis. *Iran. J. Public Health*, 2010; *39:* 36-41. [ResearchGate]
89. Zibaei, M., Rostamipour, R., Nayebzadeh, H., Effect of *Pistacia atlantica* fruit and leaf extracts on hydatid cyst protoscolices. *Recent Pat. Anti-infect. Drud Discov,* 2016; *11:* 53-58. DOI: 10.2174/1574891X10666151029113334
90. Mahmoudvand, H., Kheirandish, F., Ghasemi Kia, M., Tavakoli Kareshk, A., Yarahmadi, M., Chemical composition, protoscolicidal effects and acute toxicity of *Pistacia atlantica* Desf. fruit extract. *Nat. Prod. Res*, 2016; *30:* 1208-1211. DOI: 10.1080/14786419.2015.1046868
91. Sasanfar, B., Emrani, A.S., Zademohammadi, F., Forootani, B., Emamgholipour, S., Jambarsang, S., Khayyatzadeh, S.S., Pourrajab, F., Yasini Ardakani, S.A., Esmaillzadeh, A., Salehi-Abarghouei, A., The impact of a blend of *Pistacia atlantica* seed and canola oil compared with a blend of corn-canola oil with synthetic antioxidant and corn-canola oil without synthetic antioxidant on oxidative stress markers in patients with metabolic syndrome: protocol for a triple-blind, randomized, three-way cross-over clinical trial. *Trials*, 2023; *24:* 473. DOI: 10.1186/s13063-023-07269-1
92. Abdulzahra, A.A., Al-Salih, H.A., Anti-ulcer activity of *Pistacia Atlantica* and *Punica Granatum* hydroalcoholic extract in comparison with omeprazole in male Wister rats. *Int. J. Health Sci*, 2022; *6:* 1115-1128. DOI: 10.53730/ijhs.v6nS2.5159
93. Rashidi, S., Askari, N., Abbasnejad, M., Anxiolytic-like effect of *Pistacia atlantica* fruit in intact and gonadectomized rats subjected to chronic stress. *J. Occup. Health Epidemiol*, 2014; *3:* 152-159. DOI: 10.18869/acadpub.johe.3.3.152
94. Jamshidi, S., Hejazi, N., Golmakani, M.T., Tanideh, N., Wild pistachio (*Pistacia atlantica mutica*) oil improve metabolic syndrome features in rats with high fructose ingestion. *Iran. J. Basic Med. Sci*, 2018; *21:* 1255-1261. DOI: 10.22038/ijbms.2018.30511.7351
95. Delazar, A., Reid, R.G., Sarker, S.D., GC-MS Analysis of the Essential Oil from the Oleoresin of *Pistacia atlantica* var. *mutica*. *Chem. Nat. Comp*, 2004; *40:* 24-27. DOI: 10.1023/B:CONC.0000025459.72590.9e
96. Barrero, A.F., Herrador, M.M., Arteaga, J.F., Akssira, M., Mellouki, F., Belgarrabe, A., Blázquez, M.A., Chemical composition of the essential oils of Pistacia atlantica Desf. *J. Essent. Oil Res*, 2005; *17:* 52-54. DOI: 10.1080/10412905.2005.9698828

97. Benhassaini, H., Bendahmane, M., Benchalgo, N., The chemical composition of fruits of *Pistacia atlantica* desf. subsp. *atlantica* from Algeria. *Chem. Nat. Comp*, 2007; *43:* 121-124. DOI: 10.1007/s10600-007-0059-4
98. Benhassaini, H., Bendeddouche, F.Z., Mehdadi, Z., Romane, A., GC/MS analysis of the essential oil from the oleoresin of *Pistacia atlantica* Desf. subsp. *atlantica* from Algeria. *Nat. Prod. Commun*, 2008; *3:* 929-932. DOI: 10.1177/1934578X0800300621
99. Gourine, N., Bombarda, I., Yousfi, M., Gaydou, E.M., Chemotypes of *Pistacia atlantica* leaf essential oils from Algeria. *Nat. Prod. Commun*, 2010; *5*: 115-120. DOI: 10.1177/1934578X1000500128
100. Saber-Tehrani, M., Givianrad, M.H., Aberoomand-Azar, P., Waqif-Husain, S., Jafari Mohammadi, S.A., Chemical Composition of Iran's *Pistacia atlantica* Cold-Pressed Oil. *J. Chem*, 2013; 126106. DOI: 10.1155/2013/126106
101. Labdelli, A., Zemour, K., Simon, V., Cerny, M., Adda, A., Merah, O., *Pistacia Atlantica* Desf., a Source of Healthy Vegetable Oil. *Appl. Sci*, 2019; *9:* 2552. DOI:10.3390/app9122552
102. Mirahmadi, F., Mizani, M., Sadeghi, R., Givianrad, M.H., Chemical composition and thermal properties of *Pistacia atlantica* subsp. *Kurdica* gum. *Appl. Biol. Chem*, 2019; *62:* 4. DOI: 10.1186/s13765-019-0408-6
103. Ahmad, Z.M., Hamzah, H.M, Lazim, Z.S., 2023. Analysis of chemical profiles of different *Pistacia atlantica* parts at Sulaymaniyah and Halabja region in Iraq. *Appl. Ecol. Environ. Res*, 2023; *21:* 561-574. DOI: 10.15666/aeer/2101_561574
104. Rahbar Saadat, Y., Barzegari, A., Zununi Vahed, S., Saeedi, N., Eskandani, M., Omidi, Y., Barar, J., Cyto/Genotoxic Effects of *Pistacia atlantica* Resin, a Traditional Gum. *DNA Cell Biol*, 2016; *35:* 261-266. DOI: 10.1089/dna.2015.3048
105. Sadat Eftekharafzali, M., Mehrabani, M., Tajadini, H., Ahmadi, B., Zahedi, M.J., Effect of "*Pistacia atlantica*" Resin (Baneh) on Functional Dyspepsia: A Double-Blind, Randomized Clinical Study. *Iran. Red Crescent Med. J.*, 2018; *20:* e63822. DOI: 10.5812/ircmj.63822
106. Farzanegi, P., Mousavi, M., Ghanbari-Niaki, A., Effect of *Pistacia Atlantica* Extract on Glutathione Peroxidase Tissue Levels and Total Oxidative Capacity of Liver and Plasma Lipid Profile of Rats. *Zahedan J. Res. Med. Sci*, 2013; *15*: 59-63. [ResearchGate]
107. Tolooei, M., Mirzaei, A., Effects of *Pistacia Atlantica* Extract on Erythrocyte Membrane Rigidity, Oxidative Stress, and Hepatotoxicity Induced by CCl_4. *Glob. J. Health Sci*, 2015; *7:* 32-38. DOI: 10.5539/gjhs.v7n7p32

108. Nazifi, S., Saeb, M., Por Gonabadi, S., Saeb, S., Ansari Lari, M., The Effect of Dietary Wild Pistachio Oil (*Pistacia atlantica*) on Serum Thyroid Hormones and Leptin Concentration in Experimental Hyperthyroidism in the Female Rat. *Iran. South Med. J.,* 2011; *14:* 1-8. [Google Scholar]
109. Nazifi, S., Saeb, M., Sepehrimanesh, M., Poorgonabadi, S., The effects of wild pistachio oil on serum leptin, thyroid hormones, and lipid profile in female rats with experimental hypothyroidism. *Comp. Clin. Pathol*, 2012; *21*: 851-857. DOI: 10.1007/s00580-011-1188-5
110. Kohnepoushi, S.S., Dastan, D., Nili-Ahmadabadi, A., Effects of *Pistacia atlantica* Subsp. *Kurdica* on Cadmium- Induced Oxidative Damage in Rat Kidney. *Avicenna J. Pharm. Res*, 2020; *1:* 10-14. DOI: 10.34172/ajpr.2020.03
111. Norasteh, H., Mohammadi, S., Nikravesh, M., Taraz Jamshidi, S., Protective Effect of Bene (*Pistacia Atlantica*) on Busulfan-Induced Renal-Liver Injury in Laboratory Mice. *J. Babol Univ. Med. Sci*, 2020; *22:* 17-23. DOI: 10.22088/jbums.22.1.17
112. Peivastegan, M., Rajabi, M., Zaferani Arani, H., Olya, M., Atashi, H.A., Abolghasemi, S., Comparing the Effects of Oleoresin of *Pistacia atlantica* Tree and Diclofenac Gel on the Knee Osteoarthritis Improvement. *Shiraz E-Med J.,* 2020; *21:* e98293. DOI: 10.5812/semj.98293
113. Khamevar, A., Ebrahimzadeh, M.A., Moosazadeh, M., Shayesteh Azar, M., Saeedi, M., Bakhtiary Far, A., Yousefi, S.S., Effectiveness of *Pistacia atlantica* on older adult knee osteoarthritis, a randomized triple blind clinical trial. *Phytother. Res*, 2021; *35:* 5125-5135. DOI: 10.1002/ptr.7178
114. Mohtashami, R., Hashem-Dabaghian, F., Nabati, F., Qaderi, A., Kianbakht, S., Efficacy of topical oleoresin of Pistacia atlantica L. subspecies kurdica for symptomatic relief of knee osteoarthritis: A randomized double-blinded controlled trial. J. Herb. Med, 2023; 38: 100638. DOI: 10.1016/j.hermed.2023.100638
115. Karimi, S.M., Mostafavinia, A., Malakootikhah, J., Shams-Ardakani, M.R., Mohammadbeigi, A., Amini, A., Yazdani, A., Akbarzadeh, S., Bayat, M., Rahimi, R., Evaluation of the Effects of *Pistacia atlantica* Desf. Oleo-Gum-Resin and Its Nanocapsulated Form on Biomechanical Properties and Bone Density in a Rat Model of Ovariectomy-Induced Osteoporosis. *J. Biol. Regul. Homeost. Agents*, 2024; *38:* 233-242. DOI: 10.23812/j.biol.regul.homeost.agents.20243801.18

116. Bazrafshan, E., Kord Mostafapour, F., Ahmadabadi, M., Afsharnia, M., The efficiency of *Pistacia atlantica* extract as a natural coagulant aid on arsenic removal from aquatic environments. *J. Res. Health,* 2015; *5*: 42-49. [Google Scolar]
117. Bazrafshan, E., Alizadeh, M., Mahvi, A.H., Application of *Pistacia atlantica* (Baneh) seed extract as a natural coagulant for Reactive Red-120 removal from aqueous environments. Fresenius Environ. Bull, 2013; *22:* 727-732. [ResearchGate]
118. Bazrafshan, E., Kord Mostafapour, F., Ahmadabadi, M., Mahvi, A.H., Turbidity removal from aqueous environments by *Pistacia atlantica* (Baneh) seed extract as a natural organic coagulant aid. *Desalin. Water Treat,* 2015; *56:* 977-983, DOI: 10.1080/19443994.2014.942704
119. Haghdoost, F., Baradaran Mahdavi, M.M., Zandifar, A., Sanei, M.H., Zolfaghari, B., Haghjooy Javanmard, S., *Pistacia atlantica* resin has a dose-dependent effect on angiogenesis and skin burn wound healing in rat. *Evid. Based Complement. Alternat, Med,* 2013; 893425. DOI: 10.1155/2013/893425
120. Fkour, S., Heydari, S., Akradi, L., Rahimi, A.R., Effect of *Pistacia atlantica* Mastic Extract on Experimental Wound Healing and Various Biochemical Parameters of Blood Serum in Rabbit Models. *J. Med. Plants,* 2017; *16:* 78-91. [ResearchGate]
121. Shahouzehi, B., Sepehri, G.R., Sadeghiyan, S., Masoomi-Ardakani, Y., Effect of *Pistacia Atlantica* Resin Oil on Anti-Oxidant, Hydroxyprolin and VEGF Changes in Experimentally-Induced Skin Burn in Rat. *World J. Plast. Surg,* 2018; *7*: 357-363. DOI: 10.29252/wjps.7.3.357
122. Shahouzehi, B., Sepehri, G.R., Sadeghiyan, S., Masoomi-Ardakani, Y., Ameliorative Effects of *Pistacia atlantica* Resin Oil on Experimentally-Induced Skin Burn in Rat. *Res. J. Pharmacog,* 2019; *6:* 29-34. DOI: 10.22127/rjp.2018.80368
123. Dalvand, H., Hamdi, S.M., Kotanaee, F.N., Ahmadvand H., Evaluation of antibacterial and antifungal activities of *Pistacia atlantica* and *Pistacia khinjuk*. *Plant Sci. Today,* 2024; *11:* 634-640. DOI: 10.14719/pst.2855
124. Hazrati, S., Govahi, M., Ebadi, M-T., Habibzadeh, F., Comparison and Evaluation of Oil Content, Composition and Antioxidant Properties of *Pistacia atlantica* and *Pistacia khinjuk* Grown as Wild. *Int. J. Hort. Sci. Technol,* 2020; *7:* 165-174. DOI: 10.22059/ijhst.2020.287550.316
125. Dalvand, H., Hamdi, S.M., Kotanaee, F.N., Ahmadvand H., Phytochemicals analysis and antioxidant potential of hydroalcoholic ex-tracts of fresh fruits of *Pistacia atlantica* and *Pistacia khinjuk*. *Plant Sci. Today,* 2024; *11:* 513-520. DOI: 10.14719/pst.2853

126. Saffarzadeh, A., Vincze, L., Csapó, J., Determination of some anti-nutritional factors and metabolisable energy in acorn (*Quercus branti*), *Pistacia atlantica* and *Pistacia khinjuk* seed as new poultry diets. *Acta Agrar. Kaposvár,* 2000; *4*: 41-47. [Google Scholar]
127. Benhammou, N., Atik Bekkara, F., Kadifkova Panovska, T., Antioxidant and antimicrobial activities of the *Pistacia lentiscus* and *Pistacia atlantica* extracts. *Afr. J. Pharm. Pharmacol,* 2008; *2*: 22-28. [ResearchGate]
128. Amri, O., Elguiche, R., Tahrouch, S., Zekhnini, A., Hatimi, A., Antifungal and antioxidant activities of some aromatic and medicinal plants from the southwest of Morocco. *J. Chem. Pharm. Res,* 2015; *7*: 672-678. [ResearchGate]
129. Ayaz Tilkat, E., Batibay, H., Yener, I., Yilmaz, P.K., Akdeniz, M., Kaplan, A., Ercisli, S., Ertas, A., Holubec, V. Determination of Enzyme Inhibition Potential and Anticancer Effects of *Pistacia khinjuk* Stocks Raised in In Vitro and In Vivo Conditions. *Agronomy,* 2021; *11:* 154. DOI: 10.3390/agronomy11010154
130. Azadbakht, R., Jafarian Dehkordi, M., Fathi Hafshejani, R., Khanamani Falahatipour, S., Khanamani Falahati-pour, S., Effect of *Pistacia khinjuk* Hydroalcoholic Fruit Extract on Some Biological Parameters in Male Rats. *Pistachio Health J.,* 2021; *4*: 7-17. DOI: 10.22123/PHJ.2021.284207.1097
131. Kamal, F., Shahzad, M., Ahmad, T., Ahmed, Z., Tareen, R.B., Naz, R., Ahmad, A., Antihyperlipidemic effect of *Pistacia khinjuk*. *Biomed Pharmacother,* 2017; *96:* 695-699. DOI: 10.1016/j.biopha.2017.10.061
132. Esmat, A., Al-Abbasi, F.A., Algandaby, M.M., Moussa, A.Y., Labib, R.M., Ayoub, N.A., Abdel-Naim, A.B., Anti-inflammatory activity of *Pistacia khinjuk* in different experimental models: isolation and characterization of its flavonoids and galloylated sugars. *J. Med. Food,* 2012; *15*: 278-287. DOI: 10.1089/jmf.2011.0099
133. Taran, M., Sharifi, M., Azizi, E., Khanahmadi, M., Antimicrobial Activity of the Leaves of *Pistacia khinjuk*. *J. Med. Plants*, 2010; *9*: 81-85. [ResearchGate]
134. Tahvilian, R., Moradi, R., Zhale, H., Zangeneh, M.M., Zangeneh, A., Yazdani, H., Hajialiani, M., Ethnomedicinal plants: Study on antifungal activity of essential oil of *Pistacia khinjuk* (combined with the dominance γ-Terpinene) against Candida albicans. *Int. J. Pharm. Clin. Res,* 2016; *8*: 1369-1373. [ResearchGate]
135. Fouad, H.K., Muharam, Y.M., Sangar, S.S., Antibacterial Activity of *Pistacia khinjuk* Fatty Acids Extract on Some Pathogenic Bacteria. *Diyala J. Med*. 2017, *12*, 58-62. [ResearchGate]

136. Alkis Kocturk, S., Nabaz Fisal, D., Hakki, A., Evaluation of Antibacterial Activity of Essential Oil from *Pistacia Khinjuk* Stoks Gum of Iraqian Using Broth Microdilution. *Am. J. Lab. Med,* 2021; *6:* 27-30. DOI: 10.11648/j.ajlm.20210602.13
137. Tilkat, E.A., Haşimi, N., Suzerer, V., Antioxidant and antimicrobial responses associated with *in vitro* salt stress of *in vitro* and *in vivo* grown *Pistacia khinjuk* stocks. *Not. Bot. Horti Agrobot. Cluj-Napoca*, 2020; *48*: 1885-1900. DOI: 10.15835/48412016
138. Tahvilian, R., Moradi, R., Zhale, H., Zangeneh, M.M., Zangeneh, A., Yazdani, H., Hajialiani, M., Ethnomedicinal Plants: *In vitro* antibacterial effect of essential oil of *Pistacia khinjuk. Int. J. Sci. Eng. Res*, 2016; *7*: 437-447. [Google Scholar]
139. Tahvilian, R., Moradi, R., Zhaleh, H., Zangeneh, M.M., Zangeneh, A., Yazdani, H., Hajialiani, M., Chemical composition and screening of antibacterial activity of essential oil of *Pistacia khinjuk* against two selected pathogenic bacteria. *Ann. Trop. Med. Public Health*, 2017; *10*: 1159-1164. DOI: 10.4103/ATMPH.ATMPH_630_16
140. Taghizadeh, S.F., Davarynejad, G., Asili, J., Riahi-Zanjani, B., Nemati, S.H., Karimi, G., Chemical composition, antibacterial, antioxidant and cytotoxic evaluation of the essential oil from pistachio (*Pistacia khinjuk*) hull. *Microb. Pathog*, 2018; *124*: 76-81. DOI: 10.1016/j.micpath.2018.08.039
141. Bilal, M., Ishaq, M.S., Khattak, M., Amin, K., Anbarin, A., Sanam, F., Fayaz, M., Sabir, M.S., Phytochemical and Antimicrobial Screening of *Pistacia Khinjuk* Plant Extract. *Tob. Regul. Sci*, 2022; *8*: 2584-2596. [ResearchGate]
142. Khanahmadi, M., Shahrezaei, F., Sharifi, M., Rezanejade Bardajee, G., Ultrasound-Assisted Preparation and Optimization of Natural Flavoring Nanoemulsion for Dairy Products Based on *Pistacia Khinjuk* in Lab Scale. *Chem. Methodol*, 2023; *7:* 524-539. DOI: 10.22034/CHEMM.2023.382181.1649
143. Fattahi, A., Sakvand, T., Hajialyani, M., Shahbazi, B., Shakiba, M., Tajehmiri, A., Shakiba, E., Preparation and Characterization of *Pistacia khinjuk* Gum Nanoparticles Using Response Surface Method: Evaluation of Its Anti-Bacterial Performance and Cytotoxicity. *Adv. Pharm. Bull*, 2017; *7*: 159-164. DOI: 10.15171/apb.2017.020
144. Asnaashari, M., Bagher Hashemi, S.M., Mehr, H.M., Asadi Yousefabad, S.H., Kolkhoung (*Pistacia khinjuk*) Hull Oil and Kernel Oil as Antioxidative Vegetable Oils with High Oxidative Stability and Nutritional Value. *Food Technol. Biotechnol*, 2015; *53:* 81-86. DOI: 10.17113/b.53.01.15.3719
145. Hatamnia, A.A., Rostamzad, A., Malekzadeh, P., Darvishzadeh, R., Abbaspour, N., Hosseini, M., Nourollahi, K., Mehr, R.S., Antioxidant activity of different parts of

Pistacia khinjuk Stocks fruit and its correlation to phenolic composition. *Nat. Prod. Res*, 2015; *30*: 1445-1450. DOI: 10.1080/14786419.2015.1060593

146. Hosseinialhashemi, M., Tavakoli, J., Rafati, A., Ahmadi, F., The aplication of *Pistacia khinjuk* extract nanoemulsion in a biopolymeric coating to improve the shelf life extension of sunflower oil. *Food Sci. Nutr*, 2021; *9:* 920-928. DOI: 10.1002/fsn3.2057
147. Ebrahimi, Y., Abdalkareem Jasim, S., Mohammed, B.A., A Salman, N., Jabbar, A.M., M Hameed, N., Goudarzi, M.A., Parsaei, P., Determination of Antioxidant Properties of *Mentha longifolia*, *Pistacia khinjuk* and *Eucalyptus globulus*. *Casp. J. Environ. Sci*, 2022; 1-6. [Google Scholar]
148. Ahmed, S., Ssaeed-Ul-Hassan, S., Islam, M., Qureshi, F., Waheed, I., Munawar, I., Ishtiaq, S., Rasool, S., Akhtar, M.F., Chishti, S.A., Shabbir, M., Peerzada, S., Raza, M., Amir, K., Sharif, A., Antioxidant activity of *Pistacia khinjuk* supported by phytochemical investigation. *Acta Pol. Pharm*, 2017; *74*: 173-178. [ResearchGate]
149. Mirzaei, A., Rezaei, H., Salehpour, Z., Antioxidant effect of *Pistachio khinjuk* on alkali injury of rabbit's eye cornea. *Acta Med. Mediterr*, 2016; *32:* 1329-1333. [ResearchGate]
150. Ezatpour, B., Saedi Dezaki, E., Mahmoudvand, H., Azadpour, M., Ezzatkhah, F., *In Vitro* and *In Vivo* Antileishmanial Effects of *Pistacia khinjuk* against *Leishmania tropica* and *Leishmania major*. *Evid. Based Complement. Alternat. Med*, 2015; 149707. DOI: 10.1155/2015/149707
151. Mahmoudvand, H., Mirbadie, S.R., Kia, M.G., Badparva, E., Lori, S.S., Harandi, M.F., Efficacy of *Pistacia khinjuk* fruits on viability of hydatid cyst protoscoleces and its acute toxicity in mice model. *Iran. J. Parasitol*, 2016; *11:* 383-388. [ResearchGate]
152. Ghasemi Pirbalouti, A., Aghaee, K., Chemical Composition of Essential Oil of *Pistacia khinjuk* Stocks Grown in Bakhtiari Zagross Mountains, Iran. *Electron. J. Biol*, 2011; *7:* 67-69. [ResearchGate]
153. Tavakoli, J., Khodaparast, M.H., Chemical properties of the oil from *Pistacia khinjuk* fruits growing wild in Iran. *Chem. Nat. Compd*, 2013; *49:* 546-550. DOI: 10.1007/s10600-013-0667-0
154. Ayaz-Tilkat, E., Increasing the production of some specific cytotoxic triterpenoids and evaluation of the morpho-physiological response associated with *in vitro* salt stress in *Pistacia khinjuk* Stocks. *J. Chem. Metrol*, 2021; *15*: 76-87. DOI: 10.25135/jcm.53.20.10.1883

155. Ahmad, R.K., Dizaye, K.F., Al-Asady, A.A., Cytotoxic Effects of *Pistacia khinjuk* Seed Extracts on Different Cell Lines and its Mitogenic Effects on Blood Lymphocyte *In Vitro*. *Cihan Univ. Erbil Sci. J.*, 2020; *4*: 13-20. DOI: 10.24086/cuesj.v4n1y2020.pp13-20
156. Abolghasemi, A., Shojaaddini, M., Tajabadipour, A., Sefidkon, F., Composition of *Pistacia khinjuk* (Anacardiaceae) Leaf Essential Oil and its Insecticidal Activity on Common Pistachio Psyllid, *Agonoscena pistaciae* (Hem., Psylloidea). *J. Essent. Oil Bear. Plants*, 2018; *21:* 796-802. DOI: 10.1080/0972060X.2018.1498397
157. Ravan, S., Khan, A., Veysi, N., GC-MS analysis and insecticidal effect of methanol extract of *Pistacia khinjuk* Stocks leaves. *Acta Agric. Slov*, 2019; *113:* 231-237. DOI: 10.14720/aas.2019.113.2.4
158. Mirian, M., Behrooeian, M., Ghanadian, M., Dana, N., Sadeghi-Aliabadi, H., Cytotoxicity and antiangiogenic effects of *Rhus coriaria, Pistacia vera* and *Pistacia khinjuk* oleoresin methanol extracts. *Res. Pharm. Sci*, 2015; *10:* 233-240. [ResearchGate]
159. Fazel, H., Moslemi, H.R., Antioxidant Properties of *Pistacia khinjuk* Accelerate Healing of the Experimental Achilles Tendon Injury in Rabbits. *J. Med. Plants*, 2017; *16:* 33-42. [Google Scholar]
160. Dedoussis, G.V., Kaliora, A.C., Psarras, S., Chiou, A., Mylona, A., Papadopoulos, N.G., Andrikopoulos, N.K., Antiatherogenic effect of *Pistacia lentiscus* via GSH restoration and downregulation of CD36 mRNA expression. *Atherosclerosis*, 2004; *174:* 293-303. DOI: 10.1016/j.atherosclerosis.2004.02.011
161. Bouyahya, A., Assemian, I.C.C., Mouzount, H., Bourais, I., Et-Touys, A., Fellah, H., Benjouad, A., Dakka, N., Bakri, Y., Could volatile compounds from leaves and fruits of *Pistacia lentiscus* constitute a novel source of anticancer, antioxidant, antiparasitic and antibacterial drugs?. *Ind. Crops Prod*, 2019; *128:* 62-69. DOI: 10.1016/j.indcrop.2018.11.001
162. Catalani, S., Palma, F., Battistelli, S., Benedetti, S., Oxidative stress and apoptosis induction in human thyroid carcinoma cells exposed to the essential oil from *Pistacia lentiscus* aerial parts. *PLoS ONE*, 2017; *12*: e0172138. DOI:10.1371/journal.pone.0172138
163. Spyridopoulou, K., Tiptiri-Kourpeti, A., Lampri, E., Fitsiou, E., Vasileiadis, S., Vamvakias, M., Bardouki, H., Goussia, A., Malamou-Mitsi, V., Panayiotidis, M.I., Galanis, A., Pappa, A., Chlichlia, K., Dietary mastic oil extracted from *Pistacia lentiscus* var. *chia* suppresses tumor growth in experimental colon cancer models. *Sci. Rep*, 2017; *7*: 3782. DOI: 10.1038/s41598-017-03971-8

164. Kant, R., Singh, A., Raina, R., Dhingra, V., Bairwa, M., Kanwar, V., Real‐world safety and effectiveness of *Pistacia lentiscus* (mastic gum) in patients with diabetic gastroparesis: 24‐week interim analysis postintervention. *Indian J. Pharmacol*, 2024; *56*: 4-9. DOI: 10.4103/ijp.ijp_555_23
165. Bouakline, H., Bouknana, S., Merzouki, M., Ziani, I., Challioui, A., Bnouham, M., Tahani, A., EL Bachiri, A., The Phenolic Content of *Pistacia lentiscus* Leaf Extract and Its Antioxidant and Antidiabetic Properties. *Sci. World J*, 2024; 1998870. DOI: 10.1155/2024/1998870
166. El Omari, N., Naceiri Mrabti, H., Benali, T., Ullah, R., Iskandar Abdullah, A.A., Goh, K.W., Bouyahya, A., Expediting Multiple Biological Properties of Limonene and *α*-Pinene: Main Bioactive Compounds of *Pistacia lentiscus* L., Essential Oils. *Front. Biosci*, 2023; *28:* 229. DOI: 10.31083/j.fbl2809229
167. Hamdi, K., Boughandjioua Amoura, N., Noui, A., Dalia, F., Siline, M., Belkhiri, A., *Pistacia lentiscus* L. Fatty Oil and its Unsaponifiable Matter: Antidiabetic and Neuroprotective Activities. *J. Pharm. Res. Int*, 2023; *35:* 11-23. DOI: 10.9734/jpri/2023/v35i157376
168. Djerrou, Z., Boutobza, N., Bouzeguine, S., Khelfa, B., Brighet, I., Mokhbi, I., Saci Hadef, K., Pacha, Y.H., Effects of *Pistacia lentiscus* Virgin Fatty Oil on Lipidemic Profile and Carcass Characteristics in Hyperlipidemic *Oryctolagus cuniculus* Rabbits. *OnLine J. Biol. Sci*. 2016, *16*, 115-121. DOI: 10.3844/ojbsci.2016.115.121
169. Ostovan, M., Bagher Fazljou, S.M., Khazraei, H., Khodaei, M.A., Torbati, M., The Anti-Inflammatory Effect of *Pistacia lentiscus* in a Rat Model of Colitis. *J. Inflamm. Res*, 2020; 13: 369-376. DOI: 10.2147/JIR.S259035
170. Santarsiero, A., Onzo, A., Pascale, R., Acquavia, M.A., Coviello, M., Convertini, P., Todisco, S., Marsico, M., Pifano, C., Iannece, P., Gaeta, C., D'Angelo, S., Padula, M.C., Bianco, G., Infantino, V., Martelli, G., *Pistacia lentiscus* hydrosol: Untargeted metabolomic analysis and anti-inflammatory activity mediated by NF-κB and the citrate pathway. *Oxid. Med. Cell. Longiv*, 2020; 4264815. DOI: 10.1155/2020/4264815
171. Labhar, A., Benamari, O., El-Mernissi1, Y., Salhi, A., Ahari, M., El Barkany, S., Amhamdi, H., Phytochemical, Anti-Inflammatory and Antioxidant Activities of *Pistacia lentiscus* L. Leaves from Ajdir, Al Hoceima Province, Morocco. *Ecol. Eng. Environ. Technol*, 2023; *24:* 172-177. DOI: 10.12912/27197050/169935

172. Chaabani, E., Abert Vian, M., Dakhlaoui, S., Bourgou, S., Chemat, F., Ksouri, R., *Pistacia lentiscus* L. edible oil: green extraction with bio-based solvents, metabolite profiling and *in vitro* anti-inflammatory activity. *OCL*, 2019; *26*: 25. DOI: 10.1051/ocl/2019024
173. Bouriche, H., Saidi, A., Ferradji, A., Belambri, S.A., Senator, A., Anti-inflammatory and immunomodulatory properties of *Pistacia lentiscus* extracts. *J. Appl. Pharm. Sci*, 2016; *6:* 140-146. DOI: 10.7324/JAPS.2016.60721
174. Tassou, C.C., Nychas, G.J., Antimicrobial activity of the essential oil of mastic gum (*Pistacia lentiscus* var. *chia*) on Gram positive and Gram negative bacteria in broth and in Model Food System. *Int. Biodeter. Biodeg*, 1995; *36:* 411-420. DOI: 10.1016/0964-8305(95)00103-4
175. Debbabi, H., Nemri, K., Riahi, H., Antimicrobial Effects of *Pistacia lentiscus* L. Foliar Extracts on fresh turkey breast cutlets. *J. New Sci. Agric. Biotechnol*, 2017; 40: 2144-2152. [ResearchGate]
176. Orrù, G., Demontis, C., Mameli, A., Tuveri, E., Coni, P., Pichiri, G., Coghe, F., Rosa, A., Rossi, P., D'hallewin, G., The Selective Interaction of *Pistacia lentiscus* Oil vs. Human Streptococci, an Old Functional Food Revisited with New Tools. *Front. Microbiol*, 2017; *8*: 2067. DOI: 10.3389/fmicb.2017.02067
177. Dhieb, C., Trabelsi, H., Boukhchina, S., Sadfi-Zouaoui, N., Evaluation of Antifungal and Antibacterial Activities of Tunisian Lentisc (*Pistacia Lentiscus L.)* Fruit Oil. *J. Food Nutr. Res*, 2021; *9:* 177-181. DOI:10.12691/jfnr-9-4-1
178. Dabnoun, F.M., Mahjoub, W.S., Youssif. H.A., Antibacterial Activity of Leaves and Fruit of *Pistacia lentiscus*. *Int. J. Sci. Res. Biol. Sci*, 2022; *9:* 39-41. [Journal Website]
179. Raho, G.B., Evaluation of antibacterial activity of essential oil from Algerian *Pistacia lentiscus* resin. *J. Med. Bot*, 2017; *1*: 8-14. DOI: 10.25081/jmb.2017.v1.43
180. Mundarinti, S.H., Abdul-Ahad, H., Impact of *Pistacia lentiscus* Plant Gum on Particle Size and Swelling Index in Central Composite Designed Amoxycillin Trihydrate Mucoadhesive Microspheres. *Ind. J. Pharm. Edu. Res*, 2023; *57*: 763-772. DOI: 10.5530/ijper.57.3.93
181. Alhadi, E.A., Hamdi, O.A., Ayoub, S.M., Yagi, S., *In vitro* antioxidant and antimicrobial activities of *Pistacia lentiscus, Phyllanthus anderssonii* and *Cinnamomum verum* crude extracts and fractions. *J. Med. Plants Res*, 2018; *12:* 186-193. DOI: 10.5897/JMPR2018.6588

182. Magiatis, P., Melliou, E., Skaltsounis, A.L., Chinou, I.B., Mitaku, S., Chemical composition and antimicrobial activity of the essential oils of *Pistacia lentiscus* var. *chia*. *Planta Med*, 1999; *65:* 749-752. DOI: 10.1055/s-2006-960856
183. Koutsoudaki, C., Krsek, M., Rodger, A., Chemical composition and antibacterial activity of the essential oil and the gum of *Pistacia lentiscus* Var. *chia*. *J. Agric. Food Chem,* 2005; *53:* 7681-7685. DOI: 10.1021/jf050639s
184. Mharti, F.Z., Lyoussi, B., Abdellaoui, A., Antibacterial activity of the essential oils of *Pistacia lentiscus* used in Moroccan folkloric medicine. *Nat. Prod. Commun,* 2011; *6*: 1505-1506. DOI: 10.1177/1934578X1100601024
185. Gkogka, E., Hazeleger, W.C., Posthumus, M.A., Beumer, R.R., The Antimicrobial Activity of the Essential Oil of *Pistacia lentiscus* var. *Chia*. *J. Essent. Oil Bear. Plants,* 2013; *16:* 714-729. DOI: 10.1080/0972060X.2013.862074
186. Karygianni, L., Cecere, M., Argyropoulou, A., Hellwig, E., Skaltsounis, A.L., Wittmer, A., Tchorz, J.P., Al-Ahmad, A., Compounds from *Olea europaea* and *Pistacia lentiscus* inhibit oral microbial growth. *BMC Complement. Alternat. Med,* 2019; *19:* 51. DOI: 10.1186/s12906-019-2461-4
187. Amara, N., Benrima, A., Anba, C., Belkhir, H., Activité antimicrobienne de l'huile essentielle des fruits du Pistachier lentisque (*Pistacia lentiscus* L.). *Rev. Agrobiol,* 2019; *9*: 1669-1676. [ResearchGate]
188. Pachi, V.K., Mikropoulou, E.V., Dimou, S., Dionysopoulou, M., Argyropoulou, A., Diallinas, G., Halabalaki, M. Chemical Profiling of *Pistacia lentiscus* var. *Chia* Resin and Essential Oil: Ageing Markers and Antimicrobial Activity. *Processes*, 2021; *9*: 418. DOI: 10.3390/pr9030418
189. Ainane, A., Mohamed Abdoul-Latif, F., Mohamed, J., Boujaber, N., Oumaskour, K., Benaziz, M., Ainane, T., Chemical composition and antimicrobial activity of the essential oil of *Pistacia lentiscus* L. *PharmacologyOnline*, 2021; *2*: 518-526. [Journal Website]
190. Alabrahim, O.A., Azzazy, H.M., Antimicrobial Activities of *Pistacia lentiscus* Essential Oils Nanoencapsulated into Hydroxypropyl-beta-cyclodextrins. *ACS Omega*, 2024; *9*: 12622-12634. DOI: 10.1021/acsomega.3c07413
191. Djidel, S., Khennouf, S,, Ameni, D., Baghiani, A., Arrar, L., Charef, N., Antioxidant proprieties of *Pistacia lentiscus* L. leaves extracts. *Pharmacog. Commun*, 2013; *3*: 28-34. DOI: 10.5530/pc.2013.2.7

192. Rguez, S., Rebey, I.B., Bourgou, S., Hammami, M., Sellami, I.H., *Pistacia lentiscus* extracts as a valuable source of antioxidant compounds. *J. New Sci. Agric. Biotechnol*, 2023; *91*: 5160-5167. DOI: 10.55416/sunb.jns01.2302.09103
193. Abidi, A., Aissani, N., Sebai, H., Serairi, R., Kourda, N., Ben Khamsa, S., Protective Effect of *Pistacia lentiscus* Oil Against Bleomycin-Induced Lung Fibrosis and Oxidative Stress in Rat. *Nutr. Cancer*, 2017; *69:* 490-497. DOI: 10.1080/01635581.2017.1283423
194. Elgubbi, H.S., Mlitan, A.M., Shangi-Halfawi, A., Zorab, A., Phytochemical, Mineral Compounds and Anti-Oxidation Studies on *Pistacia Lentiscus* Shoot Extract. *Glob. J. Med. Res. B*, 2014; *14*: 33-39. [ResearchGate]
195. Mazari, A., Abdoun, L., Dif, N., Fedjer, Z., Blama, A., Mahdeb, A., Phytochemical composition and antioxidant activity of *Pistacia lentiscus* L. leaves and berries oilcake extracts. *Turk. J. Agric. Food Sci. Technol*, 2022; *10:* 669-677. DOI: 10.24925/turjaf.v10i4.669-677.4843
196. Hadini, A., Azdimousa, A., Khoulati, A., El bekkaye, K., Saalaoui, E., Valorization of Moroccan *Pistacia lentiscus* L. Leaves: Phytochemical and *In Vitro* Antioxidant Activity Evaluation Compared to Different Altitudes. *Sci. World J.*, 2022; 6367663. DOI: 10.1155/2022/6367663
197. Hadaya, O., Bransi-Nicola, R., Shalev, Y., Azaizeh, H., Roth, Z., Muklada, H., Deutch, T., Landau, S.Y., Argov-Argaman, N., *Pistacia lentiscus* extract enhances mammary epithelial cells' productivity by modulating their oxidative status. *Sci. Rep*, 2020; *10*: 20985. DOI: 10.1038/s41598-020-78065-z
198. Boke Sarikahya, N., Sumer Okkali, G., Ozan Coven, F., Isen, F., Goren, A.C., Nalbantsoy. A., Chemical characteristics and biological activity screening of *Pistacia lentiscus* mastic gum and leaves from Türkiye. *J. Sci. Food Agric*, 2024; *104:* 1691-1701. DOI: 10.1002/jsfa.13056
199. Zrira, S., Elamrani, A., Benjilali, B., Chemical composition of the essential oil of *Pistacia lentiscus* L. from Morocco—a seasonal variation. *Flavour Fragr. J.*, 2003; *18:* 475-480. DOI: 10.1002/ffj.1221
200. Amhamdi, H., Aouinti, F., Wathelet, J.P., Elbachiri, A., Chemical Composition of the Essential Oil of *Pistacia lentiscus* L. from Eastern Morocco. *Rec. Nat. Prod*, 2009; *3:* 90-95. [ResearchGate]
201. Llorens-Molina, J.A., Vacas González, S., Sabater Martínez, J., Essential oil composition of leaves of *Pistacia lentiscus* L. growing wild in Valencia (Spain). *Nat. Vol. Essent. Oil*, 2015; *2:* 17-26. [Google Scholar]

202. Mohand, B.A., El Antari, A., Benkhalti, F., Chemical Composition of *Pistacia lentiscus* Seeds' Oil from Moroccan High Atlas Mountain. *J. Food Qual*, 2020; 5190491. DOI: 10.1155/2020/5190491
203. Bensenane Dhina, F.K., Nassrallah, N., Choukchou‐Braham, A., Maachi, R., Use of *Pistacia lentiscus* leaves, after extraction of their oil, as a new biosorbent for the removal of dyes from water. *Euro-Mediterr. J. Environ. Integ*, 2021; *6:* 55. DOI: 10.1007/s41207-021-00255-6
204. Elloumi, W., Maalej, A., Ortiz, S., Michel, S., Chamkha, M., Boutefnouchet, S., Sayadi, S., *Pistacia lentiscus* L. Distilled Leaves as a Potential Cosmeceutical Ingredient: Phytochemical Characterization, Transdermal Diffusion, and Anti-Elastase and Anti-Tyrosinase Activities. *Molecules*, 2022; *27*: 855. DOI: 10.3390/molecules27030855
205. Quartu, M., Serra, M.P., Boi, M., Pillolla, G., Melis, T., Poddighe, L., Del Fiacco, M., Falconieri, D., Carta, G., Murru, E., Cordeddu, L., Piras, A., Collu, M., Banni, S., Effect of acute administration of *Pistacia lentiscus* L. essential oil on rat cerebral cortex following transient bilateral common carotid artery occlusion. *Lipids Health Dis*, 2012; *11:* 8. DOI: 10.1186/1476-511X-11-8
206. Attoub, S., Karam, S.M., Nemmar, A., Arafat, K., John, A., Al-Dhaheri, W., Al Sultan, M.A., Raza, H., Short-Term Effects of Oral Administration of *Pistacia Lentiscus* Oil on Tissue-Specific Toxicity and Drug Metabolizing Enzymes in Mice. *Cell Physiol. Biochem*, 2014; *33*: 1400-1410. DOI: 10.1159/000358706
207. Hamlat, N., Benarfa, A., Beladel, B., Begaa, S., Messaoudi, M., Aicha Hassani, A., Assessment of the contents of essential and potentially toxic elements in *Pistacia terebinthus* L. and *Pistacia lentiscus* L. by INAA technique. *J. Radioanal. Nucl. Chem*, 2019; *322:* 1127-1131. DOI: 10.1007/s10967-019-06815-z
208. Benalia, N., Boumechhour, A., Ortiz, S., Echague, C.A., Rose, T., Fiebich, B.L., Chemat, S., Michel, S., Deguin, B., Dahamna, S., Boutefnouchet, S., Identification of alkylsalicylic acids in Lentisk oil (*Pistacia lentiscus* L.) and viability assay on Human Normal Dermal Fibroblasts. *OCL*, 2021; *28*: 22. DOI: 10.1051/ocl/2021009
209. Mezni, F., Miled, K., Khaldi, A., Khouja, M.L., Boubaker, S., Maaroufi, A., Wound healing effect of *Pistacia lentiscus* L. seed oil: confirmation of its uses in Mediterranean traditional medicine. *Bol. Latinoam. Caribe Plant. Med. Aromat*, 2020; *19*: 314-320. DOI: 10.37360/blacpma.20.19.3.19

210. Firat, K., Nisari, M., Metin, I., Firat, Y.Y., Karatoprak, G.Ş., Hamurcu, Z., Effect of *Pistacia Terebinthus* (terebinth) resin extract on aggressive breast cancer cells. *Toxicol. Res*, 2024; *13:* tfae046. DOI: 10.1093/toxres/tfae046
211. Lampronti, I., Saab, A., Gambari, R., Medicinal plants from Lebanon: effects of essential oils from *Pistacia palaestina* on proliferation and erythroid differentiation of human leukemic K562 cells. *Minerva Biotecnol*, 2005; *17:* 153-158. [ResearchGate]
212. Awwad, O., Alabbassi, R., Abaza, I.F., Coperchini, F., Rotondi, M., Chiovato, L., Afifi, F.U., Effect of *Pistacia palaestina* Boiss. Essential Oil on Colorectal Cancer Cells: Inhibition of Proliferation and Migration. *J. Essent. Oil Bear. Plants*, 2020; *23*: 26-37. DOI: 10.1080/0972060X.2020.1729244
213. Najibullah, S.N., Ahamad, J., Sultana, S., Zafar, A., Chemical characterization and evaluation of anticancer activity of *Pistacia terebinthus* Linn. fruits essential oil. *J. Essent. Oil Bear. Plants*, 2022; *25:* 180-187. DOI: 10.1080/0972060X.2022.2052970
214. Giner-Larza, E.M., Máñez, S., Giner, R.M., Recio, M.C., Prieto, J.M., Cerdá-Nicolás, M., Ríos, J.L., Anti-inflammatory triterpenes from *Pistacia terebinthus* galls. *Planta Med*, 2002; *68:* 311-315. DOI: 10.1055/s-2002-26749
215. Poyrazoğlu Çoban, E., Biyik, H.H., Törün, B., Yaman, F., Evaluation the Antimicrobial Effects of *Pistacia terebinthus* L. and Papaver rhoeas l. Extracts Against Some Pathogen Microorganisms. *Indian J. Pharm. Edu. Res*, 2017; *51:* 377-380. DOI: 10.5530/ijper.51.3s.51
216. Kaya, M., Khadem, S., Cakmak, Y.S., Mujtaba, M., Ilk, S., Akyuz, L., Salaberria, A.M., Labidi, J., Abdulqadir, A.H., Deligöz, E., Antioxidative and antimicrobial edible chitosan films blended with stem, leaf and seed extracts of *Pistacia terebinthus* for active food packaging. *RSC Adv*, 2018; *8*: 3941-3950. DOI: 10.1039/c7ra12070b
217. Fidan, M.S., Baltaci, C., Öz, M., Akar, Z., Chemical composition of *Pistacia terebinthus* L. and its phytochemical and biological properties. *BioResources*, 2023; 18: 6862-6881. DOI: 10.15376/biores.18.4.6862-6881
218. Pulaj, B., Mustafa, B., Nelson, K., Quave, C.L., Hajdari, A., Chemical composition and in vitro antibacterial activity of *Pistacia terebinthus* essential oils derived from wild populations in Kosovo. *BMC Complement. Alternat. Med*. 2016, *16*, 147. DOI: 10.1186/s12906-016-1135-8
219. Turkoglu, S., Celik, S., Keser, S., Turkoglu, I., Yilmaz, O., The effect of *Pistacia terebinthus* extract on lipid peroxidation, glutathione, protein, and some enzyme activities

in tissues of rats undergoing oxidative stress. *Turk. J. Zool,* 2017; *41:* 82-88. DOI:10.3906/zoo-1508-41

220. Abu-Lafi, S., Al-Rimawi, F., Abbadi, J., Naser, S.A., Qabaha, K., Separation and identification of phenolics and flavonoids from wild *Pistacia palaestina* extract and its antioxidant activity. *J. Med. Plants Res,* 2020; *14:* 317-325. DOI: 10.5897/JMPR2020.6969
221. Bellifa, N., Benhaddou, A.I., Ferkous, H., Selka, M.A., Toumi, H., Achouri, M.Y., Antioxidant activity and polyphenol composition of *Pistacia terebinthus* fruit from Tessala (Western Algeria). *Nor. Afr. J. Food Nutr. Res,* 2021; *5*: 30-34. DOI: 10.51745/najfnr.5.11.30-34
222. Al-Marazeeq, K.M., Al-Ismail, K., Saleh, M., 2022. Butom (*Pistacia palaestina*, Boiss) fruit and its extracted oil functional characteristics. *Riv. Ital. Sostanze Gr,* 2022; *99:* 21-27. [Google Scholar]
223. Uysal, S., Sinan, K.I., Jekő, J., Cziáky, Z., Zengin, G., Chemical characterization, comprehensive antioxidant capacity, and enzyme inhibitory potential of leaves from *Pistacia terebinthus* L.(Anacardiaceae). *Food Biosci,* 2022; *48:* 101820. DOI: 10.1016/j.fbio.2022.101820
224. Kallis, M., Boura, K., Karabagias, I.K., Kanellaki, M., Koutinas, A.A. Beneficial Effects of *Pistacia terebinthus* Resin on Wine Making. *Appl. Sci,* 2022; 12: 9097. DOI: 10.3390/app12189097
225. Alshlash, M., Kitaz, A., Abdelwahed, W., Qualitative Phytochemical Screening, Antioxidant and Wound Healing Activities of *Pistacia palaestina* Boiss. Extracts. *Bull. Pharm. Sci. Assiut Univ,* 2023; *46:* 83-96. DOI: 10.21608/bfsa.2022.170738.1559
226. İçen, M.S., Yüce, H., Türkmen, N.B., Taşlıdere, A., Özek, D.A., Ünüvar, S., Protective Role of *Pistacia Palaestina* Boiss Fruit and Leaf Extracts in Isoproterenol-Induced Cardiac Ischemia. *Fabad J. Pharm. Sci,* 2024; *49:* 181-196. DOI: 10.55262/fabadeczacilik.1361591
227. Couladis, M., Ozcan, M., Tzakou, O., Akgul, A., Comparative essential oil composition of various parts of the turpentine tree (*Pistacia terebinthus* L) growing wild in Turkey. *J. Sci. Food Agric,* 2003; *83:* 136-138. DOI: 10.1002/jsfa.1295
228. Flamini, G., Bader, A., Cioni, P.L., Katbeh-Bader, A., Morelli, I., Composition of the essential oil of leaves, galls, and ripe and unripe fruits of Jordanian *Pistacia palaestina* Boiss. *J. Agric. Food Chem,* 2004; *52:* 572-576. DOI: 10.1021/jf034773t

229. Ozcan. M., Characteristics of fruit and oil of terebinth (*Pistacia terebinthus* L) growing wild in Turkey. *J. Sci. Food Agric*, 2004; 84: 517-520. DOI: 10.1002/jsfa.1632
230. Usai, M., Pintore, G., Chessa, M., Tirillini, B., Essential oil composition of different aerial parts of *Pistacia terebinthus* L. growing wild in Sardinia. *J. Essent. Oil Res*, 2006; *18:* 383-385. DOI: 10.1080/10412905.2006.9699121
231. Matthäus, B., Özcan, M.M., Quantitation of Fatty Acids, Sterols, and Tocopherols in Turpentine (*Pistacia terebinthu* s Chia) Growing Wild in Turkey. *J. Agric. Food Chem,* 2006; *54*: 7667-7671. DOI: 10.1021/jf060990t
232. Özcan, M.M., Tzakou, O., Couladis, M., Essential oil composition of the turpentine tree (*Pistacia terebinthus* L.) fruits growing wild in Turkey. *Food Chem*, 2009; *114*: 282-285. DOI: 10.1016/j.foodchem.2008.08.094
233. Kaya, F., Özer, A., Characterization of extracted oil from seeds of terebinth (*Pistacia terebinthus* L.) growing wild in Turkey. *Turk. J. Sci. Technol*, 2015; *10:* 49-57. [Google Scholar]
234. Pektanç Şengül, G., Deveci, E., Ahmet Şengül, S., Tekelioğ, Y., Investigation of the Protective Effect of Terebinth (*Pistacia terebinthus* L.) against Ovarian Ischemia-Reperfusion Damage in Rat. *J. Drug Deliv. Therap*, 2023; *13:* 82-87. DOI: 10.22270/jddt.v13i10.6264
235. Gultepe, E.E., Cetingul, I.S., Uyarlar, C., Iqbal, A., Rahman, A., Hacisalihoglu, S., Ozcinar, U., Bayram, I., Effects of *Pistacia terebinthus* seed meal and different storage times on egg quality of laying hens. *R. Bras. Zootec*, 2018; *47*: e20170322. DOI: 10.1590/rbz4720170322
236. Çetingül, I.S., Gültepe, E.E., Rahman, A., Iqbal, A., Uyarlar, C., Hacisalihoğlu, S., Özçinar, U., Bayram, I., *Pistacia terebinthus* as a dietary supplement for laying hens. *S. Afr. J. Anim. Sci*, 2020; *50:* 38-46. DOI: 10.4314/sajas.v50i1.5
237. Koten, M., Influence of roasted and unroasted terebinth (*Pistacia terebinthus*) on the functional, chemical and textural properties of wire-cut cookies. *Food Sci. Technol*, 2021; *41*: 245-253. DOI: 10.1590/fst.17020
238. Koten, M., Unsal, A.S., Nutritional, chemical and cooking properties of noodles enriched with terebinth (*Pistacia Terebinthus*) fruits roasted at different temperatures. *Food Sci. Technol*, 2022; *42:* e47120. DOI: 10.1590/fst.47120
239. Bahcecioglu, I.H., Ispiroglu, M., Tuzcu, M., Orhan, C., Ulas, M., Demirel, U., Yalniz, M., Özercan, I.H., Ilhan, N., Sahin, K., *Pistacia terebinthus* coffee protects against

thioacetamide-induced liver injury in rats. *Acta Med,* 2015; *58:* 56-61. DOI: 10.14712/18059694.2015.94

240. Erdem, F., Ozsahin, A.D., Tuzcu, Z., Influences of *Pistacia terebinthus* L. and *Rhus coriaria* L. fruits extracts on the levels of some biochemical parameters in liver tissue of Experimental Breast Cancer rats. *Prog. Nutr,* 2021; *23:* e2021063. DOI: 10.23751/pn.v23i2.10224
241. Erisir, F.E., Kirecci, O.A., Yilmaz, O., Ozsahin, A.D., Effects of *Pistacia terebinthus* L. Subsp. *palaestina* and *Rhus coriaria* L. plants on Some Biochemical Parameters of Brain Tissue of Sprague-Dawley Rats in Experimental Breast Cancer Model. *KSU J. Agric. Nat,* 2022; *25*: 33-41. DOI: 10.18016/ksutarimdoga.vi.1074615
242. Üvez, A., Kiliç, Ş., Esener, O.B., Ünder, D., Saltan, F.Z., Dimas, K., Armutak, E.I., Combinatorial Usage of Sumac Unriped Fruit Extract *(Rhus Coriaria)* and Tannic Acid Enhanced Synergistic Anti-Angiogenic Effect on Chick Chorioallantoic Membrane Assay. *Acta Vet. Eurasia,* 2021; 47: 2-9. DOI: 10.5152/actavet.2021.20019
243. Gabr, S.A., Alghadir, A.H., Potential anticancer activities of *Rhus coriaria* (sumac) extract against human cancer cell lines. *Biosci. Rep,* 2021; *41:* BSR20204384. DOI: 10.1042/BSR20204384
244. Tohma, H., Altay, A., Köksal, E., Gören, A.C., Gülçin, I., Measurement of anticancer, antidiabetic and anticholinergic properties of sumac (*Rhus coriaria*): Analysis of its phenolic compounds by LC–MS/MS. *J. Food Meas. Charact,* 2019; *13:* 1607-1619. DOI: 10.1007/s11694-019-00077-9
245. Abdallah, S., Abu-Reidah, I., Mousa, A., Abdel-Latif, T., *Rhus coriaria* (sumac) extract reduces migration capacity of uterus cervix cancer cells. *Rev. Bras. Farmacogn,* 2019; *29:* 591-596. DOI: 10.1016/j.bjp.2019.06.004
246. Golzadeh, M., Farhoomand, P., Daneshyar, M., Dietary *Rhus coriaria* L. powder reduces the blood cholesterol, VLDL-c and glucose, but increases abdominal fat in broilers. *S. Afr. J. Anim. Sci,* 2012; *42:* 398-405. DOI: 10.4314/sajas.v42i4.8
247. Shidfar, F., Rahideh, S.T., Rajab, A., Khandozi, N., Hosseini, S., Shidfar, S., Mojab, F., The effect of sumac (*Rhus coriaria* L.) Powder on Serum Glycemic Status, ApoB, ApoA-I and total antioxidant capacity in type 2 diabetic patients. *Iran. J. Pharm. Res,* 2014; *13:* 1249-1255. [ResearchGate]
248. Salimi, Z., Eskandary, A., Headari, R., Nejati, V., Moradi, M., Kalhori, Z., Antioxidant effect of aqueous extract of sumac (*Rhus coriaria* L.) in the alloxan-induced diabetic rats. *Indian J. Physiol. Pharmacol,* 2015; *59*: 87-93. [ResearchGate]

249. Shafiei, M., Nobakht, M., Moazzam, A.A., Lipid-lowering effect of *Rhus coriaria* L. (sumac) fruit extract in hypercholesterolemic rats. *Pharmazie*, 2011; *66:* 988-992. DOI: 10.1691/ph.2011.1555
250. Khalilpour, S., Sangiovanni, E., Piazza, S., Fumagalli, M., Beretta, G., Dell'Agli, M., *In vitro* evidences of the traditional use of *Rhus coriaria* L. fruits against skin inflammatory conditions. *J. Ethnopharmacol*, 2019; *238:* 111829. DOI: 10.1016/j.jep.2019.111829
251. Martinelli, G., Angarano, M., Piazza, S., Fumagalli, M., Magnavacca, A., Pozzoli, C., Khalilpour, S., Dell'Agli, M., Sangiovanni, E. The Nutraceutical Properties of Sumac (*Rhus coriaria* L.) against Gastritis: Antibacterial and Anti-Inflammatory Activities in Gastric Epithelial Cells Infected with *H. pylori*. *Nutrients*, 2022; *14:* 1757. DOI: 10.3390/nu14091757
252. Nasar-Abbas, S.M., Halkman, A.K., Antimicrobial effect of water extract of sumac (*Rhus coriaria* L.) on the growth of some food borne bacteria including pathogens. *Int. J. Food Microbiol*, 2004; *97:* 63-69. DOI: 10.1016/j.ijfoodmicro.2004.04.009
253. Adwan, G., Abu-Shanab, B., Abu-Safiya, D.I., Abu-Shanab, M., Antibacterial activity of *Rhus coriaria*. L extracts growing in Palestine. *IUG J. Nat. Stud*, 2005; *13:* 147-153. [ResearchGate]
254. Aliakbarlu, J., Mohammadi, S., Effect of Sumac (*Rhus coriaria* L.) and barberry (*Berberis vulgaris* L.) Water extracts on Microbial Growth and Chemical Changes in Ground Sheep Meat. *J. Food Proc. Preserv*, 2015; *39:* 1859-1866. DOI: 10.1111/jfpp.12423
255. Ismaeil, A.S., Saleh, F.A., Sumac (*Rhus coriaria* L) as Quorum Sensing Inhibitors in *Staphylococcus aureus*. *J. Pure Appl. Microbiol*, 2019; *13*: 5824. DOI: 10.22207/JPAM.13.4.56
256. Marouf, R., Ermolaev, A., Podoprigora, I., Volina, E., Zhigunova, A., Syrian sumac (*Rhus coriaria* L.) - An effective medicinal plant against multidrug resistant uropathogenic *Escherichia coli*. *J. Appl. Pharm. Sci*, 2022; *12:* 229-239. DOI: 10.7324/JAPS.2022.120522
257. Alaameri, S.K., Al-Hayanni, H.S., Antibacterial and anti-biofilm effects of Sumac (*Rhus coriaria* L) fruits extracts against some multidrug-resistant pathogenic bacteria. *J. Fac. Med. Baghdad*, 2022; *64*: 183-188. DOI: 10.32007/jfacmedbagdad.6431964
258. Salih, S.A., Al-Taee, N.T., The Effect of *Rhus coriaria* on the Microorganisms Present in the Gut, Gills and Aquarium Environment of Common Carp (*Cyprinus carpio L.*). *IOP*

Conf. Ser.: Earth Environ. Sci, 2023; *1214:* 012026. DOI: 10.1088/1755-1315/1214/1/012026

259. Özaydın, F., Vardin, H., Effects of antioxidant and physicochemical properties on antimicrobial activity of sumac (*Rhus coriaria* L.) plant spices which are collected from the southeastern Anatolia region of Turkey. *Harran Tarim Gida Bilim. Derg*, 2022; *26:* 327-335. DOI: 10.29050/harranziraat.1136348
260. Gabr, S.A., El-Metwally, M.M., Al-Ghadir, A.H., Antioxidant and antibacterial active constituents of *Rhus coriaria*. *Biotechnology,* 2014; *13:* 37-45. DOI: 10.3923/biotech.2014.37.45
261. Mahdavi, S., Hesami, B., Sharafi, Y., Antimicrobial and Antioxidant Activities of Iranian Sumac (*Rhus coriaria* L.) Fruit Ethanolic Extract. *J. Appl. Microbiol. Biochem*, 2018; *2:* 5. DOI: 10.21767/2576-1412.100021
262. Naik, R.R., Shakya, A.K., Ferri, B., Oriquat, G.A., Pistelli, L., Numan, N.A., Volatile Composition and Biological Activity of Jordanian Commercial Samples of R. coriaria L. Fruits. *Molecules*, 2021; 26: 5691. DOI: 10.3390/molecules26185691
263. Çalişkan, R., Sari, S.P., Büyükkiliç Altınbaşak, B., Dinç, H.O., Balekoğlu, A., Issa, G., Yüksel Mayda, P., Bioactive Components and Antioxidant and Antimicrobial Activities of *Rhus coriaria*, a Sumac species found in Turkey. *Bezmialem Sci*, 2022; *10:* 796-804. DOI: 10.14235/bas.galenos.2022.84803
264. Öz, M., Baltacı, C., Fidan, M.S., Karataş, Ş.M., Antimicrobial, Antioxidant, and Phytochemical Activities of *Rhus coriaria* L. and its Phenolic Compounds and Volatile Component Analyses. *Bio Resources*, 2023; *18:* 6842-6861. DOI: 10.15376/biores.18.4.6842-6861
265. Shahrivari, S., Zeebaree, S.M., Alizadeh‑Salteh, S., Feizy, H.S., Morshedloo, M.R., Phytochemical variations antioxidant, and antibacterial activities among zebaria sumac (*Rhus coriaria* var. *zebaria*) populations in Iraq. *Sci. Rep*, 2024; *14*: 4818. DOI: 10.1038/s41598-024-53635-7
266. Gezici, S., Neuroprotective Effect, Antimicrobial and Antioxidant Potentials of Sumac (*Rhus coriaria* L.) Fruit Extracts. *Hacettepe J. Biol. Chem*, 2019; *47*: 165-170. DOI: 10.15671/HJBC.621202
267. Gabr, S.A., Alghadir, A.H., Evaluation of the Biological Effects of Lyophilized Hydrophilic Extract of *Rhus coriaria* on Myeloperoxidase (MPO) Activity, Wound

Healing, and Microbial Infections of Skin Wound Tissues. *Evid. Based Complement. Alternat. Med*, 2019; 5861537. DOI: 10.1155/2019/5861537

268. Ashoori, F., Fakhar, M., Goli, H.R., Mirzaee, F., Faridnia, R., Kalani, H., Shahani, S., Antileishmanial and antibacterial activities of the hydroalcoholic extract of *Rhus coriaria* L. *Ann. Parasitol*, 2020; *66*: 157-163. DOI: 10.17420/ap6602.250
269. Singh, O., Ali, M., Akhtar, N., New Antifungal Xanthones from the Seeds of *Rhus coriaria* L. *Z. Naturforsch*, 2011; *66c:* 17-23. DOI: 10.5560/ZNB.2011.66c0017
270. Rashid, T.S., Sijam, K., Kadir, J., Saud, H.M., Awla, H.K., Zulperi, D., Hata, E.M., Screening for active compounds in *Rhus coriaria* L. crude extract that inhibit the growth of *Pseudomonas syringae* and *Ralstonia solanacearum*. *Indian J. Agric. Res*, 2016; *50:* 15-21. DOI: 10.18805/ijare.v50i1.8583
271. Kacergius, T., Abu-Lafi, S., Kirkliauskiene, A., Gabe, V., Adawi, A., Rayan, M., Qutob, M., Stukas, R., Utkus, A., Zeidan, M., Rayan, A., Inhibitory capacity of *Rhus coriaria* L. extract and its major component methyl gallate on *Streptococcus mutans* biofilm formation by optical profilometry: Potential applications for oral health. *Molecular Mol. Rep*, 2017; *16:* 949-956. DOI: 10.3892/mmr.2017.6674
272. Zhaleh, M., Sohrabi, N., Zangeneh, M.M., Zangeneh, A., Moradi, R., Zhaleh, H., Chemical composition and antibacterial effects of essential oil of *Rhus coriaria* fruits in the west of Iran (Kermanshah). *J. Essent. Oil Bear. Plants*, 2018; *21*: 493-501. DOI: 10.1080/0972060X.2018.1462739
273. Joseph, G., Koltai, H., Ron, E.Z., Azzam, N., Hazan, H., Raskin, I., Mengeritsky, G., Mazuz, M., Shalev, N., Biran, D., Poulev, A., Fridlender, B., *Rhus coriaria* L.(sumac) leaves harbour robust antimicrobial activity. *J. Herb. Med*, 2023; *41:* 100729. DOI: 10.1016/j.hermed.2023.100729
274. Li, T., Wang, S., Fan, P., Lou, H., New coumarins and monoterpene galloylglycoside from the stem bark of *Sapium baccatum*. *Fitoterapia*, 2019; *134:* 435-442. DOI: 10.1016/j.fitote.2019.03.011
275. Heydari, M., Nimrouzi, M., Hajmohammadi, Z., Faridi, P., Omrani, G.R., Shams, M., *Rhus coriaria* L. (Sumac) in Patients Who Are Overweight or Have Obesity: A Placebo-Controlled Randomized Clinical Trial. *Shiraz E-Med J.*, 2019; *20*: e87301. DOI: 10.5812/semj.87301
276. Bozan, B., Kosar, M., Tunalier, Z., Ozturk, N., Baser, K.H., Antioxidant and free radical scavenging activities of *Rhus coriaria* and *Cinnamomum cassia* extracts. *Acta Aliment*, 2003; *32:* 53-61. DOI: 10.1556/AAlim.32.2003.1.7

277. Najjar, F., Rizk, F., Carnac, G., Nassar, R., Jabak, S., Sobolev, A.P., Bou Saada, Y., El Sabban, M., Hamade, A., Protective effect of *Rhus coriaria* fruit extracts against hydrogen peroxide-induced oxidative stress in muscle progenitors and zebrafish embryos. *PeerJ*., 2017; *5*: e4144. DOI: 10.7717/peerj.4144
278. Ozcan, A., Susluoglu, Z., Nogay, G., Ergun, M., Sutyemez, M., Phytochemical characterization of some sumac (*Rhus coriaria* L.) genotypes from southern part of turkey. *Food Chem*, 2021; *358*: 129779. DOI: 10.1016/j.foodchem.2021.129779
279. Mazzara, E., Caprodossi, A., Mustafa, A.M., Maggi, F., Caprioli, G. Phytochemical Investigation of Sumac (*Rhus coriaria* L.) Fruits from Different Sicilian Accessions. *Foods*, 2023; *12:* 4359. DOI: 10.3390/foods12234359
280. Sharbati, A., Daneshyar, M., Aghazadeh, A., Aliakbarlu, J., Hamian, F., Effects of *Rhus coriaria* on nutrient composition, thiobarbituric acid reactive substances and colour of thigh meat in heat-stressed broilers. *S. Afr. J. Anim. Sci*, 2015; *45:* 49-55. DOI: 10.4314/sajas.v45i1.6
281. Emanet, M., Okuda, M., Şen, Ö., Lavarello, C., Petretto, A., Takeoka, S., Ciofani, G., Sumac (*Rhus coriaria*) Extract-Loaded Polymeric Nanosheets Efficiently Protect Human Dermal Fibroblasts from Oxidative Stress. *ACS Appl. Bio Mater*, 2022; *5:* 5901-5910. DOI: 10.1021/acsabm.2c00857
282. Ardalani, H., Hassanpour Moghadam, M., Rahimi, R., Soltani, J., Mozayanimonfared, A., Moradi, M., Azizi, A., Sumac as a novel adjunctive treatment in hypertension: a randomized, double-blind, placebo-controlled clinical trial. *RSC Adv*, 2016; *6*: 11507-11512. DOI: 10.1039/c5ra22840a
283. Anwar, M.A., Samaha, A.A., Baydoun, S., Iratni R., Eid, A.H., *Rhus coriaria* L. (Sumac) Evokes Endothelium-Dependent Vasorelaxation of Rat Aorta: Involvement of the cAMP and cGMP Pathways. *Front. Pharmacol*, 2018; *9*: 688. DOI: 10.3389/fphar.2018.00688
284. Toghyani, M., Faghan, N., Effect of Sumac (*Rhus Coriaria* L.) Fruit Powder as an Antibiotic Growth Promoter Substitution on Growth Performance, Immune Responses and Serum Lipid Profile of Broiler Chicks. *Indian J. Pharm. Edu. Res*, 2017; *51*: 295-298. DOI: 10.5530/ijper.51.3s.33
285. Azizi, M., Passantino, G., Akter, Y, Javandel, F., Seidavi, A., Bahar, B., O'Shea, C.J., Tufarelli, V., Laudadio, V., Effect of incremental levels of sumac (*Rhus coriaria* L.) seed powder on growth, carcass traits, blood parameters, immune system and selected ileal microorganisms of broilers. *Vet. Ital*, 2020; *6*: 185-192. DOI: 10.12834/VetIt.1892.10049.3

286. Gharaei, A., Shafiei, M., Mirdar Harijani, J., Hassanein, P., Arshadi, A., Immune Responses and Haematological Parameters Changes of Rainbow Trout (*Oncorhynchus mykiss*) under Effects of Dietary Administration of Sumac (*Rhus coriaria* L.). *J. Agric. Sci. Tech*, 2020; *22*: 173-186. [ResearchGate]
287. Zadeh, A.M., Mirghelenj, S.A., Alishah, H.S., Hasanlou. P., Effects of sumac fruit powder (*Rhus coriaria L.*) supplementation on productive performance, egg quality traits and serum biochemical parameters in old laying hens, *Ital. J. Anim. Sci*, 2021; *20*: 1348-1356. DOI: 10.1080/1828051X.2021.1965922
288. Al-Saadi, M.J., Effects of Sumac (*Rhus coriaria*) Seeds and Exogenous Fibrolytic Enzymes on Wool Growth of Awassi Male Lambs. *World Vet. J*., 2023; *13*: 293-299. DOI: 10.54203/scil.2023.wvj31
289. Gulmez, M., Oral, N., Vatansever, L., The Effect of Water Extract of Sumac (*Rhus coriaria* L.) and Lactic Acid on Decontamination and Shelf Life of Raw Broiler Wings. *Poult. Sci*, 2006; *85*: 1466-1471. DOI: 10.1093/ps/85.8.1466
290. Sakhr, K., El Khatib, S., The use of Syrian Sumac (*Rhus coriaria*) as a meat tenderizer: effect on fat, protein and collagen profiles on *pectoralis superficialis* cut. *Turk. J. Agric. Food Sci. Technol*, 2019; *7:* 1203-1215. DOI: 10.24925/turjaf.v7i8.1203-1215.2629
291. Dziki, D., Cacak-Pietrzak, G., Hassoon, W.H., Gawlik-Dziki, U., Sułek, A., Różyło, R., Sugier, D., The fruits of sumac (*Rhus coriaria* L.) as a functional additive and salt replacement to wheat bread. *LWT*, 2021; *136:* 110346. DOI: 10.1016/j.lwt.2020.110346
292. Mardoukhi, S., Alipour Eskandani, M., Alizadeh, E., Effect of aqueous extract of Iranian Sumac (*Rhus criaria* L.) on the shelf life of *Hypophthalmichthys molitrix* fillet during storage at 4 °C. *Iran. J. Fish. Sci*, 2021; *20:* 615-627. DOI: 10.22092/ijfs.2021.124000
293. Al-Hamdany, N.F., Al-Flayeh, K.A., The effects of polyphenol extract of Sumac (*Rhus coriaria*) fruits on body weights, lipid profile and leptin hormon levels in experimental mice. *Rafidain J. Sci*, 2019; *28*: 61-75. DOI: 10.33899/rjs.2019.163302
294. Kazemi S, Shidfar F, Ehsani S, Adibi P, Janani L, Eslami O. The effects of sumac (*Rhus coriaria* L.) powder supplementation in patients with non-alcoholic fatty liver disease: A randomized controlled trial. *Complement. Ther. Clin. Pract*, 2020; *41:* 101259. DOI: 10.1016/j.ctcp.2020.101259
295. Janbaz, K.H., Shabbir, A., Mehmood, M.H., Gilani, A.H., Pharmacological basis for the medicinal use of *Rhus coriaria* in hyperactive gut disorders. *Bangladesh J. Pharmacol*, 2014; *9*: 636-644. DOI: 10.3329/bjp.v9i4.20879

296. Mohammadi, S., Zarei, M., Zarei, M.M., Salehi, I.,Effect of Hydroalcoholic Leaves Extract of *Rhus Coriaria* on Pain in Male Rats. *Anesth. Pain Med*, 2016; *6*: e32128. DOI: 10.5812/aapm.32128
297. Amin, Z.A., Effect of *Rhus coriaria* extract on wound healing potential in Sprague Dawley rats. *Zanco J. Med. Sci*, 2018; *22*: 89-95. DOI: 10.15218/zjms.2018.012
298. Altamimi, A.S., Naghmouchi, S., Interspecific variations in the habitats of *Rhus tripartitum* L. populations in Saudi Arabia leading to changes in morphological traits and allelopathic activity. *CERNE*, 2021; *27:* e-102993, DOI: 10.1590/01047760202127012993
299. Tlili, H., Macovei, A., Buonocore, D., Lanzafame, M., Najjaa, H., Lombardi, A., Pagano, A., Dossena, M., Verri, M., Arfa, A.B., Neffati, M., Doria, E., The polyphenol/saponin-rich *Rhus tripartita* extract has an apoptotic effect on THP-1 cells through the PI3K/AKT/mTOR signaling pathway. *BMC Complement. Med. Ther*, 2021; *21:* 153. DOI: 10.1186/s12906-021-03328-9
300. Ben Barka, Z., Aouadhi, C., Tlili, M., Alimi, H., Ben Miled, H., Ben Rhouma, K., Sakly, M., Ksouri, R., Schneider, Y.J., Maaroufi, A., Tebourbi, O., Evaluation of the anti-diarrheal activity of the hydromethanolic root extract of *Rhus tripartita* (Ucria) (Anacardiacae). *Biomed. Pharmacother,* 2016; *83*: 827-834. DOI: 10.1016/j.biopha.2016.07.055
301. Tlili, H., Hanen, N., Ben Arfa, A., Neffati, M., Boubakri, A., Buonocore, D., Dossena, M., Verri, M., Doria, E., Biochemical profile and in vitro biological activities of extracts from seven folk medicinal plants growing wild in southern Tunisia. *PLoS One*, 2019; *14:* e0213049. DOI: 10.1371/journal.pone.0213049
302. Ben Barka, Z., Lahbib, K., Aouadhi, C., Ladjimi, M.H., Ben Miled, H., Ben Rhouma, K., Sakly, M., Maaroufi, A., Schneider, Y.J., Tebourbi, O., Antioxidant, Antimicrobial and Anti-Inflammatory Activities of Edible *Rhus Tripartita* (Ucria) Hydromethanolic Extracts. *J. Pharm. Pharmacol. Res*, 2019; *3*: 74-87. DOI: 10.26502/jppr.0022
303. Mosaoa, R.M., Kumosani, T.A., Yaghmoor, S.S., Rihan, S., Moselhy, S.S., *Rhus tripartite* methanolic extract alleviates propylparaben-induced reproductive toxicity via anti-inflammatory, antioxidant, 5-α reductase in male rats. *Environ. Sci. Pollut. Res. Int*, 2023; *30:* 76969-76976. DOI: 10.1007/s11356-023-27802-8
304. Benaissa, A., Dahbi, L.F., Tabra, O., Djellout N.C., Influence of leaf extracts and total flavonoids of *Rhus tripartita (Ucria) Grande* on phytobeneficial bacteria associated with its rhizosphere. *Alger. J. Biosci*, 2021; *2*: 30-36. DOI: 10.5281/zenodo.5047689

305. Mohammed, A.I., Phytoconstituents and the study of antioxidant, antimalarial and antimicrobial activities of *Rhus tripartita* growing in Egypt. *J. Pharmacog. Phytochem,* 2015; *4*: 276-281. [Google Scholar]
306. Alam, P., Parvez, M.K., Arbab, A.H., Siddiqui, N.A., Al-Dosary, M.S., Al-Rehaily, A.J., Ahmed, S., Kalam, M.A., Ahmad, M.S., 2017. Inter-species comparative antioxidant assay and HPTLC analysis of sakuranetin in the chloroform and ethanol extracts of aerial parts of *Rhus retinorrhoea* and *Rhus tripartita*. *Pharm. Biol*, 2017; *55:* 1450-1457. DOI: 10.1080/13880209.2017.1304428
307. Benlembarek, K., Lograda, T., Ramdani, M., Figuereddo, G., Chalard, P., Chemical composition and antibacterial activities of *Rhus tripartita* essential oils from Algeria. *Biodiversitas*, 2021; *22:* 480-490. DOI: 10.13057/biodiv/d220158
308. Shahat, A.A., Alsaid, M.S., Rafatullah, S., Al-Sohaibani, M.O., Parvez, M.K., Al-Dosari, M.S., Exarchou, V., Pieters, L., Treatment with *Rhus tripartita* extract curtails isoproterenol-elicited cardiotoxicity and oxidative stress in rats. *BMC Complement. Altern. Med*, 2016; *16:* 351. DOI: 10.1186/s12906-016-1318-3
309. Abcha, I., Criado, P., Salmieri, S., Najjaa, H., Isoda, H., Neffati, M., Lacroix, M., Edible *Rhus tripartita* fruit as source of health‐promoting compounds: characterization of bioactive components and antioxidant properties. *Eur. Food Res. Technol*, 2019; *245:* 2641-2654. DOI: 10.1007/s00217-019-03374-1
310. Hadjadj, S., Esnault, M-A., Berardocco, S., Guyot, S., Bouchereau, A., Ghouini, F., Lamini, R., Hadj-Khelil, A.O., Polyphenol composition and antioxidant activity of *Searsia tripartita* and *Limoniastrum guyonianum* growing in Southeastern Algeria. *Sci, Afr*, 2020; *10:* e00585. DOI: 10.1016/j.sciaf.2020.e00585
311. Jallali, I., Zaouali, Y., Mkadmini, K., Smaoui, A., Abdelly, C., Ksouri, R., Phytochemistry and Antioxidant Activities of *Rhus tripartitum* (Ucria) Grande Leaf and Fruit Phenolics, Essential Oils, and Fatty Acids. *Nat. Prod. Commun.* 2022; *17*: 1-8. DOI: 10.1177/1934578X221089110
312. Parvez, M.K., Al-Dosari, M.S., Abdelwahid, M.A., Alqahtani, A.S., Alanzi, A.R., Novel anti-hepatitis B virus-active catechin and epicatechin from *Rhus tripartita*. *Exp. Ther. Med*, 2022; *23:* 398. DOI: 10.3892/etm.2022.11325
313. Baaka, N., Sumac (*Rhus Tripartita*): a natural dye used for simultaneous coloration and functional finishing on textiles. *J. Nat. Fibers*, 2021; *19:* 7265-7274. DOI: 10.1080/15440478.2021.1944437

314. Benaissa, A., Djebbar, R., Boucelha, L., Eco-physiological and biochemical characterization of *Rhus tripartita* (Ucria) Grande growing in Algerian Sahara under arid climate. *Adv. Hort. Sci*, 2019; *33:* 13-21. DOI: 10.13128/ahs-22679
315. Najah, Z., Alshawish, M. GC-MS Analysis of *Rhus Tripartita* Roots Extract. *J. Humanit. Appl. Sci*, 2023; *8:* 331–339. [Google Scholar]
316. Alqahtani, A.S., Abdel-Mageed, W.M., Shahat, A.A., Parvez, M.K., Al-Dosari, M.S., Malik, A., Abdel-Kader, M.S., Alsaid, M.S., Proanthocyanidins from the stem bark of *Rhus tripartita* ameliorate methylgloxal-induced endothelial cell apoptosis. *J. Food Drug Anal*, 2019; *27:* 758-765. DOI: 10.1016/j.jfda.2019.02.002
317. Shahat, A.A., Ibrahim, A.Y., Al-Ghamdi, A.A., Alsaid, M.S., Phytochemical investigation of *Rhus tripartita* and its activity against cyclooxygenases and acetylcholinesterase. *Trop. J. Pharm. Res,* 2016; 15: 1697-1706. DOI: 10.4314/tjpr.v15i8.15
318. Ben Barka, Z., Tlili, M., Alimi, H., Ben Miled, H., Ben Rhouma, K., Sakly, M., Ksouri, R., Schneider, Y.J., Tebourbi, O., Protective effects of edible *Rhus tripartita* (Ucria) stem extract against ethanol-induced gastric ulcer in rats. *J. Funct. Foods*, 2017; *30*: 260-269. DOI: 10.1016/j.jff.2017.01.021
319. Chetoui, I., Messaoud, C., Boussaid, M., Zaouali, Y., Antioxidant activity, total phenolic and flavonoid content variationamong Tunisian natural populations of *Rhus tripartita* (Ucria) Grandeand *Rhus pentaphylla* Desf. *Ind. Crops Prod*, 2013; *51:* 171-177. DOI: 10.1016/j.indcrop.2013.09.002
320. Morgan, E.C., Overholt, W.A., Potential allelopathic effects of Brazilian pepper (*Schinus terebinthifolius* Raddi, Anacardiaceae) aqueous extract on germination and growth of selected Florida native plants. *J. Torrey Bot. Soc*, 2005; *132:* 11-15. [ResearchGate]
321. Donnelly, M.J., Green, D.M., Walters, L.J., Allelopathic effects of fruits of the Brazilian pepper *Schinus terebinthifolius* on growth, leaf production and biomass of seedlings of the red mangrove *Rhizophora mangle* and the black mangrove Avicennia germinans. *J. Exp. Mar. Biol. Ecol*, 2008; *357:* 149-156. DOI: 10.1016/j.jembe.2008.01.009
322. Konar, L., Sheldon, T., Garvis, S., Donnelly, M., Allelopathy of Invasive Brazilian Pepper (*Schinus terebinthifolius*) on Mobile Invertebrates from the Indian River Lagoon. *Pegasus Rev. UCF Undergrad. Res. J*, 2018; *3*: 3. [Google Scholar]
323. Nickerson, K., Flory, S.L., Competitive and allelopathic effects of the invasive shrub *Schinus terebinthifolius* (Brazilian peppertree). *Biol. Invasions,* 2015; *17:* 555–564. DOI 10.1007/s10530-014-0748-4

324. Fedel-Miyasato, L.E., Formagio, A.S., Auharek, S.A., Kassuya, C.A., Navarro, S.D., Cunha-Laura, A.L., Monreal, A.C., Vieira, M.C., Oliveira, R.J., Antigenotoxic and antimutagenic effects of *Schinus terebinthifolius* Raddi in Allium cepa and Swiss mice: a comparative study. *Genet. Mol. Res*, 2014; *13*: 3411-3425. DOI: 10.4238/2014.April.30.2
325. Bendaoud, H., Romdhane, M., Souchard, J.P., Cazaux, S., Bouajila, J., Chemical Composition and Anticancer and Antioxidant Activities of *Schinus Molle* L. and *Schin*us *Terebinthifolius* Raddi Berries Essential Oils. *J. Food Sci*, 2010; *75*: 466-472. DOI: 10.1111/j.1750-3841.2010.01711.x
326. Nascimento, M., Santos, P.H., Abreu, F.F., Shan, A.Y., Amaral, R.G., Andrade, L.N., Souto, E.B., Santos, M.I., Graça, A., Souza, J.B., Silva, J.P., Tavares, J., Silva, A.M., Correa, C.B., Montalvão, M.M., Piacente, S., Pizza, C., Camargo, E.A., Estevam, C., *Schinus terebinthifolius* Raddi (Brazilian pepper) leaves extract: in vitro and in vivo evidence of anti-inflammatory and antioxidant properties. *Inflammopharmacology,* 2023; *31:* 2505-2519. DOI: 10.1007/s10787-023-01316-8
327. Alves, L.A., Freires Ide, A., de Souza, T.M., de Castro, R.D., In vitro activity of *Schinus terebinthifolius* (Brazilian pepper tree) on Candida tropicalis growth and cell wall formation. *Acta Odontol. Latinoam,* 2012; *25:* 287-292. [ResearchGate]
328. Gomes, F.S., Procópio, T.F., Napoleão, T.H., Coelho, L.C., Paiva, P.M., Antimicrobial lectin from *Schinus terebinthifolius* leaf. *J. Appl. Microbiol,* 2013; *114*: 672-679. DOI: 10.1111/jam.12086
329. Alves, L.A., Freires Ide, A., Pereira, T.M., de Souza, A., Lima Ede, O., de Castro, R.D., Effect of *Schinus terebinthifolius* on Candida albicans growth kinetics, cell wall formation and micromorphology. *Acta Odontol. Scand,* 2013; *71*: 965-971. DOI: 10.3109/00016357.2012.741694
330. Salem, M.Z., El-Shikh, M.S., Ali, H.M., Antibacterial activity of extract from the stem bark of *Schinus terebinthifolius*. *J. Pure Appl. Microbiol,* 2014; *8*: 3865-3870. [Journal Website]
331. Ghanney, N., Rhouma, A., *Schinus terebinthifolius* Raddi (Anacardiaceae) leaf extracts: Antibacterial activity against two *Agrobacterium tumefaciens* strains. *J. Crop Prot,* 2015; *4:* 85-96. [ResearchGate]
332. Menezes Torres, K.A., Rosa Lima, S.M., Ykko Ueda, S.M., Activity of the aqueous extract of *Schinus terebinthifolius* Raddi on strains of the *Candida* genus. *Rev. Bras. Ginecol. Obstet,* 2016; *38:* 593-599. DOI: 10.1055/s-0036-1597694

333. Faccin, Â., Schuch, L.F., Schiavon, D.B., Gonçalves, C.L., Mota, F.V., Lessa, L.F., 2016. Use of hydroalcoholic extract of *Schinus terebinthifolius* Raddi in pre-and post-milking antisepsis of the teat in dairy cows. *Ciênc. Anim. Bras*, 2016; *17:* 90-97. DOI: 10.1590/1089-6891v17i123998
334. Viegas, D., Amêndola, I., Botrel, T.M., Oliveira, F.E., Figueira, L.W., Sper, F.L., Oliveira, J.R., Oliveira, L.D., *Schinus terebinthifolius* (Brazilian Peppertree) extract used as antifungal to control Candida spp. in planktonic cultures and biofilms. *Brazilian Dent. Sci*, 2020; *23:* biblio-1122044. DOI: 10.14295/bds.2020.v23i4.2077
335. El-Massry, K.F., El-Ghorab, A.H., Shaaban, H.A., Shibamoto, T., Chemical compositions and antioxidant/antimicrobial activities of various samples prepared from *Schinus terebinthifolius* leaves cultivated in Egypt. *J. Agric. Food Chem*, 2009; *57:* 5265-5270. DOI: 10.1021/jf900638c
336. Gundidza, M., Gweru, N., Magwa, M.L., Mmbengwa, V., Samie, A., The chemical composition and biological activities of essential oil from the fresh leaves of *Schinus terebinthifolius* from Zimbabwe. *Afr. J. Biotechnol*, 2009; *8:* 7164-7169. DOI: 10.4314/ajb.v8i24.68817
337. Costa, C.O., Ribeiro, P.R., Loureiro, M.B., Simões, R.C., Castro, R.D., Fernandez, L.G., Phytochemical screening, antioxidant and antibacterial activities of extracts prepared from different tissues of *Schinus terebinthifolius* Raddi that occurs in the coast of Bahia, Brazil. *Pharmacogn. Mag*, 2015; *11:* 607-614. DOI: 10.4103/0973-1296.160459
338. Uliana, M.P., Fronza, M., Silva, A.G., Vargas, T.S., Andrade, T.U., Scherer, R., Composition and biological activity of Brazilian rose pepper (*Schinus terebinthifolius* Raddi) leaves. *Ind. Crops Prod*, 2016; *83:* 235-240. DOI: 10.1016/j.indcrop.2015.11.077
339. Ennigrou, A., Casabianca, H., Vulliet, E., Hanchi, B., Hosni, K., Assessing the fatty acid, essential oil composition, their radical scavenging and antibacterial activities of *Schinus terebinthifolius* Raddi leaves and twigs. *J. Food Sci. Technol*, 2018; *55:* 1582-1590. DOI: 10.1007/s13197-018-3049-6
340. Oliveira, K.C., Franciscato, L.M., Mendes, S.S., Barizon, F.M., Goncalves, D.D., Barbosa, L.N., Faria, M.G., Valle, J.S., Casalvara, R.F., Goncalves, J.E., Gazim, Z.C., Ruiz, S.P., Essential Oil from the Leaves, Fruits and Twigs of *Schinus terebinthifolius*: Chemical Composition, Antioxidant and Antibacterial Potential. *Molecules*, 2024; 29: 469. DOI: 10.3390/molecules29020469
341. Johann, S., Sá, N.P., Lima, L.A., Cisalpino, P.S., Cota, B.B., Alves, T.M., Siqueira1, E.P., Zani, C.L., Antifungal activity of schinol and a new biphenyl compound isolated

from Schinus terebinthifolius against the pathogenic fungus *Paracoccidioides brasiliensis*. *Ann. Clin. Microbiol. Antimicrob,* 2010; *9*: 30. DOI: 10.1186/1476-0711-9-30

342. Silva, J.H., Simas, N.K., Alviano, C.S., Alviano, D.S., Ventura, J.A., Lima, E.J., Seabra, S.H., Kuster, R.M., Anti-*Escherichia coli* activity of extracts from *Schinus terebinthifolius* fruits and leaves. *Nat. Prod. Res*, 2018; *32*: 1365-1368. DOI: 10.1080/14786419.2017.1344657
343. Gomes, R.B., Souza, E.S., Barraqui, N.S., Tosta, C.L., Nunes, A.P., Schuenck, R.P., Ruas, F.G., Ventura, J.A., Filgueiras, P.R., Kuster, R.M., Residues from the Brazilian pepper tree (*Schinus terebinthifolia* Raddi) processing industry: Chemical profile and antimicrobial activity of extracts against hospital bacteria. *Ind. Crops Prod*, 2020; *143*: 111430. DOI: 10.1016/j.indcrop.2019.05.079
344. Silva, M.M., Neto, J., Santos, A.T., Tintino, C.D., Araújo, A.C., Freitas, P.R., Silva, L.E., Amaral, W., Deschamps, C., Azevedo, F.R., Lima, C.M., Antibiotic-potentiating activity of the *Schinus terebinthifolius* Raddi essential oil against MDR bacterial strains. *Plants*, 2023; *12:* 1587. DOI: 10.3390/plants12081587
345. Silva, A.B., Silva, T., Franco, E.S., Rabelo, S.A., Lima, E.R., Mota, R.A., Câmara, C.A., Pontes-Filho, N.T., Lima-Filho, J.V., Antibacterial activity, chemical composition, and cytotoxicity of leaf's essential oil from Brazilian pepper tree (*Schinus terebinthifolius*, raddi). *Braz. J. Microbiol*, 2010; *41*: 158-163. DOI: 10.1590/S1517-838220100001000023
346. Vasconcelos, P., Alves, É., Maia, C., Brito, A., Silva, D., Freires, I., Cavalcanti, Y., Rehder, V., Ruiz, A., Duarte, M., Rosalen, P., Godoy, G., Costa, E., Biological properties of *Schinus terebinthifolia* Raddi essential oil. *Braz. J. Pharm. Sci*. 2022, *58*, e20417. DOI: 10.1590/s2175-97902021000X2e20417
347. Djilali, A.B., Besombes, C., Allaf, K., Nabiev, M., Technological aptitudes and pharmaceutical applications of *Schinus terebinthifolius* raddi leaf and seed oil and fruit powders of *Ziziphus jujuba* mill. *Phytothérapie*, 2020; *18*: 305-313. DOI: 10.3166/phyto-2018-0083
348. Tang, H., Porras, G., Brown, M.M., Chassagne, F., Lyles, J.T., Bacsa, J., Horswill, A.R., Quave, C.L., Triterpenoid acids isolated from *Schinus terebinthifolia* fruits reduce *Staphylococcus aureus* virulence and abate dermonecrosis. *Sci. Rep*, 2020; *10*: 8046. DOI: 10.1038/s41598-020-65080-3

349. Carneiro, M.J., Pinheiro, G.P., Baseggio, A.M., Maróstica-Júnior, M.R., Sawaya, A., Chemical Composition and Antioxidant Activity of Essential Oil from Male and Female *Schinus terebinthifolius*. *Pharmacogn. Res*, 2023; *15*: 484-491. DOI: 10.5530/pres.15.3.050
350. Glória, L., Arantes, M., Pereira, S., Vieira, G., Martins, C., Junior, A., Antunes, F., Braz-Filho, R., Vieira, I., Cruz, L., Chaves, D., Freitas, S., Oliveira, D., Phenolic compounds present *Schinus terebinthifolius* Raddi influence the lowering of blood pressure in rats. *Molecules*, 2017; *22*: 1792. DOI: 10.3390/molecules22101792
351. Belhoussaine, O., El Kourchi, C., Harhar, H., Bouyahya, A., El Yadini, A., Fozia, F., Alotaibi, A., Ullah, R., Tabyaoui, M., Chemical composition, antioxidant, insecticidal activity, and comparative analysis of essential oils of leaves and fruits of *Schinus molle* and *Schinus terebinthifolius*. *Evid. based Complement. Alternat. Med*, 2022; 4288890. DOI: 10.1155/2022/4288890
352. Todirascu-Ciornea, E., El-Nashar, H.A., Mostafa, N.M., Eldahshan, O.A., Boiangiu, R.S., Dumitru, G., Hritcu, L., Singab, A.B., *Schinus terebinthifolius* Essential Oil Attenuates Scopolamine-Induced Memory Deficits via Cholinergic Modulation and Antioxidant Properties in a Zebrafish Model. *Evid. Based Complement. Alternat. Med*, 2019; 5256781, DOI: 10.1155/2019/5256781
353. Abdel Bar, F.M., Ibrahim, D.S., Gedara, S.R., Abdel-Raziq, M.S., Zaghloul, A.M., Nematicidal Compounds from the Leaves of *Schinus terebinthifolius* Against Root-knot Nematode, *Meloidogyne incognita* Infecting Tomato. *Nat. Prod. Sci*, 2018; *24:* 272-283. DOI: 10.20307/nps.2018.24.4.272
354. Carlini, E.A., Duarte-Almeida, J.M., Rodrigues, E., Tabach, R., Antiulcer effect of the pepper trees *Schinus terebinthifolius* Raddi (aroeira-da-praia) and *Myracrodruon urundeuva* Allemão, Anacardiaceae (aroeira-do-sertão). *Braz. J. Pharmacogn*, 2010; *20:* 140-146. DOI: 10.1590/S0102-695X2010000200001
355. Jamal, Y., Agusta, A., Chemical Composition of Essential Oil (*Schinus terebinthifolius* Raddi) Leaves. *Indones. J. Pharm,* 2001; *12:* 135-139. [Google Scholar]
356. Richter, R., von Reuß, S.H., König, W.A., Spirocyclopropane-type sesquiterpene hydrocarbons from *Schinus terebinthifolius* Raddi. *Phytochemistry*, 2010; *71*: 1371-1374. DOI: 10.1016/j.phytochem.2010.05.003
357. Feuereisen, M.M., Hoppe, J., Zimmermann, B.F., Weber, F., Schulze-Kaysers, N., Schieber, A., Characterization of phenolic compounds in Brazilian pepper (*Schinus*

terebinthifolius Raddi) exocarp. *J. Agric. Food Chem*, 2014; *62:* 6219-6226. DOI: 10.1021/jf500977d

358. Cavalcanti, A., Alves, M., Silva, L.C., Patrocínio, D., Sanches, M.N., Chaves, D.S., Souza, M.A., 2015. Volatiles composition and extraction kinetics from *Schinus terebinthifolius* and Schinus molle leaves and fruit. *Rev. Bras. Farmacogn*, 2015; *25:* 356-362. DOI: 10.1016/j.bjp.2015.07.003
359. Carneiro, F.B., Lopes, P.Q., Ramalho, R.C., Scotti, M.T., Santos, S.G., Soares, L.A., Characterization of leaf extracts of *Schinus terebinthifolius* Raddi by GC-MS and chemometric analysis. *Pharmacogn. Mag*, 2017; *13*: 672-675. DOI: 10.4103/pm.pm_555_16
360. Lima, R., Silva, L., Andrade, A., Phytochemical study of shells *Schinus terebinthifolius* Raddi (Anacardiaceae). *Rev. Eletrônica Gest. Educaç. Tecnol. Ambient*, 2017; *21:* 97-103. DOI: 10.5902/2236117027108
361. Migues, V.H., David, J.M., David, J.P., Determination of polyphenols in *Schinus terebinthifolius* Raddi bark extracts and chemometric analysis. *Anal. Methods*, 2020; *12*: 1478-1485. DOI: 10.1039/d0ay00197j
362. Velasques, J., Crispim, B.D., Vasconcelos, A.A., Bajay, M.M., Cardoso, C.A., Barufatti, A., Vieira, M., Genetic and chemodiversity in native populations of *Schinus terebinthifolia* Raddi along the Brazilian Atlantic forest. *Sci. Rep*, 2021; *11*: 20487. DOI: 10.1038/s41598-021-00015-0
363. Reis, M.Y., Xavier, A., Souza, R., Ramalho, Í., Nascimento, Y.M., Ferreira, M.D., Damasceno, B., Sobral, M.V., Sampaio, F.C., Pink pepper (*Schinus terebinthifolius* Raddi) essential oil: phytochemical composition and cytotoxic activity. *Nat. Prod. Res*, 2023; 1-7. DOI: 10.1080/14786419.2023.2283756
364. Bertoloni, A.V., Polizel, D.M., Júnior, M.V., Miszura, A.A., Barroso, J.P., Martins, A.S., Sardinha, L.A., Limede, A.C., Oliveira, G.B., Ferreira, E.M., Pires, A.V., Brazilian red pepper fruit essential oil (*Schinus terebinthifolius*) may replace monensin in high concentrate diets for feedlot lambs. *Braz. J. Vet. Res. Anim. Sci*, 2019; *56*: e153845. DOI: 10.11606/issn.1678-4456.bjvras.2019.153845
365. Bertoloni, A.V., Polizel, D.M., Júnior, M.V., Oliveira, G.B., Miszura, A.A., Barroso, J.P., Martins, A.S., Sardinha, L.A., Limede, A.C., Ferreira, E.M., Pires, A.V., Brazilian red pepper leaves essential oil (*Schinus terebinthifolius*) in diets for feedlot lambs. *Braz. J. Vet. Res. Anim. Sci*, 2020; *57*: e157580. DOI: 10.11606/issn.1678-4456.bjvras.2020.157580

366. Fortunato, A.R., Monteiro, M.L., Costa-Lima, B.R., Cunha, L.C., Guedes-Oliveira, J.M., Conte-Junior, C.A., Effect of Brazilian pepper (*Schinus terebinthifolius* Raddi) extracts on color and oxidative stability of sardine patties stored under refrigeration. *J. Food Process. Preserv*, 2019: *00*: e14187. DOI: 10.1111/jfpp.14187
367. Santos, O.J., Barros-Filho, A.K., Malafaia, O., Ribas-Filho, J.M., Santos, R.H., Santos, R.A., *Schinus terebinthifolius* Raddi (Anacardiaceae) in the healing process of gastrorraphy in rats. *Arq. Bras. Cir. Dig*, 2012; *25:* 140-146. DOI: 10.1590/S0102-67202012000300002
368. Santos, O.J., Malafaia, O., Ribas-Filho, J.M., Czeczko, N.G., Santos, R.H., Santos, R.A., 2013. Influence of Schinus terebinthifolius Raddi (aroeira) and Carapa guianensis Aublet (andiroba) in the healing process of gastrorraphies. *Arq. Bras. Cir. Dig*, 2013; *26:* 84-91. DOI: 10.1590/s0102-67202013000200003
369. Jorge, A.T., Arroteia, K.F., Santos, I.A., Andres, E., Medina, S.P., Ferrari, C.R., Lourenço, C.B., Biaggio, R.M., Moreira, P.L., *Schinus terebinthifolius* Raddi extract and linoleic acid from *Passiflora edulis* synergistically decrease melanin synthesis in B16 cells and reconstituted epidermis. *Int. J. Cosmet. Sci*, 2012; *34:* 435-440. DOI: 10.1111/j.1468-2494.2012.00736.x
370. Silva, A.G., Almeida, D.L., Ronchi, S.N., Bento, A.C., Scherer, R., Ramos, A.C., Cruz, Z.M., The essential oil of Brazilian pepper, *Schinus terebinthifolia* Raddi in larval control of *Stegomyia aegypti* (Linnaeus, 1762). *Parasites Vector,* 2010; *3:* 79. DOI: 10.1186/1756-3305-3-79
371. Procópio, T.F., Fernandes, K.M., Pontual, E.V., Ximenes, R.M., Oliveira, A.R., Souza, C.D., Melo, A.M., Navarro, D.M., Paiva, P.M., Martins, G.F., Napoleão, T.H., *Schinus terebinthifolius* leaf extract causes midgut damage, interfering with survival and development of *Aedes aegypti* larvae. *PLoS One,* 2015; *10:* e0126612. DOI: 10.1371/journal.pone.0126612
372. Goergen, P.C., Kruger, C.A., Bianchi, V., Silva, I.W., Gehrke, I.T., Effects of *Schinus terebinthifolius* extracts on the control of *Sitophilus* species in stored wheat grains. *Afr. J. Agric. Res*, 2017; *12:* 3556-3561. DOI: 10.5897/AJAR2017.12621
373. Nascimento, A.F., Camara, C.A., Moraes, M.M., 2018. Fumigant activity of *Schinus terebinthifolius* essential oil and its selected constituents against *Rhyzopertha dominica*. *Rev. Fac. Nac. Agron. Medellin*, 2018; *71:* 8359-8366. DOI: 10.15446/rfna.v71n1.62743
374. Dias, A.S., Spadetto, R.M., Pinto, C.A., Barros, C.J., *In vitro* activity of the *Schinus terebinthifolius* (R.) extract on engorged female tick of *Rhipicephalus Boophilus*

microplus and on larvae hatchability. *Sci. Elec. Arch*, 2019; *12*: 64–69. DOI: 10.36560/1222019762

375. Bortolucci, W.D., Oliveira, H.L., Silva, E.S., Campo, C.F., Gonçalves, J.E., Junior, R., Colauto, N.B., Linde, G.A., Gazim, Z.C., *Schinus terebinthifolius* essential oil and fractions in the control of *Aedes aegypti*. *Biosci. J.*, 2019; *35*: 1575-1587. DOI: 10.14393/BJ-v35n5a2019-41999
376. Lima, L.B., Vasconcelos, C.F., Maranhão, H.M., Leite, V.R., Ferreira, P.A., Andrade, B.A., Araújo, E.L., Xavier, H.S., Lafayette, S.S., Wanderley, A.G., Acute and subacute toxicity of *Schinus terebinthifolius* bark extract. *J. Ethnopharmacol*, 2009; *126*: 468-473. DOI: 10.1016/j.jep.2009.09.013
377. Araujo Carlini, A., Duarte-Almeida, J.M., Tabach, R., Assessment of the Toxicity of the Brazilian Pepper Trees *Schinus terebinthifolius* Raddi (Aroeirada-praia) and *Myracrodruon urundeuva* Allemão (Aroeira-do-sertão). *Phytother. Res*, 2013; *27*: 692-698. DOI: 10.1002/ptr.4767
378. Nunes, M.A., Silva, L.D., Santos, D.M., Cutrim, B.D., Vieira, S.L., Silva, I.S., Branco, S.J., Nascimento, M.D., Vale, A.A., Azevedo, A.P., Zagmignan, A., Sousa, J.C., Napoleão, T.H., Paiva, P.M., Neto, V.M., Silva, L.C., *Schinus terebinthifolius* leaf lectin (SteLL) reduces the bacterial and inflammatory burden of wounds infected by *Staphylococcus aureus* promoting skin repair. *Pharmaceuticals*, 2022; *15*: 1441. DOI: 10.3390/ph15111441
379. Fadhil, H., Mraihi, F., Zouied, D., Ayadi, M.T., Cherif, J.K., Anticorrosion Inhibition Behavior of *Rhus Pentaphylla* Fruit Extracts in (1 M) HCl against Carbon Steel and their Chemical Characterization using HPLC-MS-ESI. *ChemistrySelect*, 2021; *6:* 5281-5289. DOI: 10.1002/slct.202100747
380. Fadhil, H., Mraihi, F., Cherif, J.K., Sökmen, M., Comparative Study on Total Polyphenols Content of Tunisian Wild *Rhus pentaphylla* Fruit Extracts and the Evaluation of Their Biological Activities. *Ital. J. Food Sci*, 2019; *31:* 224-232. DOI: 10.14674/IJFS-1301
381. Agouram, F., Sokar, Z., Chait, A., Evaluation of Antinociceptive Activity, Antioxidant Properties and Total Phenolic Content of the Ethanolic Extracts of *Rhus pentaphylla* Leaves and Fruits from Morocco. *J. Anim. Plant Sci*, 2023; *33*: 1304-1313. DOI: 10.36899/JAPS.2023.6.0670
382. Lafdil, F.Z., Amirou, A., Bnouham, M., Legssyer, A., Ziyyat, A., Mekhfi, H., Exploring the Therapeutic Potential: Antiplatelet and Antioxidant Activities of Some Medicinal

Plants in Morocco. *Curr. Chem. Biol*, 2023; *17*: 237-248. DOI: 10.2174/0122127968271295231212043119

383. Benmansour, N., Allal, A., Selles, C., Tabti, B., Muselli, A., Essential oil and hydrosol extract chemical composition, phytochemicals of Algerian *Rhus pentaphylla* Desf. and its antioxidant activity. *Curr. Bioact. Compd*, 2020; *16*: 627-638. DOI: 10.2174/1573407215666190207094119
384. Benamar, H., Bennaceur, M., Bioactive Compound Contents and Biological Activities of the Algerian Medicinal Plant *Rhus Pentaphylla* (Jacq.) Desf. (Anacardiaceae). *Biol. Life Sci. Forum*, 2021; *6*: 68. DOI: 10.3390/Foods2021-10915
385. Ghouila, H., Haddar, W., Ticha, M.B., Baaka, N., Meksi, N., Mhenni, M.F., Jannet, H.B., *Rhus pentaphylla* bark as a new source of natural colorant for wool and silk fibers. *J. Soc. Chim. Tunisie*, 2014; *16:* 95-102. [ResearchGate]
386. Messaoudi, N., Mekhfi, H., Aziz, M., Legssyer, A., Bnouham, M., Ziyyat, A., Vasorelaxant and antihypertensive effects of *Rhus pentaphylla* (*Searsia pentaphylla*). *Int. J. Pharm. Sci. Res*, 2019; *10:* 4430-4443. DOI: 10.13040/IJPSR.0975-8232.10(10).4430-43
387. Danin, A., The inclusion of adventive plants in the second edition of Flora Palaestina. *Willdenowia*, 2000; *30:* 305-314. DOI: 10.3372/wi.30.30209
388. Canavan, K., Magengelele, N.L., Paterson, I.D., Williams, D.A., Martin, G.D., Uncovering the phylogeography of *Schinus terebinthifolia* in South Africa to guide biological control. *AoB Plants*, 2022; *14*: plab078. DOI: 10.1093/aobpla/plab078
389. Javanmiri Pour, M., The physical structure of pistachio (*Pistacia atlantica* Desf.) and economic value of its turpentine in the Zagros region, Western Iran. *Cent. Asian J. Environ. Sci. Technol. Innov*, 2022; *3*: 40-49. DOI: 10.22034/CAJESTI.2022.02.02
390. Belyagoubi-Benhammou, N., Belyagoubi, L., Benmahieddine, A., El Zerey-Belaskri, A., Di Marco, G., D'Agostino, A., Canini, A., Gismondi, A., Nutraceutical Content and Biological Properties of Lipophilic and Hydrophilic Fractions of the Phytocomplex from *Pistacia atlantica* Desf. Buds, Roots, and Fruits. *Plants*, 2024; *13*: 611. DOI: 10.3390/plants13050611
391. Yarahmadi, N., Hojjatoleslamy, M., Sedaghat Boroujeni, L., Different drying methods of *Pistacia Atlantica* seeds: Impact on drying kinetics and selected quality properties. *Food Sci. Nutr*, 2020; *8*: 3225-3233. DOI: 10.1002/fsn3.1582

392. Salhi, M., Gharsallaoui, M., Gabsi, S., Tunisian *Pistacia atlantica* Desf. Extraction Process: Impact on Chemical and Nutritional Characteristics. *Eur. J. Lipid Sci. Technol*, 2021; *123*: 2100013. DOI: 10.1002/ejlt.202100013
393. Benhassaini, H., Fetati, A., Hocine, A.K., Belkhodja, M., Effect of salt stress on growth and accumulation of proline and soluble sugars on plantlets of *Pistacia atlantica* Desf. subsp. atlantica used as rootstocks. *Biotechnol. Agron. Soc. Environ*, 2012; *16:* 159-165. [ResearchGate]
394. Taib, N., Sitayeb, T., Beşer, N., Aissaoui, N., Docking Studies on the Effects of Some Bioactive Compounds from *Pistacia atlantica* Desf. against Main Protease SARS-CoV2. *Int. J. Innov. Approaches Agric. Res*, 2021; *5*: 269-278. DOI: 10.29329/ijiaar.2021.378.2
395. Murtala, N., Rahman, R., Said, K.A., Mannan, M.A., Patwary, A.M., A review of
396. nanoparticle synthesis methods, classifications, applications, and characterization. *Environ. Nanotechnol. Monit. Manag*, 2023; *20:* 100900. DOI: 10.1016/j.enmm.2023.100900
397. Dang, L., Yang, J., Negm, S., El-kott, A.F., Shati, A.A., Ghamry, H.I., Karmakar, B., Treatment of gastric cancer by green mediated silver nanoparticles using *Pistacia atlantica* bark aqueous extract. *Open Chem*, 2023; *21*: 20230157. DOI: 10.1515/chem-2023-0157
398. Dousti, M., Sari, S., Saffari, M., Kelidari, H., Asare-Addo, K., Nokhodchi, A., Loading *Pistacia atlantica* essential oil in solid lipid nanoparticles and its effect on apoptosis of breast cancer cell line MDA-MB-231, *Pharm. Dev. Technol*, 2022; *27:* 63-71, DOI: 10.1080/10837450.2021.2022693
399. Alshlash M, Abdelwahed W, Kitaz A. Green synthesis of silver nanoparticles using *Pistacia palaestina* (Boiss). extract: Evaluation of in vivo wound healing activity. *J. Res. Pharm*, 2023; *27:* 1170-1187. DOI: 10.29228/jrp.407
400. Charghadchi, M., Gharari, Z., Sadighian, S., Yazdinezhad, A., Sharafi, A., Green Synthesized Silver Nanostructure Using *Rhus coriaria* Fruit Extract Inhibits the Growth of Malignant MCF-7 Cell Line. *Braz. Arch. Biol. Technol*, 2021; *64*: e21210069. DOI: 10.1590/1678-4324-2021210069
401. Gur, T., Green synthesis, characterizations of silver nanoparticles using sumac (*Rhus coriaria* L.) plant extract and their antimicrobial and DNA damage protective effects. *Front. Chem*, 2022; *10*: 968280. DOI: 10.3389/fchem.2022.968280
402. Ranjbarfordoei, A., Samson, R., Van Damme, , Lemeur, R., Effects of drought stress induced by polyethylene glycol on pigment content and photosynthetic gas exchange of

Pistacia khinjuk and *P. mutica*. *Photosynthetica*, 2000; *38:* 443-447. DOI: 10.1023/A:1010946209484

403. Ranjbarfordoei, A., Samson, R., Lemeur, R., Van Damme, P., Effects of osmotic drought stress induced by a combination of NaCl and polyethylene glycol on leaf water status, photosynthetic gas exchange, and water use efficiency of *Pistacia khinjuk* and *P. mutica*. *Photosynthetica*, 2002; *40:* 165-169. DOI: 10.1023/A:1021377103775
404. Ahmadi, M., Karimi, F., Optimization of Enzymatic Extraction of Oil from *Pistacia Khinjuk* Seeds by Using Central Composite Design. *Food Sci. Technol*, 2013; *1*: 37-43. DOI: 10.13189/fst.2013.010301
405. Vasseghian, Y., Zahedi, G., Ahmadi, M., Oil extraction from *Pistacia khinjuk*-experimental and prediction by computational intelligence models. *J. Food Bioscie. Technol*, 2016; *6*: 1-12. [Google Scholar]
406. Hammoud, F.K., Hussein, A.A., Sulyman, E.Z., Preparation of Activated Carbon from (*Pistacia Khinjuk* Peels) and Study its chemical Properties. *Minar Int. J. Appl. Sci. Technol*, 2022; *4*: 226-233. DOI: 10.47832/2717-8234.12.25
407. Asif, S., Ahmad, M., Bokhari, A., Chuah, L.F., Klemeš, J.J., Akbar, M.M., Sultana, S., Yusup, S., Methyl ester synthesis of *Pistacia khinjuk* seed oil by ultrasonic-assisted cavitation system. *Ind. Crops Prod*, 2017; *108:* 336-347. DOI: 10.1016/j.indcrop.2017.06.046
408. Karthickeyan, V., Ashok, B., Thiyagarajan, S., Nanthagopal, K., Geo, V.E., Dhinesh, B., Comparative analysis on the influence of antioxidants role with *Pistacia khinjuk* oil biodiesel to reduce emission in diesel engine. *Heat Mass Transf*, 2019; *56:* 1275-1292. DOI: 10.1007/s00231-019-02797-6
409. Hosseinzdeh Samani, B., Zareiforoush, H., Lorigooini, Z., Ghobadian, B., Rostami, S., Fayyazi, E., Ultrasonic-assisted production of biodiesel from *Pistacia atlantica* Desf. oil. *Fuel*, 2015; *168:* 22-26. DOI: 10.1016/j.fuel.2015.11.063
410. Stefi, A.L., Papaioannou, V., Nikou, T., Halabalaki, M., Vassilacopoulou, D., Christodoulakis, N.S. Heat and Cold-Stressed Individuals of *Pistacia lentiscus* (Mastic Tree) Do Modify Their Secreting Profile. *Plants*, 2022; *11*: 3290. DOI: 10.3390/plants11233290
411. Boudieb, K., Kaki, S., Amellal-Chibane, H., 2019. Effect of maturation degree on the fixed oil chemical composition, phenolic compounds, mineral nutrients and antioxidant properties of *Pistacia lentiscus* L. fruits. *Not. Bot. Horti Agrobo*, 2019; *47*: 836-847. DOI: 10.15835/nbha47311534

412. Dragović, S., Dragović-Uzelac, V., Pedisić, S., Čošić, Z., Friščić, M., Elez Garofulić, I., Zorić, Z., The mastic tree (*Pistacia lentiscus* L.) leaves as source of BACs: Effect of growing location, phenological stage and extraction solvent on phenolic content. *Food Technol. Biotechnol*, 2020; *58*: 303-313. DOI: 10.17113/ftb.58.03.20.6662
413. Goda, R.M., Shohayeb, M.M., Use of *Pistacia lentiscus* mastic for sustained-release system of chlorocresol and benzoic acid for in vitro prevention of bacterial colonization of silicon urinary catheter. *Lett. Appl. Microbiol*, 2021; *73*: 599-606. DOI: 10.1111/LAM.13541
414. Gülsoy, S., Özkan, K., Özkan, G., Effect of environmental factors on the fruit essential oils of *Pistacia terebinthus* L. growing wild in Turkey. *CERNE*, 2022; *28:* e-102994, DOI: 10.1590/01047760202228012994
415. Zam, W., Ali, A. Hasan, R., Determination of Phenolic Compounds' Extraction Conditions from *Pistacia palaestina* Leaves at Two Different Stages of Maturity. *Curr. Nutr. Food Sci*, 2020; *16:* 808-814. DOI: 10.2174/1573401315666191009100726
416. Note: this same research was published a year earlier,
417. Zam, W., Ali, A. Hasan, R., Parameters Influencing Phenolic compounds extraction from *Pistacia palaestina* fruits during different stages of Maturity. *Res. J. Pharm. Tech*, 2019; *12*: 6133-6137. DOI: 10.5958/0974-360X.2019.01065.5
418. Inan, M., Seasonal variation of fatty and essential oil in terebinth (*Pistacia terebinthus* L.) fruit. *Not. Bot. Horti Agrobo*, 2021; *49:* 12171. DOI: 10.15835/nbha49112171
419. Kaya, F., Ozer, A., A Study on the Investigation of Diffusion Coefficient for Oil Extraction from Terebinth (*Pistacia terebinthus L.*) Seeds. *Curr. Phys. Chem*, 2020; *10:* 144-153. DOI: 10.2174/1877946810666200129155312
420. Rand, K., Bar, E., Ben-Ari, M., Lewinsohn, E., Inbar, M., The mono-and sesquiterpene content of aphid-induced galls on *Pistacia palaestina* is not a simple reflection of their composition in intact leaves. *J. Chem. Ecol*, 2014; *40*: 632-642. DOI: 10.1007/s10886-014-0462-9
421. Rand, K., Bar, E., Ari, M.B., Davidovich-Rikanati, R., Dudareva, N., Inbar, M., Lewinsohn, E., Differences in monoterpene biosynthesis and accumulation in *Pistacia palaestina* leaves and aphid-induced galls. *J. Chem. Ecol*, 2017; *43*: 143-152. DOI: 10.1007/s10886-016-0817-5
422. Davidovich-Rikanati, R., Bar, E., Hivert, G., Huang, X-Q., Hoppen-Tonial, C., Khankin, V., Rand, K., Abofreih, A., Muhlemann, J.K., Marchese, J.A., Shotland, Y., Dudareva, N., Inbar, M., Lewinsohn, E., Transcriptional up-regulation of host-specific terpene

metabolism in aphid-induced galls of *Pistacia palaestina*. *J. Exp. Bot*, 2022; *73:* 555-570. DOI: 10.1093/jxb/erab289

423. Abu-Reidah, I.M., Ali-Shtayeh, M.S., Jamous, R.M., Arráez-Román, D., Segura-Carretero, A., HPLC–DAD–ESI-MS/MS screening of bioactive components from *Rhus coriaria* L. (Sumac) fruits. *Food Chem*, 2015; *166*: 179-191. DOI: 10.1016/j.foodchem.2014.06.011
424. Lo Vecchio, G., Cicero, N., Nava, V., Macrì, A., Gervasi, C., Capparucci, F., Sciortino, M., Avellone, G., Benameur, Q., Santini, A., Gervasi, T., Chemical Characterization, Antibacterial Activity, and Embryo Acute Toxicity of *Rhus coriaria* L. Genotype from Sicily (Italy). Foods, 2022; *11*: 538. DOI: 10.3390/foods11040538
425. Nayebpour, N., Asadi-Gharneh, H.A., Variability of Fatty Acids Composition of Wild Sumac (*Rhus coriaria* L.) Fruit. *J. Med. Plants*, 2019; *18*: 118-129. DOI: 10.29252/jmp.3.71.118
426. Farag, M.A., Fayek, N.M., Abou Reidah, I., Volatile profiling in *Rhus coriaria* fruit (sumac) from three different geographical origins and upon roasting as analyzed via solid-phase microextraction. *PeerJ.*, 2018; *6:* e5121. DOI: 10.7717/peerj.5121
427. Grassia, M., Sarghini, F., Bruno, M., Cinquanta, L., Scognamiglio, M., Pacifico, S., Fiorentino, A., Geraci, A., Schicchi, R., Corona, O., Chemical composition and microencapsulation suitability of sumac (*Rhus coriaria* L.) fruit extract. *Eur. Food Res. Technol*, 2021; *247*: 1133-1148. DOI: 10.1007/s00217-021-03694-1
428. Kossah, R., Nsabimana, C., Zhao, J., Chen, H., Tian, F., Zhang, H., Chen, W., Comparative study on the chemical composition of Syrian sumac (*Rhus coriaria* L.) and Chinese sumac (*Rhus typhina* L.) fruits. *Pak. J. Nutr,* 2009; *8:* 1570-1574. DOI: 10.3923/pjn.2009.1570.1574
429. Kossah, R., Nsabimana, C., Zhang, H., Chen, W., Optimization of extraction of polyphenols from Syrian sumac (*Rhus coriaria* L.) and Chinese sumac (*Rhus typhina* L.) fruits. *Res. J. Phytochem*, 2010; *4*: 146-153. DOI: 10.3923/rjphyto.2010.146.153
430. Feuereisen, M.M., Barraza, M.G., Zimmermann, B.F., Schieber, A., Schulze-Kaysers, N., Pressurized liquid extraction of anthocyanins and biflavonoids from *Schinus terebinthifolius* Raddi: A multivariate optimization. *Food Chem*, 2017; *214:* 564-571. DOI: 10.1016/j.foodchem.2016.07.002
431. Acácio, R., Adrian, A.J., Rodriguez, P.P., Freitas, J.D., Goulart, H.F., Santana, A.E., Dataset of *Schinus terebinthifolius* essential oil microencapsulated by spray-drying. *Data Brief*, 2023; *47:* 108927. DOI: 10.1016/j.dib.2023.108927

432. Wang, J., Daré, P, Emer A., The perception of Naturology students from inhaling the pink pepper essential oil (*Schinus terebinthifolius* Raddi). *Flavour Fragr. J.*, 2021; 36: 593-604. DOI: 10.1002/ffj.3673
433. "Cashew Nuts Market Analysis: Size, Share, Trends, Growth Drivers, and Future Prospects in the Global Cashew Industry", 2024. [LinkedIn]
434. "Pistachio Market, Latest Size, Share, Trends, 2030", 2024. [LinkedIn]
435. Nezami, E., Gallego, P.P., History, Phylogeny, Biodiversity, and New Computer-Based Tools for Efficient Micropropagation and Conservation of Pistachio (*Pistacia* spp.) Germplasm. *Plants*, 2023; *12:* 323. DOI: 10.3390/plants12020323
436. Zeng, L., Tu, X-L., Dai, H., Han, F-M., Lu, B-S., Wang, M-S., Nanaei, H.A., Tajabadipour, A., Mansouri, M., Li, X-L., Ji, L-L., Irwin, D.M., Zhou, H., Liu, M., Zheng, H-K., Esmailizadeh, A., Wu, D-D., Whole genomes and transcriptomes reveal adaptation and domestication of pistachio. *Genome Biol*, 2019; *20:* 79. DOI: 10.1186/s13059-019-1686-3
437. Elakremi, M., Sillero, L., Ayed, L., Labidi, J., Moussaoui, Y., Chemical composition of leaves and hull from *Pistacia Vera* L. an evaluation of phenolic content and antioxidant properties of their extracts. *Research Square*, 2020. DOI: 10.21203/rs.3.rs-128147/v1
438. Safdar, S., Shamim, S., Khan, M., Imran, A., Khan, M.A., Ali, Q., Han, S. Probing Antibacterial and Anticancer Potential of *Selenicereus undatus*, *Pistacia vera* L. and *Olea europaea* L. against Uropathogens, MCF-7 and A2780 Cancer Cells. *Molecules*, 2023; *28*: 8148. DOI: 10.3390/molecules28248148