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BIOLOGICAL ACTIVITIES OF COLOCASIA ESCULENTA

Ashwini Gaikwad* and Meena Pisal

D. K. Patil Institute of Pharmacy, Sayal Road, Loha.

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***Corresponding Author**
Ashwini Gaikwad
D. K. Patil Institute of Pharmacy, Sayal Road, Loha.

ABSTRACT

Colocasia esculenta is a traditional medicinal plant, belongs to the family Araceae. C. esculenta is commonly known as taro in English, aravi in hindi, alupam in Sanskrit, alavi in Gujrati, sempu in tamil, alu in marathi, etc.Colocasia esculenta leaves mainly contain chemical constituent is flavonoids and triterpenoids; tubers in methanolic and aqueous extract showed that alkaloids, glycosides, flavonoids, terpenes, saponins and phenol are present. Plant exerted many pharmacological activities including antihypertensive, diuretic, antihyperglycemic, neuropharmacological activities, antinioceptive, antimicrobial, anticancer, antihyperlipidemic, anthelmintic, hepatoprotective, anti-inflammatory, antifungal, etc.

KEYWORDS: Colocasia esculenta, taro, flavonoids, phenols.

INTRODUCTION

Traditional knowledge of medicine has long been used since ages for curing various human ailments. About 60-80% world populations still rely on plant-basedmedicines.[1] Treating diseases by using locally available natural resources can be drawn from the prevedic period itself. It further developed in the vedic period, where in the names and usage of around 100 plants were mentioned. This knowledge continued and found its utmost development in the Samhita period (Classical literature), where in it was systematically documented. Though the details of medicinal plants mentioned in Samhita are limited compared to that of Nighantu kala (Lexicon), they believed every plant is medicinal and the protocol of adding a drug into Ayurveda Materia medica is elaborated by quoting about collecting the information from cowherds, shepherds and other persons who are well versed with names as well as forms of the plant.[2]

Herbal medicines, also known as medicinal plants, and their isolated compounds and extracts have shown a wide range of biological activities. An ideal strategy for the creation of new plant-based medicines is the selection of a methodical, scientific approach for the biological assessment of plant products based on their use in conventional medicine. Colocasia esculent Linn is one ofthese plants.[3] *Colocasia esculenta* Linn. (Family: Araceae) is also known as *Arum esculentum* L. and *Colocasia esculenta* Schott.[4]

It is originated in the Bay of Bengal region of South-east Asia. It was carried by early Polynesians throughout Oceania, where it became a staple food. It is an ancient crop in Asia, being introduced into Japan more than 2500 years ago. Compared with tannia, it is better adapted to excessively moist areas. Many clones are grown like rice in flooded conditions.[5]

The tropical tuber crop taro (Colocasia esculenta) is primarily grown for its underground corms, which contain 70–80% starch. Colocasia esculenta corms, on the other hand, contain anthocyanins like cyanidin-3-glucoside, pelargonidin-3-glucoside, and cyanidin-3-chemnoside, which have been shown to have anti-inflammatory and antioxidative qualities.[6]

PLANT PROFILE

Colocasia esculenta, a member of the Araceae family, is an ancient crop that is produced for its leaves and edible corms in the humid tropics. It is also used ceremonially in traditional ways.[7] The herb has been known since ancient times for its curative properties and has been utilized for treatment of various ailments such as Otalgia, Otorrhoea, Adenitis, Asthma, Arthritis, Internal haemorrhage, Hepatomegaly, Neurological disorders, Skin disorders etc. In the recent times its extract is proved to be having Anti-bacterial, Anti-fungal, Anti-inflammatory, Analgesic, Anti-hepatotoxic, Anti-microbial activity.[3-6] It is a good source of Provitamin A, Vitamin C, Calcium, Phosphorus, Iron etc.[2]

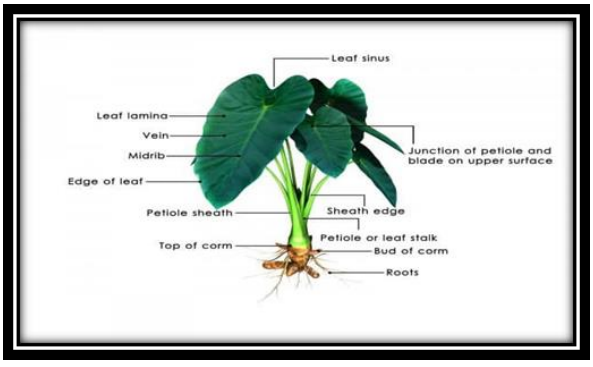

Image No. 1- Colocasia esculenta.

Morphology[8]

The taro plant is herbaceous, tuberous in nature, with a strong short caudex, flowering together, and leafing. Leaves are normally elongated arrows or heartshaped and pointing earthward in the cluster. This plant has a few meters high erect stems and can be orange, red-black, or variegated. The adventitious and shallow root system develops ample quantities of fine starch from the corm. The broad elongated leaves that have a height of 1–2 m is called "elephant head." The dimensions of the leaves maybe 30–90 cm long & 23 inches thick, and are acquitted at the close of standing, broad, lush, 78 inches high leafstalks in crowns. The taro plant can grow to a height of 2 m. The plant uses reproductive rhizomes such as tubers and corms, while it also produces a bunch of 2–5 fragment inflorescences in the axil of leaves. Generally, the taro corms are cylindrical and about 30 cm in diameter around 15 cm, and can vary in scale, shape, and color.

Taxonomical Classification[9]

Scientificclassification	
Kingdom	Plantae
Order	Alismatales
Family	Araceae
Subfamiy	Aroideae
Tribe	Calocasiodeae
Genus	Colocasia
Species	*esculenta*

Common and vernacular names[9],[4]

vernacularnames	
English	Taro, Cocoyam, Eddo
Hindi	Aravi
Sanskrit	Alupam
Gujarati	Alavi
Marathi	Alu
Tamil	Sempu
Tulu	Thev, Sev

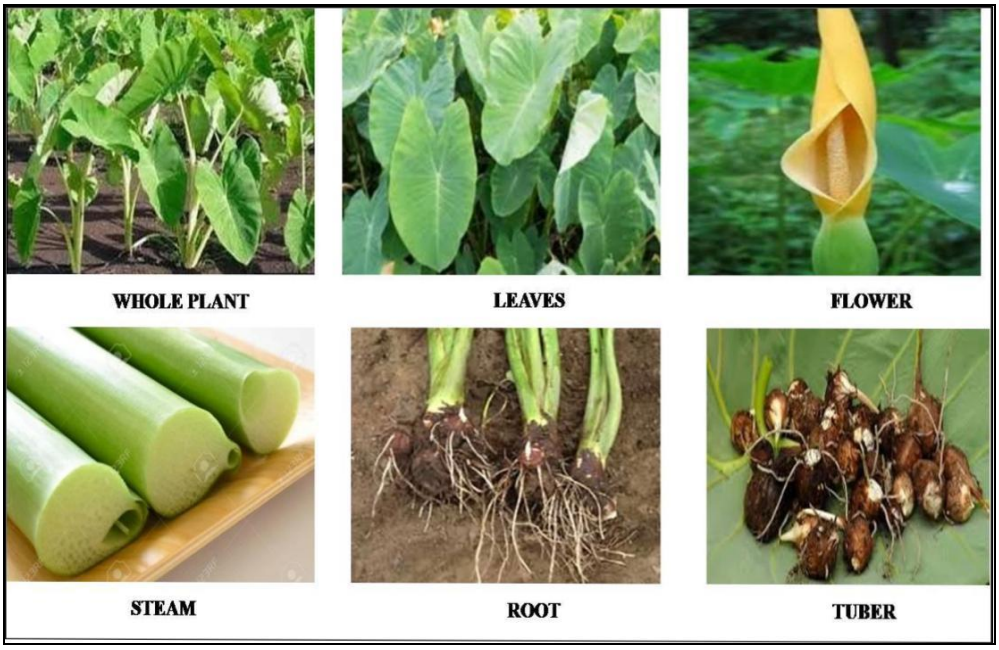

Image No. 2- various parts of Colocasia esculenta.

PHYTOCHEMISTRY[1,2,10]

Qualitative phytochemical screening of Colocasia esculenta tubers in methanolic and aqueous extract showed that alkaloids, glycosides, flavonoids, terpenes, saponins and phenol are present.[1,2] The two pharmacologically active classes of compounds such as flavonoids and triterpenoids are found mainly in extracts of the Colocasia leaf. Vicenin-2, iso-vitexin, iso-vitexin 30 -O-glucoside, vitexin X0 -O-glucoside, iso-orientin, orientin-7-O-glucoside, luteolin 7-O-glucoside are the flavonoids present in the concentrate of the Colocasia leaf. The anthocyanins, namely, cyanidin-3-rhamnoside, cyanidin 3-O-glucoside, and pelargonidin 3-O-beta-D-glucoside are also present. Taro tubers are high in starch and include cyanidin-3-glucoside anthocyanin.

Table 3: Chemical constituents of different parts of Colocasia esculenta plant.[10,11]

Plant part	Chemicalconstituents	
Leaves	Calciumoxalate,mineralslikecalciumphosphorus,fibers,starch,vitaminA, B,C	
	Apigenin	
	Luteolin	
	Anthocyanin	
	Flavonoids	Orientin
		Iso-orientin
		Iso-vitexin
		Vicenin-2
		Orientin7-O-glucoside
		Iso-vitexin3'-O-glucoside

		VitexinX"-O-glucoside
		Luteolin7-O-glucoside
Tubers	Starch	73-76%
	Naturalpolysaccharide	56%Naturalsugars
		40%Anioniccomponents
	Oxalate	Soluble-19-87 mg/100 g
		Insoluble-33-156mg/ 100g
	Aminoacids	13to23%
	Nitrogencontent	0.33to1.35%
	Lipid	0.23to0.52%
	Phosphatemonoesterderivatives	0.017to0.025%
	Dihydroxysterols	
	β-sitosterol	
	Stigmasterol	
	Nonacosane	
	Cyaniding3-glucoside	
	Aliphatic compounds	Tetracos-20-en-1,18-diol
		25-methyltriacont-10-one
		Octacos-10-en-1,12-diol
		Pentatriacont-1,7-dien-12-ol
		25-methyl-tritriacont-2-en-1,9,11-triol
	Octadecenoicacid	
	Enzymes	Lipoxygenase
		Lipidhydroperoxide-convertingenzyme
Petiole	Anthocyanins	3.29%

MEDICINALUSES[10]

It is an annual herbaceous plant with a long history of usage in traditional medicine in several countries across the world, especially in the tropical and subtropical regions. The herb has been known since ancient times for its curative properties and has been utilized for treatment of various ailments such as asthma, arthritis, diarrhoea, internal haemorrhage, neurological disorders, and skin disorders. The juice of CE corm is widely used for treatment of body ache and baldness. The plant has been studied for various pharmacological activities such as analgesic, anti-inflammatory, anti-cancer, anti-diarrheal, astringent, nervine tonic, and hypolipidemic activity. Pharmacologically, the plant is antimicrobial, antihepatotoxic, antidiabetic, anti-lipid peroxidative, antimetastatic, antifungal.

PHARMACOLOGICAL PROPERTIES

1) Antihypertensive and diuretic activity

The ethanolic extract of taro leaves (Colocasia esculenta (L.) Schott.) (EECE) showed anti-hypertensive and diuretic effect. The greatest effect of antihypertensive and diuretic of EECE is 40 mg/ 200g bw, but the effect still lower than HCT. The preliminary phytochemical

investigations in the present study revealed the presence of flavonoid, saponins, tannins and triterpenoid. The flavonoids isoquercitrin showed inhibition of ACE activity. Flavonoids suspected to have efficacy as a diuretic to stimulate blood flow to the kidneys and lead to the inhibition of tubular reabsorption of water and ions that cause diuretic effect.[12] The flavonoids vitexin and isovitexin showed in-vitro inhibition of ACE activity. The in-vitro and in-vivo hypotensive effect of vitexin was reported earlier.[13]

2) Antihyperglycemic activity

Subacute treatment for 14 days with the EECE in the treated doses brought about improvement in body weights indicating its beneficial effect in preventing loss of body weight in diabetic rat, The ability of EECE to prevent body weight loss seems to be due to its ability to reduced hyperglycaemia. Flavonoids are potent antioxidant and known to modulate the activities of various enzymes due to their interaction with various biomolecules. reported that flavonoids, alkaloids, tannins and phenolics as bioactive antidiabetic principles. The plants of C. esculenta have been reported to contain alkaloids, flavonoids, saponin and tannins. Preliminary phytochemical analysis indicated that, the ethanol extract of Colocasia esculenta leaves contain sterols, flavonoids, glycosides, tannins, carbohydrates and Vitamin A and C. The antihyperglycemics activity of EECE may probably be due to the presence of several bioactive antidiabetic principals. It is thus apparent that EECE possesses antihyperglycemicactivity.[14] C. esculenta leaf confirmed promising anti diabetic activity in STZinduced diabetic rat.[15]

3) Antinociceptive activity

MECEE caused dose-dependent and significant reductions in the number of abdominal constrictions or writhings induced by intraperitoneal administration of acetic acid. At doses of 50, 100, 200 and 400 mg per kg body weight, MECEE reduced the number of constrictions, respectively, by 27.0, 40.5, 51.4 and 67.6%. A standard antinociceptive drug, aspirin, when administered to experimental animals at doses of 200 and 400 mg per kg body weight, reduced the number of constrictions by 37.8 and 59.5%, respectively. Thus, at the three highest doses of the extract, MECEE showed antinociceptive activity much better than that of 200 mg per kg aspirin.[16] the antinociceptive activity exhibited by crude methanolic extract of the leaves may be due to the extract's ability to block any further expression of prostaglandins, which may be mediated through inhibition of cyclooxygenase and/or lipoxygenase activities.[17]

4) Neuropharmacological activity

The effects of HECE on anxiety, depression, thiopental-induced sleeping time, and rotarod performance were evaluated. The anxiolytic activity of HECE (100, 200, and 400 mg/kg) per os (p.o.) was characterized by increased time spent and number of entries in open arms in the EPM paradigm as compared to control group ($p < 0.001$). The HECE (100, 200, and 400 mg/kg, p.o.) showed dose-dependent significant reduction in duration of immobility ($p < 0.01$) in the behaviour despair test. The HECE at the doses 50 and 100 mg/kg, i.p. was found to produce a significant reduction in motor coordination ($p < 0.001$) and prolongation of thiopental-induced sleeping time ($p < 0.001$). The phytochemical screening revealed the presence of flavonoids, β-sitosterol, and steroids. The presence of flavonoids, β-sitosterol, and steroids in HECE could be responsible for these activities.[18]

5) Antimicrobial activity

extracts of C. esculenta leaf, extracted using distilled water, showed antimicrobial activity against all the tested bacterial isolates i.e. Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Klebsiella sp, Candida albicans.[19] The methanol extract of tuber and leaves showed characteristic zone of inhibition against all pathogens. The zone of inhibition was very pronounced. Highest zone of inhibition was observed at 100mg/ml concentration against Klebsiella sp. for tuber extract while leaves extract has shown highest activity at 100mg/ml concentration against Proteus mirabilis. In comparison to leaves extract, tuber extract was observed to possess higher antimicrobial activity.[20]

6) Anticancer activity

Taro corms contain valuable bioactive molecules effective against cancer and cancer-related risk factors, such as carcinogens and biological agents, several pathophysiological conditions, including oxidative stress and inflammation, while controlling metabolic dysfunctions and boosting the immunological response.[21] poi, a starchy paste made from the taro (*Colocasia esulenta L*.) plant corm. Soluble extracts of poi were incubated at 100 mg/mL *in vitro* for antiproliferative activity against the rat YYT colon cancer cell line.[3] H-thymidine incorporation studies were conducted to demonstrate that the poi inhibited the proliferation of these cancer cells in a dose-dependent manner.[22] A water-soluble extract of taro (TE) potently inhibits lung colonizing ability as well as spontaneous metastasis from mammary gland-implanted tumors, in a murine model of highly metastatic ER, PR and Her-2/neu negative breast cancer. TE modestly inhibits proliferation of some, but not all, breast and

prostate cancer cell lines. Morphologic changes including cell rounding were observed. Tumor cell migration was completely blocked by TE. TE treatment also inhibited prostaglandin E_2 (PGE_2) synthesis and downregulated cyclooxygenase (COX) 1 and 2 mRNA expression.[23]

7) Antihyperlipidemic activity

The corm extract treatment led to a notable decrease in the cholesterol, and triglycerides in the elevated lipid levels that were induced by P-407 and D- fructose. The extract also showed a significant decrease in the LDL and VLDL levels. study indicates that the CE has the potential as an antihyperlipidemic agent, possibly due to its ability to inhibit the synthesis of cholesterol, and facilitate the catabolism and excretion of the other lipids. The CE is rich in nutrients and phytochemicals like flavonoids and saponins, which may contribute to its hypolipidemic effect.[24]

8) Hepatoprotective activity

The hepatoprotective effect of orally administered leaf aqueous extract of Colocasia esculenta (CCLE) in thioacetamide-induced liver toxicity in rats was investigated, 5 groups (n=5) and received no treatment (normal control), distilled water (negative control), 50mg/kg silymarin (positive control) and CCLE (250 and 500mg/kg) respectively once daily for 3 consecutive days. Thioacetamide (TAA) (150mg/kg b.w.) was administered intraperitoneally on the 4th day to rats in all groups except the normal control. Evaluations were made for serum levels of alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphate (ALP) and serum albumin. Histopathological examination was performed on the excised liver tissues. TAA-induced hepatotoxicity increased ALT, AST, ALP and decreased serum albumin. Histopathological results revealed extensive disruption of the liver histoarchitecture when compared to the normal control liver sections. Pre-treatment with CCLE showed protective effects by normalizing the liver enzymes markers. These results were supported by the histopathological observations. The activity of the CCLE was comparable to that of the standard hepatoprotective drug, silymarin (50mg/kg). Overall findings suggest that CCLE possesses in vivo hepatoprotective activity against thioacetamide in rats.[25] antihepatotoxic and hepatoprotective as well as antioxidant effects of the crude filtered juice of the Colocasia esculenta may be due to the presence of anthocyanins or some flavonoids.[26]

9) Anthelmintic activity

The ethanolic extract of Colocasia esculenta caused paralysis of 16 min and time of death of 42 min while water extract revealed paralysis of 31.25 min and death of 60.34 min against the earthworm Pheritima posthuman. The crude extracts of Colocasia esculenta not only demonstrated paralysis but also caused death of worms especially at higher concentration of 100 mg/ml in shorter time as compared to reference drug Piperazine citrate.[27]

10) Anti-inflammatory activity

Anti-inflammatory agents mainly inhibit the cyclooxygenase enzyme responsible for synthesizing inflammatory mediators by converting arachidonic acid to prostaglandins.[28] Pre-treatment with CEMRE (400 mg/kg) could inhibit the paw inflammation significantly which was elevated due to carrageenan induction. The inhibition is comparable to that of the standard drug Indomethacin. The concentration of serum AST, ALT, ALP, NO, PGE2 and cytokines were also considerably lowered in the CEMRE-treated group as compared to the carrageenan-induced group. CEMRE (34 µg/ml) inhibited the LPS-stimulated relative expression of mRNA of COX-2 and iNOS and significantly reduced the expression of nitric oxide and prostaglandin E2. Docking analyses revealed promising interaction with low binding energies between Sinapic acid with both the target proteins COX-2 and iNOS, results suggested that CEMRE exhibited effective anti-inflammatory actions.[29]

11) Antifungal activity

Alcoholic leaf extract of Colocasia esculenta against Alternaria solani and Alternaria ricini showed 100% percentage controlefficacy (PCE) at 25 % concentration. Aqueous leaf extract reduces the growth of pathogens as concentration of extract increased.[30]

12) Wound healing activity

Application of Colocasia esculenta (L.) Schott leaf extract is efficacious for healing wounds contaminated with Staphylococcus aureus through examination of neutrophils, macrophages, reepithelialization, and expression of fibroblast growth factor-2. The Colocasia esculenta (L.) Schott leaf extract affects the proliferative phase of wound healing.[31] The emulgel preparation of taro leaf extract at a concentration of 5% (Treatment-2) was effective for wound healing in diabetic rats. Emulgel preparations applied twice a day were most effective for wound healing. The length of time for wound healing in diabetic rats was 13 days. There was an interaction between treatment and the length of time for wound healing in diabetic rats given taro leaf extract emulgel.[32]

REFERENCES

1. Krishnapriya T.V, Suganthi A., Biochemical and phytochemical analysis of Colocasia esculenta (L.) Schott tubers, International Journal of Research in Pharmacy and Pharmaceutical Sciences, 2017; 2: 21-25.
2. Dr. Niyathi, Dr. Chaithra Hebbar, Dr. Suma V. Mallya, Dr. Mohammed Faisal and Suchitra Narayan Prabhu, Pharmacognostic, phytochemical and HPTLC profile of thevdhantu [petiole of colocasia esculenta (linn.) schott.] World Journal of Pharmaceutical Research, 201; 8: 550-561.
3. Rashmi DR, Raghu N, Gopenath TS, Pradeep Palanisamy, PugazhandhiBakthavatchalam, Murugesan Karthikeyan, Ashok Gnanasekaran, Ranjith MS, Chandrashekrappa GK and Kanthesh M Basalingappa, Taro (Colocasia esculenta): An overview. Journal of Medicinal Plants Studies, 2018; 6(4): 156-161.
4. Prajapati, Rakesh; Kalariya, Manisha; Umbarkar, Rahul; Parmar, Sachin; Sheth, Navin. Colocasia esculenta: A potent indigenous plant. International Journal of Nutrition, Pharmacology, Neurological Diseases, 2011; 1(2): 90-96.
5. S. K. O'Hair, D. N. Maynard, vegetables of tropical climates Edible Aroids, Editor(s): Benjamin Caballero, Encyclopedia of Food Sciences and Nutrition (Second Edition), Academic Press, 2003; 5970-5973.
6. Kaushal, P., Kumar, V. & Sharma, H. K. Utilization of taro (*Colocasia esculenta*): a review. *J Food Sci Technol.*, 2015; 52: 27-40.
7. Jaw-Kai Wang Taro A Review of Colocasia Esculenta and its PotentialsUniversity ofHawall PRESS Honolulu, 1983; 24.
8. Sharma, S., Jan, R., Kaur, R., Riar, C. S. Taro (Colocasia esculenta). In: Nayik, G. A., Gull, A. (eds) Antioxidants in Vegetables and Nuts - Properties and Health Benefits. Springer, Singapore, 2020.
9. Keerthy SP and Dr. K Hanumanthachar Joshi, The pharmacological importance of Colocasia esculenta Linn: A review, Journal of Pharmacognosy and Phytochemistry, 2019; 8(6): 1945-1948.
10. HarshalAshokPawar, PritamDineshChoudhary and Swati Ramesh, AnOverviewofTraditionallyUsedHerb, *Colocasiaesculenta*, asaPhytomedicine, Med Aromat Plants (Los Angeles), an open access journal, 7: 317: 2167-0412.
11. Ashish Patel, Jay Singh, Taro (Colocasia esculenta L.) Review on its botany, morphology, ethno medical uses, phytochemistry and pharmacological activities; The Pharma Innovation Journal, 2023; 12(2): 05-14.

12. Rini Prastiwi Siska, Ervina Bhakti Utami, Gigih Pangestu Witji Antihypertensive and Diuretic Effects of The Ethanol Extract of Colocasia Esculenta (L.) Schott. Leaves, JURNAL ILMU KEFARMASIAN INDONESIA, April 2016; 14(1): 99-102. ISSN 1693-1831.
13. Vasant OK, Vijay BG, Virbhadrappa SR, Dilip NT, Ramahari MV, Laxamanrao BS. Antihypertensive and Diuretic Effects of the Aqueous Extract of Colocasia esculenta Linn. Leaves in Experimental Paradigms. Iran J Pharm Res., 2012; 11(2): 621-34.
14. Kumawat N. S., Chaudhari S. P., Wani N. S., Deshmukh T. A., Patil V. R., Antidiabetic activity of ethanol extract of Colocasia esculenta leaves in alloxan induced diabetic rats, International Journal of PharmTech Research CODEN (USA): IJPRIF., 2010; 2(2): 1246-1249.
15. Akhilesh K. Tripathi and Seema Kohli Phytochemical Screening and Evaluation of Antidiabetic Activity of Colocasia Esculenta (L) Leaves on Stz Induced Diabetic Rats Adv. Pharmacol. Toxicol., 2013; 14(2): 1-12. ISSN - 0973 – 2381.
16. Mohd. Najib Mostafa, Md. Hamidul Islam and Mohammed Rahmatullah, Antinociceptive Activity Evaluation of Corms of Colocasia Esculenta Var Esculenta, World Journal of Pharmaceutical Research, 11 Nov. 2017; 7(1): 165-171.
17. Afsana Akter, Shiblur Rahman, Md. Tanvir Morshed, Sophia Hossain, Sharmin Jahan, Auditi Swarna, Mohammed Rahmatullah: Evaluation of antihyperglycemic and antinociceptive potential of Colocasia esculenta (L.) Schott (Araceae) leaves, Advances in Natural and Applied Sciences, 2013; 7(2): 143-148. ISSN 1995-0772.
18. Manisha Kalariya, Sachin Parmar, and Navin Sheth, Neuropharmacological activity of hydroalcoholic extract of leaves of Colocasia esculenta, Pharmaceutical Biology, 2010; 48(11): 1207–1212.
19. Al-Kaf AG, Taj Al-Deen AM, Ali ALhaidari SA, Al-Hadi FA. Phytochemical analysis and antimicrobial activity of colocasia esculenta (taro) medicinal plant leaves used in folk medicine for treatment of wounds and burns in Hufash district al Mahweet Governorate–Yemen. Universal Journal of Pharmaceutical Research, 2019; 4(2): 32-35.
20. Prithsa Chakraborty, Papiya Deb, Sudeshna Chakraborty, Bohnisikha Chatterjee and Jayanthi Abraham, Cytotoxicity and antimicrobial activity of Colocasia esculenta, Journal of Chemical and Pharmaceutical Research, 2015; 7(12): 627-635.
21. Ribeiro Pereira, P.; Bertozzi de Aquino Mattos, É.; Nitzsche Teixeira Fernandes Corrêa, A.C.; Afonso Vericimo, M.; Margaret Flosi Paschoalin, V. Anticancer and

Immunomodulatory Benefits of Taro (Colocasia esculenta) Corms, an Underexploited Tuber Crop. Int. J. Mol. Sci., 2021; 22: 265.

22. Amy C. Brown, Jonathan E. Reitzenstein, Jessie Liu, Martin R. Jadus, The anti-cancer effects of poi (Colocasia esculenta) on colonic adenocarcinoma cells In vitro, Phytotherapy research, September 2005, 19: 767-771.
23. Kundu N, Campbell P, Hampton B, Lin CY, Ma X, Ambulos N, Zhao XF, Goloubeva O, Holt D, Fulton AM. Antimetastatic activity isolated from Colocasia esculenta (taro). Anticancer Drugs, 2012 Feb; 23(2): 200-11.
24. Swapnil S. Lad, Swati U. Kolhe, Evaluation of antihyperlipidemic potential of aqueous corm extract of Colocasia esculenta in experimental model of rats,Pharmacological Research - Modern Chinese Medicine, 2023; 9: 2667-1425.
25. Chinonyelum AN, Uwadiegwu AP, Nwachukwu OC, Emmanuel O. Evaluation of hepatoprotective activity of Colocasia esculenta (L. Schott) leaves on thioacetamide-induced hepatotoxicity in rats. Pak J Pharm Sci., 2015 Nov; 28: 2237-41.
26. Bhagyashree R Patil, Hussein M Ageely, Antihepatotoxic Activity of Colocasia Esculenta Leaf Juice, International Journal of Advanced Biotechnology and Research ISSN 0976-2612, June-2011; 2(2): 296-304.
27. Meenal S. Kubde, S. S. Khadabadi, I. A. Farooqui, S. L. Deore; In-vitro anthelmintic activity of Colocasia esculenta; Der Pharmacia Lettre, 2010; 2(2): 82-85.
28. Shrivastava AK, Keshari M, Neupane M, Chaudhary S, Dhakal PK, Shrestha L, Palikhey A, Yadav CK, Lamichhane G, Shekh MU, Yadav RK. Evaluation of Antioxidant and Anti-Inflammatory Activities, and Metabolite Profiling of Selected Medicinal Plants of Nepal. J Trop Med., 2023 Nov 3; 2023: 6641018.
29. Baro MR, Das M, Kalita A, Das B, Sarma K. Exploring the anti-inflammatory potential of Colocasia esculenta root extract in in-vitro and in-vivo models of inflammation. J Ethnopharmacol., 2023 Mar 1; 303: 116021.
30. S. K. Mengane, Antifungal activity of the crude extracts of Colocasia esculenta leaves invitroon plant pathogenic fungi, International Research journal of Pharmacy, 2015; 6(10).
31. Endang Sjamsudin1, AnnisyaMuharty, Lucky Riawan, Bambang PontjoPriosoeryanto, The efficacy taro leaf extract on wound healing contaminated with Staphylococcus aureus; Padjadjaran Journal of Dentistry, 2021; 33(3): 199-209.

32. Erni Rustiani, Lia Suliawati, Sara Nurmala, In Vivo Wound Healing Potential of Taro Leaf Extract (Colocasia esculenta L.) Emulgel on Diabetic Rat Models; FITOFARMAKA: JurnalIlmiah Farmasi, December 2022; 12(2): 100-111.