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PHYTOCHEMICAL ANALYSIS OF JATHIKAI CHOORANAM

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ABSTRACT

Jathikai chooranam is a traditional Siddha poly-herbal formulation which is mentioned in ancient siddha literature used to cure various ailments. It contains the ingredients of Jathikai, Kodiveli, Sanal seeds, Kirambu, Elakkai and Choodan. Jathikai chooranam indicates for Abdominal pain, Migraine, Rheumatic pain, Cough, Dysmenorrhoea and Menorrhagia. This preparation having various phytochemicals depends on their ingredients. The aim of the present study was to investigate the presence of phytochemicals in the selected herbal formulation.

KEYWORDS: Jathikai chooranam, Herbs, Siddha, Phytochemical.

INTRODUCTION

Siddha system of medicine is a traditional medical system that uses a scientific and holistic approach to provide preventive, promotive, curative, rejuvenating and rehabilitative health care. The word Siddha which means “Perfection” “Heavently bliss” and accomplishment. In ancient times, the Siddhars were the foremost scholars of this system, they laid the groundwork for Siddha medical system, hence the name Siddha medicine. There are several types of medicines developed under the Siddha branch of medicine, containing a herbals, metals, minerals and other products. Among these products herbals are highly used in this system.

Phytochemicals are naturally occurring biologically active chemical compounds in plants. The presence of certain types of phytochemicals in some plants can act as a natural defence system against pathogens. They are used to treat various metabolic, immunological and neurological disorders in humans. Here that phytochemicals are analysed in selected siddha formulation, Jathikai chooranam and results are given.

MATERIALS AND METHODS

INGREDIENTS: Jathikai chooranam.

TAMILNAME	ENGLISH NAME	BOTANICAL NAME
Jathikai	Nut meg	*Myristica fragrans*
Kodiveli	Ceylon lead wort	*Plumbago zeylanica*
Kirambu	Clove	*Syzygium aromaticum*
Elakkai	Cardamomum seeds	*Elettaria cardamomum*
Sanal	Bengal hemb	*Crotalaria juncea*
Choodan	Camphor	*Cinnamomum camphora*

General information

INDICATION	Cough Abdominal pain Migraine Rheumatic pain Dysmenorrhoea Menorrhagia
DOSAGE	3 – 6 kuntri (390 – 780mg)
ADJUVANT	Warm water

Method of Analysis

PLIM- Protocol- ASU Formulations.

PHYTOCHEMICAL ANALYSIS

PROCEDURE

Test for alkaloids

Mayer's Test: To the test sample, 2ml of mayer's reagent was added, a dull white precipitate revealed the presence of alkaloids.

Test for coumarins

To the test sample, 1 ml of 10% sodium hydroxide was added. The presence of coumarins is indicated by the formation of yellow colour.

Test for saponins

To the test sample, 5 ml of water was added and the tube was shaken vigorously. Copious lather formation indicates the presence of Saponins.

Test for tannins

To the test sample, ferric chloride was added, formation of a dark blue or greenish black colour showed the presence of tannins.

Test for glycosides

Borntrager's Test: Test drug is hydrolysed with concentrated hydrochloric acid for 2 hours on a water bath, filtered and the hydrolysate is subjected to the following tests. To 2 ml of filtered hydrolysate, 3 ml of chloroform is added and shaken, chloroform layer is separated and 10% ammonia solution is added to it. Pink colour indicates presence of glycosides.

Test for flavonoids

Alkaline reagent test. Two to three drops of sodium hydroxide were added to 2 mL of extract. Initially, a deep yellow colour appeared but it gradually became colourless by adding few drops of dilute HCL, indicating that flavonoids were present.

Test for phenols

Lead acetate test: To the test sample; 3 ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenolic compounds.

Test for steroids

To the test sample, 2ml of chloroform was added with few drops of conc. Sulphuric acid (3ml), and shaken well. The upper layer in the test tube was turns into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

Test for Triterpenoids

Liebermann–Burchard test: To the chloroform solution, few drops of acetic anhydride was added then mixed well. 1 ml concentrated sulphuric acid was added from the sides of the test tube, appearance of red ring indicates the presence of triterpenoids.

Test for Cyanins

Anthocyanin: To the test sample, 1 ml of 2N sodium hydroxide was added and heated for 5 min at 100^{o}C. Formation of bluish green colour indicates the presence of anthocyanin.

Test for Carbohydrates

Benedict's test: To the test sample about 0.5 ml of Benedic's reagent is added. The mixture is heated on a boiling water bath for 2 minutes. A characteristic coloured precipitate indicates the presence of sugar.

Test for Proteins

Biuret Test: To extracts 1% solution of copper sulphate was added followed by 5% solution of sodium hydroxide, formation of violet purple colour indicates the presence of proteins.

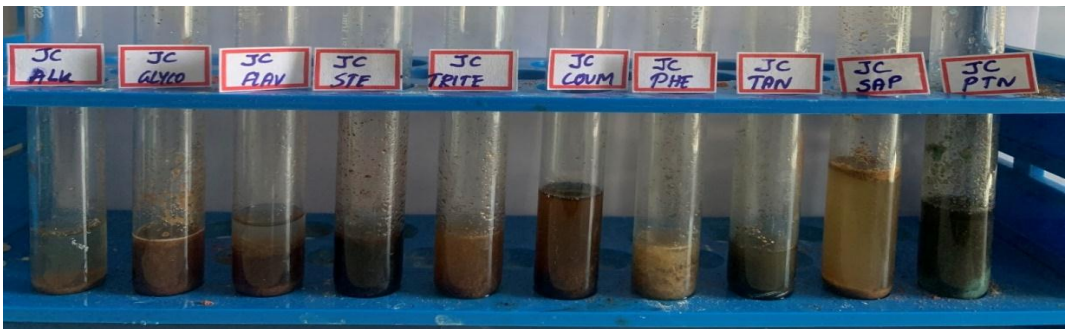
RESULTS

Phytochemical analysis of JC.

S.NO	TEST	OBSERVATION
1	ALKALOIDS	+
2	FLAVANOIDS	_
3	GLYCOSIDES	_
4	STEROIDS	+
5	TRITERPENOIDS	+
6	COUMARIN	+
7	PHENOL	+
8	TANIN	+
9	PROTEIN	_
10	SAPONINS	+
11	SUGAR	+
12	ANTHOCYANIN	_
13	BETACYANIN	+

(+) Indicates Positive and (-) Indicates Negative. JC- Jathikai chooranam.

Qualitative Phytochemical Investigation



PHYTOCHEMICAL COMPOUNDS OF JC.

ALKALOIDS

Alkaloids are essential compounds of plants defense mechanism against pest and pathogens. Alkaloids, one element of these, are named plant secondary metabolites. They are well

known naturally occurring nitrogen-containing bioactive compounds. Alkaloid used as medicines with scientific and historical evidence and covers plant-derived alkaloid and their therapeutic activities, including acetylcholinesterase (AChE) inhibitory activity, anti-inflammatory activity and antioxidant activity. Moreover, the use of alkaloid in treating neurodegenerative and inflammatory diseases has been included.

STEROIDS

Plant steroids, also known as phytosterols, are steroid compounds found in plants. The compounds present in plant that are responsible for medicinal property are usually secondary metabolites which are having definite chemical structure. Among all these compounds, steroids have the fundamental structure of four carbon rings called the steroid nucleus. different chemical groups at different positions on backbone leads to the formation of many different types of steroidal compounds including sex hormones progesterone and testosterone, the anti- inflammatory steroids like corticosteroids, cardiac steroids digoxin 7,8 and digitoxin, animal steroid like cholesterol, steroidal glycosides. Plant steroids synthesized by cyclisation of 2,3-epoxysqualene into cycloartenol are further metabolized owing to the distribution of the various classes of plant steroids in different plants and their pharmacological activities. Plant steroids possess many interesting medicinal, pharmaceutical and agrochemical activities like anti-tumor, immunosuppressive, hepatoprotective, antibacterial, plant growth hormone regulator, sex hormone, antihelminthic, cytotoxic and cardiotonic activity.

TERPENOIDS

The terpenoids are a class of natural products which have been derived from five-carbon isoprene units. Most of the terpenoids have multi cyclic structures that differ from one another by their functional groups and basic carbon skeletons. These types of natural lipids can be found in every class of living things, and therefore considered as the largest group natural products. Many of the terpenoids commercially interesting because of their use as flavours and fragrances in foods and cosmetics examples menthol and sclareol. Among plant secondary metabolites terpenoids are a structurally most diverse group they function as phytoalexins in plant direct defense or as signal in indirect defense responses which involve herbivares and their natural enemies. Last, but not least, terpenes play an important role as signal compounds and growth regulators (phytohormones) of plants, as shown by preliminary investigation. In addition, terpenoids can have medicinal properties such anti-carcinogenic,

antimalarial, anti-ulcer, hepariciдal, antimicrobial or diuretic activity. Triterpenoid is the one of the unit of terpenoids.

COUMARIN

Coumarins are a group of compounds of the oxygenated heterocyclic benzopyrone class and contain a pyron/furan ring and benzene in their structure. They show anticoagulant, antispasmodic, anti-inflammatory, antibacterial, antirheumatic, diuretic, and sedative effects. The coumarin compound has an anti-inflammatory and calming pleasant smell, it was added to foods as an odorant in the past. The dafnetine compound is a blood attractant and is used in rheumatism. Fraxetin compound has diuretic effects, herniarin compound has anti-inflammatory, umbelliferone compound has antibacterial, scopoletin compound has spasmolytic, visnadin compound has antispasmodic, novobiocin and kumermycin compounds have antibiotic effects.

PHENOL

Phenolic phytochemicals are the largest category of phytochemicals and the most widely distributed in the plant kingdom. Phenol (CHOH) considered the simplest class of this group of natural compounds. Phenolic compounds are a large and complex group of chemical constituents found in Plants. They are plant secondary metabolites, and they have an important role as defence compounds. Phenolics exhibit several properties beneficial to humans and its antioxidant properties are important in determining their role as protecting agents against free radical-mediated disease processes. They show anticancer, anti-inflammatory, antioxidant, antimutagenic, and antidiabetic effects.

TANIN

Tanins constitute a large group of complex organic, non-nitrogenous, phenolic compounds of high molecular weight and are widely distributed in plant kingdom. Tanins are soluble in water and alcohol, have astringent taste, precipitate proteins, and produce acidic reaction. Tanins may be employed medicinally in antidiarrheal, hemostatic, and anti-hemorrhoidal compounds. The anti-inflammatory effect of tanins help control all indications of gastritis, esophagitis, enteritis, and irritating bowel disorders. Diarrhoea is also treated with an effective astringent medicine that does not stop the flow of the disturbing substance in the stomach; rather, it controls the irritation in the small intestine. Tanins not only heal burns and stop bleeding, but they also stop infection while they continue to heal the wound internally. The ability of tannins to form a protective layer over the exposed tissue keeps the wound

from being infected even more. Tanins are also beneficial when applied to the mucosal lining of the mouth. Tanins can also be effective in protecting the kidneys. Tanins have been used for immediate relief of sore throats, diarrhea, dysentery, hemorrhaging, fatigue, skin ulcers and as a cicatrizant on gangrenous wounds. Tanins can cause regression of tumors that are already present in tissue, but if used excessively over time, they can cause tumors in healthy tissue. They have also been reported to have anti-viral effects.

SAPONIN

Most known saponins are plant-derived secondary metabolites. The ability to synthesize saponins is rather widespread among plants belonging to the division of Magnoliophyta, covering both dicotyledons and monocotyledons. However, the majority of saponin-producing species has been found within dicotyledons. The biological role of saponins is not completely understood. In plants, they are generally considered to be part of defense systems due to anti-microbial, fungicidal, allelopathic, insecticidal and molluscicidal, etc. activities. Also Saponins are glycosides that are widely dispersed in plants and contain a tri-terpenoid or steroidal aglycon moiety with one or more sugar chains. Pharmaceutical preparations of plant extracts containing saponin have been used to treat a variety of ailments, including alcoholism, inflammation, infection, pre and post-menopausal symptoms, cerebrovascular and cardiovascular diseases, such as hypertension and coronary heart disease, cataract, dementia, gastritis, prophylaxis, ultraviolet damage, gastric ulcer, duodenal ulcer, etc.

SUGAR

Sugars are metabolic substrates playing a part in modulating various processes in plants during different phases of development. Thus, modulating the sugar metabolism can have intense effects on the plant metabolism. Glucose is a soluble sugar, found throughout the plant kingdom. Apart from being a universal carbon source, glucose also operates as a signaling molecule modulating various metabolic processes in plants. From germination to senescence, wide range of processes in plants is regulated by glucose. The effect of glucose is found to be concentration dependent. Photosynthesis and its related attributes, respiration and nitrogen metabolism are influenced by glucose application. Endogenous content of glucose increases upon exposure of plant to various abiotic stresses and also when glucose is supplied exogenously. Glucose accumulation alleviates the damaging effects of stress by enhancing production of antioxidants and compounds similar to that of photosynthetic CO2 fixation

which act as an osmoticum by maintaining osmotic pressure inside the cell, pH homeostasis regulator and reduce membrane permeability during stress.

BETACYANIN

Betacyanins are red and/or violet pigments, constituting a group of chromo alkaloids called as betalains. This pigment class of secondary metabolites are synthesized from tyrosinase. It contains anti- microbial (antiviral, antibacterial, antifungal, antiprotozoal) anti- cancer, anti-lipidemic, hepatoprotective and anti-inflammatory effects. Also contain effect on cardio vascular by decrease systolic and diastolic blood pressure.

DISCUSSION

The polyherbal formulation of Jathikai Chooranam were analysed for shown the presence of phytochemicals. The result of qualitative analysis given, the sample contains presence of alkaloid, steroid, triterpenoids, coumarin, phenol, tannin, saponin, sugar and also betacyanin. Most of the phytochemicals having antioxidant, anti-inflammatory and anti carcinogenic effect. The pharmacological activity of above phytochemicals were compare with indication of Jathikai chooranam, which proven the theraupautic use of selected sample of Jathikai Chooranam.

CONCLUSION

This study highlights the presence of phytochemicals that responsible for pharmacological activity of Jathikai chooranam. This analysis were screen, identify, extract and isolate the phytoconstituents to evaluate the therapeutic potential of the medicine and to develop phytochemical standards for the herbal medicine for quality control purpose. Further study needed to elucidate the possible mechanism of action of these phytochemical extracts.

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REFERENCE

1. Vaidhya Rathnam K.S.Murugesa Mudhaliyar, Gunapadam Mooligai Vaguppu, Department of Indian Medicine and Homeopathy, Madras, 6th edition, 2006.

2. Dr. S. Somasundaram. M. S. C, Phd, Taxonomy of Angiosperms (Maruthuva Thavaraviyal, vol- 1&2), 4th edition, Elangovan Publication, 2011.
3. N. Kumar, A Textbook of Pharmacognosy, 3rd edition, AITBS Publication, 2018.
4. J.S. Qadry, Parmacognosy with 140 colour photographs, 16th edition, 2010.
5. Dr. Syed Aftab Iqbal & Dr. Noor Ahmed Khan, Textbook of Phytochemistry, First edition, DPH Publication, 2011.
6. https://www.ncbi.nlm.nih.gov.in.
7. https://www.sciencedirect.com
8. https://www.researchgate.net