



ELUCIDATING & COMPARING PHYTOCHEMICAL COMPOSITION OF PANAX GINSENG, NYMPHAEA STELLATA, MUCUNA PRURIENS, SYZYGIUM CUMINI AND AEGLE MARMELOS

Suresh Singh*, Namrata Singh

Abstract

The discovery of novel bioactive phytochemicals is a key step in the possible production of new medications. The side effects of synthetic drugs lead us to recognize & isolate specific bioactive compounds with health benefits. Considering these recent developments this study specifically deals with analyzing the phytochemicals present in Root of *Panax ginseng*, flower of *Nymphaea stellata*, seeds of *Mucuna pruriens*, leaves of *Syzygiumcumini* and leaves of *Aegle marmelos*. The plant materials were collected & subjected to hydroalcoholic solvent for extraction. Further percentage yield & phytochemical studies were carried out on all the plant extracts. The results revealed that the percentage yield of different plant found to be vary slightly. In case of *Nymphaea stellate*&*Aegle marmelos* the extractive value was found to be 7.80% & 7.51% respectively. The lowest yield of 6.14% is observed in case of *Mucuna pruriens*. For *Panax ginseng* the estimated yield came out to be 8.56%. The record of highest yield can be seen in case of *Syzygiumcumini*. The results of phytochemical study revealed the range of results. In case of *P. ginseng* extract almost all phytoconstituents were found to be present except alkaloid, tannin, proteins. Further *N.stellate* found to have components like alkaloid, flavonoid, diterpenes, Phenol & saponins. The *M. pruriens* also found to be laden with phytochemicals as all the test resulted positive except glycosides & tannins. The same was true with *S. cumini* as it is devoid of only alkaloid & Tannin. For *A. marmelos* extract alkaloid, flavonoid, phenol, protein, carbohydrate & saponin were found to be present. Thus, it can be concluded that all the studied plants have unique features & bioactive principles with therapeutic benefit.

Keywords: Herbal medicines, *Panax ginseng*, *Nymphaea stellata*, *Mucuna pruriens*, *Syzygiumcumini*, *Aegle marmelos*, percentage yield, Phytochemicals

Oriental University, Indore, Sanwer Road, Jakhya Opposite Revati Range Gate No.1,
Indore, Madhya Pradesh 453555
Corresponding Author mail id
sumeshraj39@rediffmail.com

Introduction

Humanity has access to an almost limitless number of potential treatments thanks to plants. They have historically served as the earliest foundation for creating medications that relieve human suffering and treat a variety of crippling ailments. A plant, where a variety of organic substances are produced, can be compared to a chemical factory. The discovery of novel bioactive phytochemicals is a key step in the possible production of new medications, and the tropical forest's enormous biodiversity holds tremendous promise in this regard. The preclinical development of bioactive natural compounds and their equivalents is a key goal of natural product research (Sam,2019; Pradeepet *al.*, 2014; Verma and Singh,2008). The Council of Scientific and Industrial Research recently launched a revitalization drive for the drug discovery process from natural sources. To keep up with other drug discovery efforts, pharmacognosists, phytochemists, and other natural product scientists will need to consistently increase the quality and quantity of substances that enter the drug development phase. Herbal products currently represent safety and security in comparison to synthetic drugs, which encourages research into herbal medications. Herbs are making a comeback. If a comprehensive strategy is used, together with the engagement of tribes, to document, preserve, and use traditional knowledge before it is permanently lost, it may play a significant role (Kayseret *al.*, 2018; Balunasand Kinghor,2005; Farnsworth,2007). Considering Eur. Chem. Bull. 2023,12(Special issue 11), 96-103

these recent development this study specifically deals with analyzing the phytochemicals present in Root of *Panax ginseng*, flower of *Nymphaea stellata*, seeds of *Mucuna pruriens*, leaves of *Syzygiumcumini* and leaves of *Aegle marmelos*.

Panax ginseng C. A. Meyer (PG) is a widely used herb from the Araliaceae family. It is commonly known as Asian or Korean ginseng. The roots of the plant are used in traditional medicine, mainly in East Asia. The main ingredient, ginsenosides are believed to have therapeutics action, and many scientific studies through laboratory systematic reviews and clinical trials have been conducted to investigate ginseng effect on performance enhancements, cardiovascular risk factor, quality of life, cognition Alzheimer's disease, hypertension, and type 2 diabetes; however, the most promising evidence was its use in regulating glucose metabolism and the immune response, particularly cell-mediated immunity (Colemanet *al.*, 2003; Ji et al., 2022; Kiefer & Pantuso,2003).

Another plant *Nymphaea stellata* Willd. (Syn. *Nymphaea nouchali* Burman f.) (Nymphaeaceae) is an important and well-known medicinal plant, widely used in the Ayurveda and Siddha systems of medicines for the treatment of diabetes, inflammation, liver disorders, urinary disorders, menorrhagia, blenorragia, menstruation problem, as an aphrodisiac, and as a bitter tonic. Traditional use and experimental findings, such as hepatoprotective, anti-inflammatory, and

particularly antidiabetic action, appear to be in concordance. The traditionally attributed anti-diabetic effect of nymphyol, a steroid endocrine tissue and increases insulin secretion in the β -cells (Selvakumari et al., 2016; Kiranmai et al., 2023; Singh&Jain,2017).

The third plant Popular Indian medicinal plant *M. pruriens* has been used for many years in traditional Ayurvedic Indian medicine to treat illnesses such parkinsonism The ancient traditional medical science of Ayurveda, which has been practised in India since the Vedic period, makes extensive use of this plant. L-dopa is said to be one of the components of *M. pruriens*. The beans have also been used to treat neurological illnesses and arthritis in Ayurveda in addition to being a potent aphrodisiac. The bean is said to absorb the venom when applied as a paste to scorpion stings (Sathiyarayanan and Arulmozhi,2007; Lampariello et al., 2012).

The next important plant *Syzygiumcumini* is one of the important medicinal plants having potential to treat several ailments successfully. Additionally, it has a long medical history, is an age-old medicinal plant, and has been discussed in classical literature for more than a century. It is readily available throughout India and is mentioned in Ayurvedic medicine (Indian folk medicine) as a cure for diabetes mellitus. Different components of the plant are used by various traditional healers in India to treat conditions such as diabetes, mouth blisters, cancer, colic, diarrhoea, digestive disorders, dysentery, piles, acne, and

extracted from the flowers, has been experimentally demonstrated to be true; it restores the damaged stomachaches. Numerous folk medicine claims on this plant's antidiabetic benefits have been cited in the literature during the past 40 years. Various Jambolan components are used in Union medicine as liver tonics, blood enrichers, teeth and mouth strengtheners, and good lotions for curing ringworm infections (Srivastava and Chandra,2013; Ahmad et al., 2019; Katiyaret al., 2016).

The last plant *Aegle marmelos* has been utilized in the Ayurvedic, Unani, and Siddha systems of medicine in India, Bangladesh, and Sri Lanka as a herbal remedy for the treatment of diabetes mellitus. This tree's components are mostly used for medicinal purposes. The unripe dried fruit is stomachic, astringent, and useful for treating diarrhoea and dysentery. Patients who have recently recovered from bacillary dysentery have a calming effect after drinking a sweet beverage made from fruit pulp. The different parts of Bael are used for various therapeutic purposes, such as for treatment of Asthma, Anaemia, Fractures, Healing of Wounds, Swollen Joints, High Blood Pressure, Jaundice, Diarrhoea Healthy Mind and Brain Typhoid Troubles during Pregnancy. The rind of the unripe fruits is used to make a yellow colour. The dried fruits are used as pill boxes for storing pricey medications, holy ashes, and tobacco once the pulp has been extracted from the rind. It is frequently used in homoeopathic therapies for chronic diarrhoea, nocturnal

seminal emission with romantic fantasies, conjunctivitis and styes, rhinitis, and

Materials & Methods

Collection of plant material

Root of *Panax ginseng*, flower of *Nymphaea stellata*, seeds of *Mucuna pruriens*, leaves of *Syzygiumcumini* and leaves of *Aegle*

Extraction by maceration method

The shade dried root of *Panax ginseng*, flower of *Nymphaea stellata*, seeds of *Mucuna pruriens*, leaves of *Syzygiumcumini* and leaves of *Aegle marmelos* were subjected to extraction with petroleum ether by maceration. The extraction was continued till the defatting of the

Determination of percentage yield

The percentage yield of yield of each extract was calculated by dividing by weight of extract

Phytochemical screening

Phytochemical examinations were carried out extracts as per the following standard

Results & Discussion

The percentage yield of different plant found to be varied slightly. In case of *Nymphaea stellate* & *Aegle marmelos* the extractive value was found to be 7.80% & 7.51% respectively. The lowest yield of 6.14% is observed in case of *Mucuna pruriens*. For *Panax ginseng* the estimated yield came out to be 8.56%. The record of highest yield can be seen in case of *Syzygiumcumini*.

Further phytochemical analysis was performed. Phytochemicals are compounds with physiological activity that work in concert with one another to enhance how effectively living things utilise nutrients. These creatures defend plants against hazardous environmental

coccygodynia (Baligaet *al.*, 2011; Sharmaet *al.*, 2011; Rahman and Parvin, 2014).

marmelos were collected from local area of Bhopal (M.P.) in the month of July, 2020.

material had taken place. Defatted marc of *Panax ginseng*, *Nymphaea stellata*, *Mucuna pruriens*, *Syzygiumcumini* and *Aegle marmelos* were extracted with hydroalcoholic solvent (ethanol: aqueous; 80:20) using maceration method (Trushevaet *al.*, 2007).

by weight of powdered drug taken multiplied by 100.

methods (Shaikh et *al.*, 2020).

elements such pollution, dehydration, stress, disease attacks, and UV radiation. Numerous substances fall under this category, such as phenolic acids, tannins, alkaloids, flavonoids, quinines, terpenoids, oils, lignins, resins, saponins, phytosterols, cardiac glycosides, stilbenes, coumarins, etc. These organic chemicals are not regarded as essential for a healthy human existence because they do not supply sustenance. Previously, it was thought that they primarily shielded plants from herbivorous mammals, predators, fungi, and harmful insects, but recent research has proven that they also shield people from lethal infections.

The results of phytochemical study revealed the range of results. In case of *P. ginseng* extract almost all phytoconstituents were found to be present except alkaloid, tannin, proteins. Further *N.stellate* found to have components like alkaloid, flavonoid, diterpenes, Phenol & saponins.

The *M. pruriens* also found to be laden with phytochemicals as all the test resulted positive except glycosides & tannins. The same was true with *S. cumini* as it is devoid of only alkaloid & Tannin. For *A. marmelos* extract alkaloid, flavonoid, phenol, protein, carbohydrate & saponin were found to be present.

Table 1: % Yield of hydroalcoholic extracts of *Panax ginseng*, *Nymphaea stellata*, *Mucuna pruriens*, *Syzygiumcumini* and *Aegle marmelos*

S. No.	Hydroalcoholic extracts	% Yield (W/W)
1.	<i>Panax ginseng</i>	8.56%
2.	<i>Nymphaea stellata</i>	7.80%
3.	<i>Mucuna pruriens</i>	6.14%
4.	<i>Syzygiumcumini</i>	9.22%
5.	<i>Aegle marmelos</i>	7.51%

Table 2: Result of phytochemical screening of hydroalcoholic extracts of *Panax ginseng*, *Nymphaea stellata*, *Mucuna pruriens*, *Syzygium cumini* and *Aegle marmelos*

S. No.	Constituents	<i>P. ginseng</i> extract	<i>N. stellata</i> extract	<i>M. pruriens</i> extract	<i>S. cumini</i> extract	<i>A. marmelos</i> extract
1.	Alkaloids Wagner's Test:	-ve	+ve	+ve	-ve	+ve
2.	Glycosides Legal's Test:	+ve	-ve	-ve	+ve	-ve
3.	Flavonoids Alkaline Reagent Test: Lead acetate Test:	+ve +ve	-ve +ve	-ve +ve	+ve +ve	-ve +ve
4.	Diterpenes Copper acetate Test:	+ve	+ve	+ve	+ve	-ve
5.	Phenol Ferric Chloride Test:	+ve	+ve	+ve	+ve	+ve
6.	Proteins Xanthoproteic Test:	-ve	-ve	+ve	+ve	+ve
7.	Carbohydrate Fehling's Test:	+ve	-ve	+ve	+ve	+ve
8.	Saponins Froth Test:	+ve	+ve	+ve	+ve	+ve
9.	Tannins Gelatin test:	-ve	-ve	-ve	-ve	+ve

+ve =positive; -ve=negative

Conclusion

There were significant differences among percentage yield & phytochemical constituents of studied extracts. All the studied plants have unique features & bioactive principles with

therapeutic benefit. The availability and worth of information are crucial in promoting the development of new medication syntheses and the extraction of bioactive components from

plant parts in the future. The presence of many bioactive substances, including polyphenols, flavonoids, phenolic compounds alkaloids, saponins, tannins, phlobatannins, glycosides, anthraquinones, steroids, terpenoids, and triterpene, was discovered through tables generated from phytochemical analyses of diverse medicinal plants. It is strongly advised

that these plants be used in traditional medicine, and it is also proposed that more research be done to extract, purify, and characterise the active ingredients responsible for these plants' effects. Additionally, more research is encouraged to clarify the potential mechanism of action of these extracts.

References

- Sam S. Importance and effectiveness of herbal medicines. *Journal of pharmacognosy and phytochemistry*. 2019;8(2):354-7.
- Pradeep A, Dinesh M, Govindaraj A, Vinothkumar D, Ramesh Babu NG. Phytochemical analysis of some important medicinal plants. *Int J Biol Pharm Res*. 2014;5(1):48-50.
- Verma S, Singh SP. Current and future status of herbal medicines. *Veterinary world*. 2008 Nov 1;1(11):347.
- Kayser O. Ethnobotany and medicinal plant biotechnology: from tradition to modern aspects of drug development. *Planta Medica*. 2018 Aug;84(12/13):834-8.
- Balunas MJ, Kinghorn AD. Drug discovery from medicinal plants. *Life sciences*. 2005 Dec 22;78(5):431-41.
- Farnsworth NR. The role of ethnopharmacology in drug development. In *Ciba Foundation Symposium 154- Bioactive Compounds from Plants: Bioactive Compounds from Plants: Ciba Foundation Symposium 154 2007 Sep 28 (pp. 2-21)*. Chichester, UK: John Wiley & Sons, Ltd..
- Coleman CI, Hebert JH, Reddy P. The effects of Panax ginseng on quality of life. *Journal of clinical pharmacy and therapeutics*. 2003 Feb;28(1):5-15.
- Ji X, Hou C, Shi M, Yan Y, Liu Y. An insight into the research concerning Panax ginseng CA Meyer polysaccharides: a review. *Food reviews international*. 2022 Aug 18;38(6):1149-65.
- Kiefer DS, Pantuso T. Panax ginseng. *American family physician*. 2003 Oct 15;68(8):1539-42.
- Selvakumari E, Shantha A, Kumar CS, Prabhu TP. Phytochemistry and pharmacology of the genus Nymphaea. *Journal of Academia and Industrial Research*. 2016 Dec;5(7):98-108.
- Kiranmai B, Sandhyarani M, Tiwari AK. Water Lily (*Nymphaea nouchali* Burm. f): An Ancient Treasure of Food and Medicine. *Pharmacognosy Research*. 2023;15(2).

- Singh M, Jain AP. A review on genus Nymphaea: multi-potential medicinal plant. Asian Journal of Pharmaceutical Education and Research. 2017;6(4):1-9.
- Sathiyarayanan L, Arulmozhi S. Mucuna pruriens Linn.-A comprehensive review. Pharmacognosy Reviews. 2007;1(1).
- Lampariello LR, Cortelazzo A, Guerranti R, Sticozzi C, Valacchi G. The magic velvet bean of Mucuna pruriens. Journal of traditional and complementary medicine. 2012 Oct 1;2(4):331-9.
- Srivastava S, Chandra D. Pharmacological potentials of Syzygiumcumini: a review. Journal of the Science of Food and Agriculture. 2013 Jul;93(9):2084-93.
- Ahmad N, Nawab M, Kazmi MH. Medicinal potential of jamun (Syzygiumcumini Linn): A review. Journal of Drug Delivery and Therapeutics. 2019 Sep 15;9(5):175-80.
- Katiyar D, Singh V, Ali M. Recent advances in pharmacological potential of Syzygiumcumini: A review. Advances in Applied Science Research. 2016;7(3):1-2.
- Baliga MS, Bhat HP, Joseph N, Fazal F. Phytochemistry and medicinal uses of the bael fruit (Aegle marmelos Correa): A concise review. Food Research International. 2011 Aug 1;44(7):1768-75.
- Sharma GN, Dubey SK, Sharma P, Sati N. Medicinal values of bael (Aegle marmelos)(L.) Corr.: A review. Int J Curr Pharm Rev Res. 2011;2(1):12-22.
- Rahman S, Parvin R. Therapeutic potential of Aegle marmelos (L.)-An overview. Asian Pacific journal of tropical disease. 2014 Feb 1;4(1):71-7.
- Trusheva B, Trunkova D, Bankova V. Different extraction methods of biologically active components from propolis: a preliminary study. Chemistry Central Journal. 2007 Dec;1:1-4.
- Shaikh JR, Patil M. Qualitative tests for preliminary phytochemical screening: An overview. International Journal of Chemical Studies. 2020 Mar;8(2):603-8.