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QUANTITATIVE PHYTOCHEMICAL ANALYSIS OF *BIOPHYTUM SENSITIVUM* (L.) DC. (OXALIDACEAE)

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ABSTRACT

The present study investigates the quantitative analysis of the major bioactive constituents of medicinally important plant *Biophytum sensitivum* (L.) DC. Flavonoids, alkaloids, phenols were reported in the ethanol extract. Percentage of major elements like carbon, nitrogen, phosphorus, potassium, sodium, calcium, magnesium and sulphur were determined. The significance of the plant in traditional medicine is discussed in the study with respect to the role of the plant in ethnomedicine in India.

KEY WORDS: **Phytochemical constituents, *Biophytum sensitivum,* Quantitative analysis.**

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INTRODUCTION

Medicinal plants have been used in virtually all cultures as a source of medicine, since times immemorial. Herbal medicine is still the mainstay of health care in several developing countries. The widely used herbal remedies and health care preparations as described in ancient texts such as the Vedas and the Bible are obtained from commonly used traditional herbs and medicinal plants. The medicinal properties of these botanicals are being better understood and are attributable to the phytochemicals that specific plants contain. Plants show enormous versatility in synthesizing complex materials which have no immediate obvious growth or metabolic functions. These complex materials are referred to as secondary metabolites. Phytochemicals are naturally occurring and biologically active plant compounds that have potential disease inhibiting capabilities. It is believed that phytochemicals may be effective in combating or preventing disease due to their antioxidant effect (Halliwell and Gutteridge, 1992). A number of phytochemical screenings of plant material have been carried out (Manorenjitha *et al.*, 2013; Sanjay *et al.*, 2013). The present investigation aims at the screening of *Biophytum sensitivum* (L.) DC. (Family: Oxalidaceae) for quantitative phytochemical characteristics. Pharmacologically, the *Biophytum* plant has been investigated for its hypoglycemic (Puri and Baral, 1998), hypocholesterolemic (Puri, 2003), and anti-cancer effect (Guruvayoorappan and Girija, 2005). It is a known traditional remedy for the treatment of diabetes (Puri *et al.,* 1997) and anti-tumor activities (Bhaskar and Rajalakshmi, 2010). It possesses a wide spectrum of medicinal properties in curing for asthma, snakebites, stomachalgia and phthisis, inflammatory diseases and antioxidant activity (Guruvayoorappan *et al.,* 2006), the leaf extracts with anti-bacterial activity (Natarajan *et al.,* 2010). *Biophytum sensitivum* extracts lowered blood sugar on streptozotocin and nicotinamide-induced diabetes in rats (Ananda Prabu *et al.,* 2012).

Plant Description

The little plant grows up to a maximum of 20 cm and possesses unbranched woody erect stem. Leaves abruptly pinnate, leaflets opposite, 6 to 12 pairs, and each leaflet is up to 1.5 cm long, the terminal pair is the largest. The flowers are many and crowded at the apices of the numerous peduncles, normally yellow, white, or orange with red streak in the center of each of the five petals. The sepals are subulate-lanceolate, striate, and about 7 mm long. Fruits are ellipsoid capsules which are shorter than the persistent calyx (Kirtikar and Basu, 1987).

MATERIALS AND METHODS

The identified plant of *Biophytum sensitivum* was collected from Sivanthipatti hills near Palayamkottai, Tamil Nadu, South India. It was confirmed with voucher specimen (No: 3006) deposited at the Survey of Medicinal Plants Unit, Govt. Siddha Medical College, Palayamkottai. The taxonomic features of the plant confirmed with the Flora of Presidency of Madras (Gamble, 1915 – 1921) and The Flora of Tamil Nadu Carnatic (Mathew 1983 – 1988). The air-dried and powdered plant materials were taken in different amber coloured bottles, extracted (by Soxhlet method) in ethanol and then the solvent were filtered off. The extract thus obtained from the plant was then subjected to qualitative tests. Total ash was determined by employing standard methods of analysis as described in *Pharmacopoeia of India* (Anonymous, 1996). The percentage of major elements like carbon, nitrogen, phosphorus, potassium, sodium, calcium, magnesium andsulphar were determined by the method of AOAC (1984). The trace elements like zinc, copper, iron, manganese, boron and molybdenum were determined by the method of Williams and Twine (1960). The minerals (N, P, K, Na and Ca) were estimated using Flame Photometer (Spectronics Flame Photometer, India). Alkaloids were determined by using the method of Harbone (1973). Flavonoids were determined by the method of Boham and Kocipal-Abyazan (1974). Biochemical

estimation for Phenol (Farkes and Kiraly 1962) and tannin (Aparna Buzarbarua, 2000) were carried out. Glycoside and serpentines were carried out on the powdered samples using the standard procedures as given in Anonymous, AOAC (1984).

RESULTS AND DISCUSSION

The present study carried out on the *Biophytum sensitivum* revealed the presence of medicinally active constituents. Basic phytochemical investigation of plant extracts for their major phytoconstituents is vital. The active principles of many drugs found in plants are secondary metabolites (Ghani, 1990; Dobelis, 1993). The quantitative estimation of phytochemicals is depicted in table1. The medicinal value of plants lies in some chemical substances that have a definite physiological action on the human body. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases. Phytochemicals have long been recognized to possess antioxidant, antiallergic, anti-inflammatory, antiviral, antiproliferative, anticarcinogenic, insecticide, antifungal and antibacterial (Eastwood, 1999; Hollman and Katan, 1999; Joshi *et al*., 2008; Pattanaik *et al*., 2002). The flavonoid content of ethanol extract of the plant was found to be 1.32 (mg kg^{-1}). Flavonoids are a large group of polyphenolic compounds that have been known for a long time to exert diverse biological effects. Their wide range of biological and pharmacological activities include antioxidant, cytotoxic, anticancer, cardioprotective, hepatoprotective, neuroprotective, and antimicrobial properties (Harborne and Williams, 2000; Nowakowska, 2007; Weimann *et al*., 2002; Havsteen, 2002 and Jean Fotie, 2008). In the present finding ,flavonoid has been reported in the selected species. This perhaps justifies the already locally established function of the plant in the treatment and management of general cancer, antioxidant activity and anti-bacterial activity.

The phenolic content in various parts of the plant was studied by spectroscopic method. The phenolic content of the plant extract was found to be 3.46 mg kg^{-1}. Phenols have stimulating, antiseptic, anti-infectious and detoxifying activities (Kenner and Requena, 1996).

The tannin content of the plant was found to be 0.21mg kg^{-1}. Tannins have important roles such as stable and potent antioxidants (Trease and Evans, 1985). Presence of tannin suggests the ability of the plant to play a major role as antidiarrheic and antihemorrhagic agent (Mercer and Davis, 1991). Alkaloids are known to be effective for antihypertensive (Zee-Cheng, 1997). The present observation also alkaloid was reported supports the use of selected in traditional medicine for treating hypertension. The result of the present study offers supportive evidence that the *B. sensitivum* possess some active chemical principles which are traditionally used in treatment of boils, purgative, anthelmintic, stimulant etc. It has authenticated the usefulness of the chosen plants for medicinal purposes. These species could also be seen as potential sources of useful drugs due to their rich contents of phytochemicals.

Table 1
Quantitative phytochemical constituents of Biophytum sensitivum

S. No.	Parameter	Amount
1.	Ash (%)	5.68
2.	Organic Carbon (%)	1.23
3.	Total Nitrogen (%)	1.52
4.	Total Phosphorus (%)	0.26
5.	Total Potassium (%)	2.89
6.	Total Sodium (%)	0.18
7.	Total Calcium (%)	4.58
8.	Total Magnesium (%)	2.47
9.	Total Sulphur (%)	0.29
10.	Total Zinc (ppm)	1.64
11.	Total Copper (ppm)	0.15
12.	Total Iron (ppm)	75.26
13.	Total Manganese (ppm)	2.36
14.	Total Boron (ppm)	0.04
15.	Total Molybdenum (ppm)	0.01
16.	Total Alkaloids (mg kg^{-1})	0.74
17.	Total flavonoids (mg kg^{-1})	1.32
18.	Phenol (mg kg^{-1})	3.46
19.	Tannin (mg kg^{-1})	0.21
20.	Lignin (mg kg^{-1})	0.23
21.	Glycosides (mg kg^{-1})	0.02
22.	Serpentines (mg kg^{-1})	0.02

REFERENCES

1. Ananda Prabu K, Kumarappan CT, Sunil Christudas, and Kalaichelvan VK. (2012 Effective on *Biophytum sensitivum* on streptozotin and nicotinamide induced diabetic rats. *Asian Pacific J Tropical Biomedicine* 31-5.
2. Anonymous (1996). Pharmacopoeia of India 2nd Ed Manager of Publications, Govt. of India, New Delhi. Pp. 947 – 948.
3. AOAC "Official Methods of Analysis (AOAC)", (1984) 14th Edn, In: Helrich, K., Association of Official Analytical Chemists, Washington.
4. Aparna Buzarbarua (2000). A text book of practical plant chemistry, S. Chand & Company Ltd., New Delhi 90 – 95.
5. Bhaskar VH, Rajyalakshmi V. (2010). Anti- tumor activity of aqueous extract of *Biophytum sensitivum* Linn. *Annals of biological research* 1:76-80.
6. Boham, BA. and Kocipal-Abyazan, RK. (1974). Phytochemistry analysis Pacific Sci. 48, 458-463.
7. Dobelis, IN. (1993). Magic and medicine of plants. The Readers Digest Association Inc. Pleasant, New York, Montreal. p. 8-48.
8. Eastwood, MA. (1999). Interaction of dietary antioxidants *in vivo*: How fruit and vegetables prevent disease? *Q.J.M.,* 92: 527–30.
9. Fakras GL and Kiraly Z. (1962). Relation between phenol metabolism and stem rust resistance in wheat *Phytopathology* 52 651 – 664.
10. Gamble JS. (1915 – 1921). *Oxlidaceae* In: Flora of the Presidency of Madras, Bishen Singh Mahandra Pal Singh Dehra Dun.
11. Ghani, A. (1990). *Introduction to Pharmacognosy*. Ahmadu Bello University Press, Ltd. Zaria, Nigeria. p. 45-197.
12. Guruvayoorappan C, Afira AH, and Kuttan G. (2006). Antioxidant potential of *Biophytum sensitivum* extract *in-vitro* and *in vivo*. *J. Basic Clin. Physiol. Pharmacol.* 17:255-67.
13. Guruvayoorappan, C. and Girija K.(2005) Effect of *Biophytum sensitivum* on B16 - 10 melanoma cells induced metastasis. Indian J Med Res 13:56-9.
14. Halliwell, B. and Gutteridge, JMC. (1992). Free radicals, antioxidants and

human diseases: where are we now? *J. Lab. Clin. Med*., 119: 598-620.
15. Harborne, JB. and Williams, CA. (2000). Advances in flavonoid research since 1992. *Phytochemistry*, 55(6): 481-504.
16. Harborne, JB. (1973) Phytochemical Methods, 1st Edn, Chapman and Hall Ltd, London.
17. Havsteen, BH. (2002). The biochemistry and medical significance of flavonoids. *Pharmacol. Therapeutics*, 96(2-3): 67-202.
18. Hollman, PCM. and Katan, B. (1999) Health effects and bioavailability of dietary flavonols. *Free Radic. Res.,* 31: 75–80.
19. Jean Fotie. (2008). The Antiprotozoan potential of Flavonoids, *Pharmacognosy Reviews*, 2(3): 6-19.
20. Joshi, H., Jagadeesh, P. and Parle, M. (2008). Potential of phytochemicals in management of cognitive disorders- An update. *Pharmacognosy Reviews*, 2(3): 54-60.
21. Kenner, D. and Requena, Y. (1996). *Botanical Medicine*. A European professional perspective. Paradign publications, Brookline, Massachusetts. p.7-12.
22. Kirtikar KR, and Basu BD. (1987) Indian medicinal plants; Dehradun, India: International book distributors; p. 30.
23. Manorenjitha, MS. Norita, AK. Norshisham, S. and Asmauli, MZ. (2013). GC- MS Analysis of Bioactive Components of *Ficus religiosa* (L.) Stem., *Int. J. Pharm. Biosci*., 4(2) (p) 99-103. .
24. Matthew, KM, (1983 – 1988). The Flora of Tamil Nadu Carnatic Vol I, The Rapinat Herbarium, Tiruchirappali, Vol - I.
25. Mercer, NS. and Davis, DM. (1991). The chemistry of tannin. *Tattoos Br. Med. Journ.* 3 (3): 380 - 382.
26. Natarajan D, Shivakumar MS, and Srinivasan, R. (2010) Antibacterial activity of leaf extracts of *Biophytum sensitivum*. *J. pharmaceutical sciences and Research* 2:717-20.
27. Nowakowska, Z. (2007). A review of anti-infective and anti-inflammatory chalcones. *Eur. J. Med. Chem.,* 42(2): 125-137.
28. Pattanaik, S., Subramanyam, VR. and Kole, C. (2002). Antibacterial and antifungal activity of the essential oils *in vitro*. *Microbios*, 86(349): 237-246.
29. Puri, D, Baral, N, and Upadhyaya BP. (1997). Indigenous plant remedies in Nepal used in heart diseases. *J. Nepal Med Assoc*. 36:334-7.
30. Puri, D, and Baral, N. (1998). Hypoglycemic effect of *Biophytum sensitivum* in alloxan diabetic rabbits. *Indian J. Physiol. Pharmacol*. 42:401-6.
31. Puri, D. (2003). Hypocholesterolemic Effect of *Biophytum sensitivum* Leaf water extract. *Pharm Biol*. 41:253-8.
32. Sanjay, S. Kharat, Pradeep, B. Kumkar, Siddhesh, R. Rajpure and Kishor S. Sonawane (2013). Qualitative Phytochemical Screening of *Gnidia Glauca* (Fresen) Gilg. Plant Extract *Int. J. Pharm. Bio Sci*. 4(4): 144 – 148.
33. Trease, GE. and Evans, WC. (1985). Pharmacognosy 11th Ed. *Baillere Tindall Ltd., London*: p. 60 – 75.
34. Weimann, C., Goransson, U. Ponprayoon-Claeson, P. Bhlin, L. Rimpler, H. and Heinrich, M. (2002). Spasmolytic effects of *Baccharis conferta* and some of its constituents. *J. Pharm. Pharmacol*., 54(1): 99-104.
35. Williams, A. and Twine, J. (1960). "Modern Methods of Plant Analysis", Peach, K, Tracey, M.V, (Edu.), Springer Verlog, Berlin.
36. Zee-Cheng, RK. (1997). Anticancer research on *Loranthaceae* plants. *Drugs Future* 22: 515 – 530.