

CENTRATHERUM PUNCTATUM CASS. – A HERBAL DIETARY SUPPLEMENT IN THE MANAGEMENT OF CANCER

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ABSTRACT

“Nutraceuticals” play a major role in health enhancement by contributing in preventing and managing diseased conditions. The global market size of Nutraceuticals is expected between 30 and 60 billion US\$, with Japan, US, and Europe occupying the biggest share. By 2015, the Nutraceutical demand is forecasted to touch \$201 billion. There is an increased global interest due to the recognition that Nutraceutical have been claimed to encompass a physiological betterment or offer defense against certain ailments. For example Flavonoids in onion and black grape can act as protective agents against cardiac diseases. Similarly bittermelon and cinnamomum extracts can be good supplements in diabetic conditions and Resveratol from berry fruits can help patient suffering from inflammatory diseases.

In the present work with a view to develop a healthy herbal supplement for Cancer patients the nutraceutical potentials of an anticancerous traditional drug source *Centratherum punctatum* Cass. belonging to the family Asteraceae is evaluated employing sophisticated instrumentation and analytical tools. The data of the results obtained revealed presence of Carbohydrates, Proteins, Vitamins and minerals such as Zinc, Magnesium and Iron. Flavones and Phenols were other important secondary metabolites detected in the plant source. These nutraceutical elements identified could be useful especially for Cancer patients in improving their immunity and altering the weakened hemopoietic profiles. Further in depth studies can significantly contribute in developing a safe and efficacious herbal supplement from this plant source for the better healthcare of human society particularly for people suffering from cancer.

INTRODUCTION

Plants have enormous importance due to their nutritive value and maintain to be a chief resource of medicines as they have been found throughout human history [1]. 30 to 40% of today's drugs are sourced from various plants and employed as supplements, and nutraceuticals [2]. All human beings require number of complex organic compounds like carbohydrates, fats and proteins added [3] caloric requirements to meet the need for their muscular activities which are obtained mostly from plant materials [4].

In the present study the aerial parts of an anticancerous medicinal plant *Centratherum punctatum* Cass. was selected for evaluating nutritive value from the Herbal Garden of Srimad Andavan Arts and Science College, Tiruvanaikovil, Trichy - 620005 during the month of February. Identified with the help of Flora of Presidency of Madras [5] and confirmed by comparing with the Herbarium specimen deposited at Royal Botanic Garden, Kew (Voucher specimen number K000373089) [6].

MATERIALS & METHODS

After appropriate identification and authentication, collected drugs were washed thoroughly three times with running water, shade dried, coarsely powdered and stored in airtight bottle for analysis. Different physio-chemical values such as ash value, loss on drying, foreign matter [7,8] and their nutraceutical values and major Phytochemical constituents were determined as per standard protocols.

Perkin Elmer; Analyst 700, single beam atomic absorption spectrometer was used for the determination of Macro and micronutrients and the data obtained was in parts per million (ppm), (1ppm=1mg/kg). Calibration curve was established using working standards for each element. Preparation of plant samples for the determination of Macro and micronutrients were done using method outlined by Shah et al. (2009) [9].

RESULTS

In **Table 1** the physicochemical constants of the plant were recorded. High value of Total ash content and less foreign matter content & Loss on drying clearly indicates the presence of higher inorganic content and the purity of the test drug.

Table 1: Tests for Purity

S. No.	Parameters	Value %
1.	Foreign Matter	0.84
2	Loss on drying	5.21
3.	Total Ash Content	6.8

Table 2: Primary Metabolites and Ascorbic acid Determined

S. No.	Parameters	Value %
1.	Total Carbohydrates	32.15
2.	Total Protein	11.22
3.	Total Fat	2.64
4.	Ascorbic acid	0.65

From **Table 2** it is evidenced that the aerial parts of the plant *Centratherum punctatum* Cass. are rich in carbohydrate (32.15%), protein (11.22%) and have a moderate amount of total fat (2.64%).

Table 3: Macro and Micro nutrients Estimated

S. No.	Macro and Micro nutrients	Value
1	Total Nitrogen in %	1.64
2	Total Phosphorus in %	0.46
3	Total Potassium in %	3.47
4	Total Sodium in %	1.24
5	Total Calcium in %	6.45
6	Total Magnesium in %	2.48
7	Total Sulphur in %	0.46
8	Total Zinc in ppm	2.67
9	Total Copper in ppm	0.65
10	Total Iron in ppm	49.34
11	Total Manganese in ppm	4.36
12	Total Boron in ppm	0.15
13	Total Molybdenum in ppm	0.12

The quantitative analysis of important Inorganic substances was tabulated in **Table 3**. The calcium (6.45 %) and Iron (49.34 ppm) contents were found to be more. The amount of Potassium (3.47 %), Magnesium (2.48 %), Sodium (1.24 %), Nitrogen (1.64 %),

Manganese (4.36 ppm) and Zinc (2.67 ppm) were present in moderated levels whereas Boron (0.15 ppm), Molybdenum (0.12 ppm), copper (0.65 ppm), Phosphorous (0.46 %) and Sulphur (0.46 %) were present in lesser quantity.

Table 4: Determination of Secondary Metabolites

S. No.	Secondary Metabolites	Sample details
1.	Total Alkaloids (mg/kg)	0.32
2.	Total Flavonoids (mg/kg)	0.97
3.	Tannin (mg/kg)	0.56
4.	Lignin (mg/kg)	0.26
5.	Glycosides (mg/kg)	0.05

The quantitative analysis of important secondary metabolites were estimated and tabulated in the **Table 4**. The Total Flavonoids (0.97

mg/kg), Total Alkaloids (0.32 mg/kg) and Tannin (0.56 mg/kg) contents were found to be more compared to Lignin (0.26 mg/kg) and Glycosides (0.05 mg/kg).

DISCUSSION

The data of the results obtained revealed that the plant drug under study contain higher amounts of Carbohydrates, Proteins, Vitamin C and minerals such as Zinc, Magnesium and Iron which play a crucial role in improving their immunity and to enhance the weakened hemopoietic system. The rich Flavones and Alkaloids of the plant may attribute towards inhibiting the growth of the cancer and may prevent the angiogenesis process which would result in prolongation of the life span of the cancer patients. Besides it could be a good antioxidant and can help in improving the antioxidant status. It can be administered as an adjuvant in chemotherapy.

Table 5: Nutrients and their related health profits [10]

S. No.	Nutrients	Health Profits
1.	Vitamin C	Antioxidant, necessary for growth and maintenance of healthy bones, gums, teeth and skin, facilitates wound healing, preventing common cold and soothe its symptoms.
2.	Nitrogen	Helps in Tissue protein synthesis and the production of several nitrogenous compounds such as hormones, neurotransmitters and various functions such as immune competence and peroxidative defenses.
3.	Phosphorous	Building strong bones and teeth, helps in formation of genetic material, energy production and storage.
4.	Potassium	Used to Build proteins, break down and use carbohydrates, build muscle, maintain normal body growth, control the electrical activity of the heart and to control the acid-base balance.
5.	Sodium	Maintaining water balance within cells and involved in functioning of both nerve impulses and muscles. It also plays a crucial role in blood pressure regulation.
6.	Calcium	Crucial element for building and maintaining bones and teeth, vital in nerve, muscle and glandular functions.
7.	Magnesium	Fundamental for healthy nerve and muscle function and bone formation and help prevent premenstrual syndrome (PMS).
8.	Sulphur	Used to detoxify the body, assist the immune system and fight the effects of aging and age related illnesses like arthritis and essential element of biotin as well as vitamin B1 and an important component of the amino acids methionine, cysteine, taurine and glutathione. Crucial in the synthesis of collagen to maintain good skin integrity.
9.	Zinc	Vital component in Cell reproduction, normal growth and development, used in wound healing, sperm and testosterone synthesis.
10.	Copper	Important component for hemoglobin and collagen synthesis, healthy functioning of the heart, energy production, absorption of iron from digestive tract.
11.	Iron	Helps in energy production, helps to carry and transfer oxygen to tissues.
12.	Manganese	It enables body to make use of vitamin C, B1, biotin as well as choline. It is used in the produce of fat, sex hormones and breast milk in females, also helps counterbalance free radicals, may assist in prevent diabetes and needed for normal nerve function and in stimulating growth of the connective tissue.
13.	Boron	It enhances the body's ability to utilize calcium, magnesium and vitamin D. It also assists in normal brain functions and may decrease menstrual pain by increasing the oestradiol level, a very active type of estrogen.
14.	Molybdenum	Break down sulfite toxin build-ups in the body and may prevent cavities, helps in antioxidant enzymes, assists in fighting the nitrosamines associated with cancer and assist to prevent anemia. Useful for normal cell function and nitrogen metabolism.

CONCLUSION

Nutraceuticals comprise well-known health benefits and their usage will keep illnesses at bay and let humans to keep overall good healthiness. Further in depth studies can significantly contribute in developing a safe and efficacious herbal dietary supplement from this plant source for the better healthcare of human society.

The data and results acquired in the present work shown that the plant *Centratherum punctatum* Cass. assessed for Nutraceutical prospective turned out to be more noteworthy with required nutraceutical values. Though this herb is valued as effective herbal dietary supplement, care must be taken to collect them from clean environment, washed thoroughly and must be checked for heavy metal and microbial contamination while preparing any product from these sources. Genuine herbs processed as per ayurvedic methods will certainly contributes appreciably towards developing an eco-friendly herbal supplement.

REFERENCES

- Balick MJ. Paul and Cox A. Plants that heal; people and culture: The science of ethno botany. Scientific American library 1996;73:25 - 61.
- Shulz Volker, Rudolf Hansel, Mark and Blumenthal Medicinal plants, Phytomedicines and Phytotherapy. A physician's guide to herbal medicine New York 2001; 4:1 - 39.
- William Benton. Encyclopedia Britannica Inc. 1972; 16:802 - 5.
- Indrayan AK, Sharma SD, Durgapal N Kumar and Kumar M Determination of nutritive value and analysis of mineral elements for some medicinally valued plants from Uttaranchal Current Science 2000; 89(7):1252- 3.
- Gamble JS Flora of the presidency of Madras, Printed by S.N. Guha Ray at Sree Saraswaty Press Ltd., Achary Prafulla Chandra Road, Calcutta. 1957.
- www.kew.org : Apps.kew.org/herbcat/navigator.do
- Anonymous. The Ayurvedic pharmacopoeia of India. Government of India, Ministry of Health and Family welfare, Department of Indian system of medicine and Homeopathy, New Delhi. 2001; 1: 142-143.
- Brindha P, Sasikala B, Purushothaman KK Pharmacognostic studies on *Merugan kizhangu*. Bulletin of Medio-Ethno Botanical Research 1981; 3:84 - 86..
- Shah MT, Begum S, Khan S Pedo and biogeochemical studies of mafic and ultramafic rocks in the Mingora and Kabal areas, Swat, Pakistan". Environmental Earth Sciences 2009 DOI: 10.1007/s12665-009- 0253-8.
- Allen LV Nutritional products, In: Covington TR, Berardi RR, Young LL, Kendall SC, Hickey MJ, editors. Handbook of Nonprescription Drugs. Washington DC: American Pharmaceutical Association 1997.