

Nutritional Value and Oil Yielding Analysis of the Seeds of *Holoptelea Integrifolia*, Planch (Family-Ulmaceae)

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Abstract

Minerals are inorganic compounds needed by your body to regulate chemical reactions and maintain structures. Medicinal plants are said to have high nutritive value and as a result of that they are prescribed for their therapeutic values. Medicinal plants contribute major part in the economic value of India. The seeds of *Holoptelea integrifolia* are rich source of minerals and oil. For this study, seeds of *Holoptelea integrifolia* were selected. The aim of the present study was to investigate the presence of nutritional value and to determine the oil yielding capacity of the seeds of *Holoptelea integrifolia*. Seed oil was extracted by n-hexane solvent by using Soxhelt apparatus. Phytochemical screening was carried out on the oil extract. The study revealed that the terpenoids and saponins are present and flavanoids and alkaloids, phenols, tannins, glycosides, anthraquinones, carbohydrates and proteins were completely absent. Total mineral content of the seeds were determined by the standard methods. Minerals analysis of the seeds of *Holoptelea integrifolia* reveals that the seeds contain phosphorus, potassium, calcium, magnesium, sulphur, copper, iron and zinc. The quality and quantity of the oil in the seeds of *Holoptelea integrifolia* clearly suggest that the oil yielding capability of this plant can fulfill the future demands of the edible oil in the country and seeds are also balance our nutrition.

Keywords: Seeds; N-hexane; Phytochemical, Minerals.

Introduction

India is rich in two levels of biodiversity, namely species diversity and habitat diversity. In India, thousands of species are known to have medicinal properties and the use of different parts of several medicinal plants to cure specific ailments has been in vogue since ancient times. Herbal medicine is still in the run of about 75 - 80% of the whole population, mainly in developing nations. For primary health care because of (Mahalingam et al., 2011) better cultural acceptability with the human bodies, it reduces side effects. Sixteen nutrient elements are essential for the growth the reproduction of plants. Nutrients are classified in to two types a) macronutrients and b) micronutrients. Carbohydrates, fats and proteins are usually

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called macronutrients. Minerals and vitamins are micronutrients. The vitamins and minerals are equally important to our well being although they are needed in very small quantity. Nutrients are substances derived from food during the process of digestion. A nutrient is a chemical that an organism needs to live and grow or a substance used in organism metabolism which must be taken in from seeds (Ezeagu Ikechukwu, 1996).



Materials and Methods

Study Area: (Plate-1 and 2)

Tamilnadu is one of the 29 states in India. Its capital is Chennai, the largest city. Tamilnadu is bordered by the union territory of puducherry and the states of Kerala, Karnataka and Andhra Pradesh. It is situated in the southern most part of the Indian peninsula. Coimbatore is the city in Tamilnadu, South India. The Nirmala College is situated in the district of Coimbatore, which has a salubrious climate due to the presence of forests to the north and the cool winds blowing through the Palakkad gap in the Western Ghats. The college campus is pollution free and eco-friendly. It is filled with trees and has a rich Botanical garden. Temperature of study area was 280 C.



Source of Map Google

Plate-1: Location Map.



Plate-2: Study Area.

Sample Collection

The seeds of *Holoptelea integrifolia* were collected for the present study. *Holoptelea integrifolia*, Planch. selected in Nirmala College campus to find out the qualitative phytochemical and minerals analysis of the seeds of *Holoptelea integrifolia* were analysed. Seeds were collected during the month of April. The data were then processed and represented in tables and chart.



Plate-3: Habit of *Holoptelea integrifolia*.

Systematic position

Division:	Phanerogams
Class:	Dicotyledons
Order:	Urticales
Family:	Ulmaceae
Genus:	<i>Holoptelea</i>
Species:	<i>H. integrifolia</i> , Planch.;

Holoptelea integrifolia, Planch.; is a native to Asian-tropical region including India, Nepal, Srilanka, Cambodia, Laos, Myanmar, Vietnam and china. It is a large deciduous tree. It has spreading branches and grows up to 30 to 35m height and 3m girth. Bark is whitish, yellow, grey, covered with blisters, peeling in corky, exfoliate with regular intervals. Leaves are simple, alternate, elliptic ovate, entire glabrous with cordate base, acuminate, nerves 5-8pairs, 5-13cm long and 3.2 to 6.3cm wide. The bark when cut and the leaves when smashed emit an unpleasant smell. Flowers are polygamous greenish yellow to brown in short racemes or fascicles. In bisexual flowers, 5 stamens and in male flowers, 8 stamens are present, basally adnate to tepals, ovary is unilocular and stalked, style very short and its length is 2.5 to 4mm; stigmas 2 in number. The flower appear at the scars of fallen leaves on the tree, from February

to March. Fruits are, light brown, obliquely elliptic or orbicular, one-seeded samara winged and stalked, indehiscent, 2.5 to 3.5cm long 1.5 to 2.5cm wide. The plant produces a large number of fruits in the month of April-May. It is used traditionally for the treatment of inflammation, gastritis, dyspepsia, colic, intestinal worms, vomiting, wound healing, leprosy, diabetes, hemorrhoids, dysmenorrhoea and rheumatism. Bark and leaves are used as better astringent, thermogenic, anti-inflammatory, digestive, carminative, laxative, anti-helminthic, depurative, repulsive urinary astringent and in rheumatism.

Preparation of Plant Extracts

The collected seeds were washed with running tap water followed by sterilized distilled water and were shade dried at room temperature in laboratory for 30-40 days. The dried seed materials were powdered by using an electric blender and then stored in air tight containers until further use. N-hexane was used for extraction. 45g of leaf powder packed with a Whatman filter paper. It is placed into the thimble of a Soxhlet apparatus and extracted using N-hexane. Appearance of the colourless solvent in the siphon tube was indication of exhaustive extraction and based on that further extraction was terminated. The extracts were then transferred into the previously weighed empty Petri dishes and allow evaporating the solvent. The oil extracts is finally obtained.

I. Preliminary Phytochemical Analysis

The phytochemical screening of methanol extract of analysed by standard methods and shown various phytochemical constituents such as saponins, phenols, alkaloids, protein, tannins, flavonoids, carbohydrates and terpenoids (Harbone, 1984 and Wagner et al., 1984).

II. Analysis of Mineral Profile

The minerals like phosphorus, potassium, calcium, magnesium, sulphur, copper, iron and zinc were estimated in the standard laboratory by employing Atomic Absorption Spectrophotometer, the results were recorded by following the methods of Issac and Johnson (1975).

Results and Discussions

Phytochemical compounds are analysed in the oil of the seed of *Holoptelea integrifolia*. The study reveals that the oil extracts of *Holoptelea integrifolia* seeds are showed the maximum

presence of terpenoids but adequately the presence of saponins and flavanoids and alkaloids, phenols, tannins, glycosides, anthraquinones, carbohydrates and proteins were completely absent. The detailed investigations of phytochemicals in n-hexane solvent are showed (Table-1). The seeds contain high percentage of oil which can be an alternative source of edible oils. The seeds contain about 50% oil having palmitic and oleic acids. Seeds are easily available and it has the capacity to produce oil seeds for a longer period of time. This result indicates that production of edible oil in India increases and reduces dependency of the country on importing edible oils from other countries. The plant extracts shows the consist saponins which are known to produce inhibitory effect on inflammation (Just et al., 1988). Saponins have the ability of precipitating and coagulating red blood cells. Some of the notable characteristics of saponins include formation of foams in aqueous solutions, hemolytic activity, cholesterol binding properties and bitterness (Sopido et al., 2000 and Okwu, 2004). Potent water-soluble antioxidant and free radical scavenger, flavonoids are also present, which prevent oxidative cell damage and also have strong anticancer activity (Rio et al., 1997 and Salah et al., 1995). Nutritional analysis of the seeds of *Holoptelea integrifolia* reveals that the seeds contain phosphorus (948.0mg), potassium (813.0mg), calcium (632.0mg), magnesium (108.0mg), sulphur (28.50mg), copper (0.22mg), iron (9.87mg) and zinc (3.50mg). Evaluation of mineral profile of these seeds extracts was recorded (Table-2). Proximate and ultimate analyses of plant seeds were done. Oil from the seeds was extracted by solvent extraction method. Micro-nutrients viz., Ca, Mg, Fe, Zn, Cu etc. were determined atomic absorption spectrometry and P was determined by phosphor molybdate method AOAC. The results of the present analyses are showed (Table-2). These seeds are excellent sources of phosphorus, potassium and iron but poor sources of copper, magnesium and zinc. The high contents make these seeds attractive as a natural source of calcium supplementation for pregnant and lactating women, as well as for children and the elderly people. The amount of minerals we needs is actually very small-much smaller than the amounts of carbohydrates, proteins and fats required for a healthy diet. Most adults need about 1000 milligrams of calcium per day (IOM, 2011), but only about 10 to 15 milligrams of iron and zinc per day (IOM, 2001). Recommended Dietary Allowance (RDA) and Adequate intakes (AI), the daily intakes that should meet the needs of most healthy people. (Fig. 1)

Table-1: Qualitative analysis of phytochemical constituents present in the n-hexane extract of the seeds of *Holoptelea integrifolia*.

S. No.	Phytochemical Constituents	N-Hexane
1	Alkaloids	-
2	Flavonoids	+
3	Saponins	++
4	Phenols	-
5	Tannins	-
6	Glycosides	-
7	Anthraquinones	-
8	Terpenoids	+++
9	Carbohydrates	-
10	Protein	-

Table 2: Mineral analysis of the seeds of *Holoptelea integrifolia*.

S. No.	Parameter	Results	Daily Value
1	Potassium	813.0 mg	3,500 mg
2	Phosphorus	948.0mg	1,000mg
3	Calcium	632.0 mg	1,000 mg
4	Sulphur	28.50 mg	980 mg
5	Magnesium	108.0mg	400mg
6	Iron	9.87 mg	18 mg
7	Zinc	3.50mg	15mg
8	Copper	0.22mg	2mg

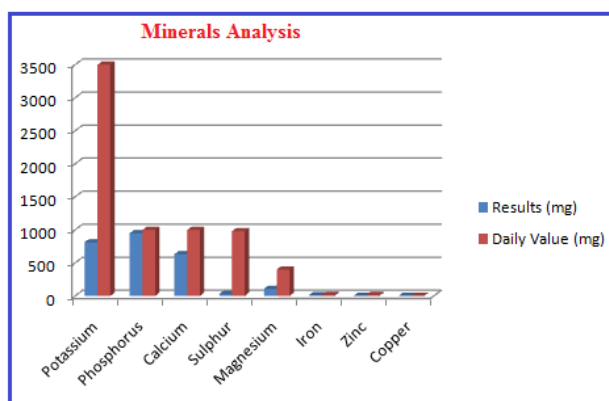


Figure-1: Mineral analysis of the seeds of *Holoptelea integrifolia*.

Conclusion

Good nutrition has plays a major role in human survival. Under-nutrition is often a major problem in most of the developing countries of the world. Consequently the cases of under-nutrition are

common in these countries. Nutrients e.g. oils, fats, carbohydrates, proteins etc. are substances derived from food during the process of digestion. A nutrient is a chemical that an organism needs to live and grow or a substance used in organism metabolism which must be taken in from seeds. Plant seeds have been reported to contain oils and fats, carbohydrates, proteins, amino acids, vitamins and minerals with good nutritive value. These seeds are easily available in our common peoples. These seeds included daily diet, they can change their nutritional deficiency. The seed contains all the macronutrients and micronutrients. The results revealed the presence of oil yielding capacity and minerals of the seeds studied. Therefore, oil extracts from these seeds could be used as edible oil.

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