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PHYTOCHEMICAL SCREENING AND CHARACTERIZATION OF *PONGAMIA PINNATA* (L) SEED OIL

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Abstract- *Pongamia pinnata* (L.) Pierre [family: Fabaceae] popularly known as "Karanj" or "Karanja" in Hindi, and Indian beech in English, is a medium-sized glabrous tree. The Pongamia pinnata seeds were collected in and around the Bidar and Gulbarga area. The goal of research work is to biochemical characterization of primary metabolites such as sugar, starch, protein, lipid, phenol, ascorbic acid and amino acid which are present in different plant parts of *Pongamia pinnata*. It is adaptable tree for tropical and sub-tropical regions which requires excellent drainage and a sunny location. It grows easily from seed. Historically, this plant has long been used in India and neighboring regions as a source of traditional medicines, animal fodder, green manure, timber, fish poison and fuel. Extract of the plant possess significant anti-diarrhoeal, anti-fungal, anti-plasmodial, anti-ulcerogenic, anti-inflammatory and analgesic activities. Its oil is a source of biodiesel. It has also alternative source of energy, which is renewable, safe and non-pollutant. This article briefly reviews the botany, distribution, ecology, uses of the plant and as a source of biodiesel. This is an attempt to compile and document information on different aspect of *Pongamia pinnata* and its potential use as a source of biodiesel.
Keywords: *Pongamia pinnata, Primary* metabolites, Sugar, Starch, Lipid, Protein

INTRODUCTION

India is rich in medicinal plant, and recognizes the more than 2500 plant species which have the medicinal values and these are main sources for the bioactive compounds like primary metabolites.

Primary metabolites are responsible for the growth and development of plant. They are primarily used as industrial raw material, food or food additives.

Pongamia pinnata locally known as karanja is a mangrove plant belonging to genus pongamia and family Fabaceae (Chopra et al., 1958). It is medium sized glabrous evergreen tree with short bole attaining height of around 18-20meter and its habitat is in the littoral region of south east Asia, Australia, and widely distributed in India, Pakistan, Bangladesh, Philippine and Australia (Ali, 1980., Ghani, 1998., and Kirtikar, 1994). The leaves are soft, shiny burgundy in summer and mature to a glossy deep green as the season progress.

Traditionally its bark is used in pile; leave are effective as medicated bath and rheumatic pains; and the seeds are used in hypertension, bronchitis, whooping cough, skin diseases and rheumatic arthritis. Roots are used for cleaning gums, teeth, and ulcers also effective in gonorrhea. Flowers used for diabetes. In ayurveda and unani medicine, used as anti inflammatory, antiplasmodial, anti-noneceptive, anti hyperglycemic, anti lipodoxidative, antidiarrheal, anti-ulcer, anti-hyper ammonic and antioxidant.

Primary metabolites are of prime importance and essentially required for growth of plants for example; sugar, protein, lipids, starch. Many primary metabolites act as precursors of pharmacologically active metabolites. The present study deals with the study of primary metabolites present in *Pongamia pinnata.*

MATERIAL AND METHODS

For the quantitative estimation primary metabolites different protocols were used. Seeds of mature *Pongamia pinnata* plant were collected from in and around the city of Bidar and Gulbarga area, washed with distilled water, shade dried and powdered. The powder was used for Soxhlet extraction; the extract was used for phytochemical screening and analysis of primary metabolites of seeds of *Pongamia pinnata*. The characterization of fatty acids were carried out by Thin layer Chromatography.

RESULTS AND DISCUSSION

The Pongamia pinnata plant seed extract used for analyzed the phytochemical screening, primary metabolite screening from seeds and characterization by thin layer chromatography.

Pongamia pinnata seeds were evaluated quantitatively for the analysis of total soluble sugars, starch, protein, phenol, lipid, amino acid and ascorbic acid. A primary metabolite is directly involved in the normal growth, development, and reproduction. Plants are rich sources of high value metabolites like proteins, phenols, sugars, starch, lipids, amino acids and ascorbic acids are useful in flavoring, fragrances, insecticides, sweeteners and natural dyes. In the present study, Phytochemical screening of Pongamia pinnata evaluated and results shown in table: 1, biochemical estimation of primary metabolites of seeds of *Pongamia pinnata* has been undertaken. The results are shown in Figure-1.

The fatty acids separations of *Pongamia pinnata* oil were carried out for comparison of others oil as standard and it shown in Figure: 2.

Plant sugars can be used as artificial sweeteners and they can even help diabetics by supporting the body in its rebuilding. Starch is biodegradable and renewable in nature. They are increasingly being considered as an eco-friendly alternative to the use of synthetic additives in many other products, including plastics, detergents, pharmaceutical tablets, pesticides, cosmetics and even oil-drilling fluids. Proteins are the primary components of living things. The presence of higher protein level in the plant points towards their possible increase food value or that a protein base bioactive compound could also be isolated in future.

The higher amount of phenols is important in the regulation of plant growth, development and diseases resistance. It can be used as fungicide, pesticides, an antiseptic, disinfectant and in the manufacture of resins, explosives, plastics, detergents and pharmaceutical substances. The higher amount of plant lipid can be used as essential oils, spice oleoresins and natural food colors. With a strong foundation in research and development, plant lipids have developed products that work with diverse requirements, be it culinary, medicinal or cosmetic. Amino acids are critical to life, and have many functions in metabolism. Amino acids are very important in nutrition. These are commonly used in food technology and industry. Very often in plants during diseases conditions, the free amino acid composition exhibits a change and hence, the measurement of the total free amino acids gives the physiological and health status of the plants20. Ascorbic acid (vitamin C) is a familiar molecule because of its dietary significance, most aspects of its metabolism and some aspects of its function in plants are very poorly understood.

DISCUSSION

We quantify that *Pongamia pinnata* contain many primary metabolites like carbohydrates, proteins, phenols, lipids, amino acids and ascorbic acids. Highest amount of soluble sugar were found to be higher in leaves of *Pongamia pinnata* i.e. 45.00mg/gdw., starch in root i.e. 81.90mg/gdw., lipids in seed i.e. 358mg/gdw., proteins in root i.e. 24.00mg/gdw., phenol in leaf i.e. 0.76mg/gdw., amino acids in leaf i.e. 10.99mg/gdw and ascorbic acid in root i.e. 3.02mg/gdw. These results are suggestive of primary bioactive compound of commercially importance and may result in great interest in plants pharmaceuticals. Primary metabolites analysis is necessary for knowing the nutritional potential of plants and them also from the precursors for the synthesis of secondary metabolites22.

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Table 1- Phytochemical screening of Pongamia pinnata

Tests	Pet. ether	Chloroform	Methanol
Alkaloids	Positive	Positive	Positive
Carbohydrates	Positive	Positive	Positive
Steroids	Positive	Positive	Positive
Glycosides	Positive	Positive	Positive
Proteins	Positive	Positive	Positive
Saponins	Positive	Positive	Positive
Flavonoids test	Positive	Positive	Positive
Phenols	Positive	Negative	Positive
Tannins	Negative	Negative	Positive
Gums and Mucilages	Positive	Positive	Positive

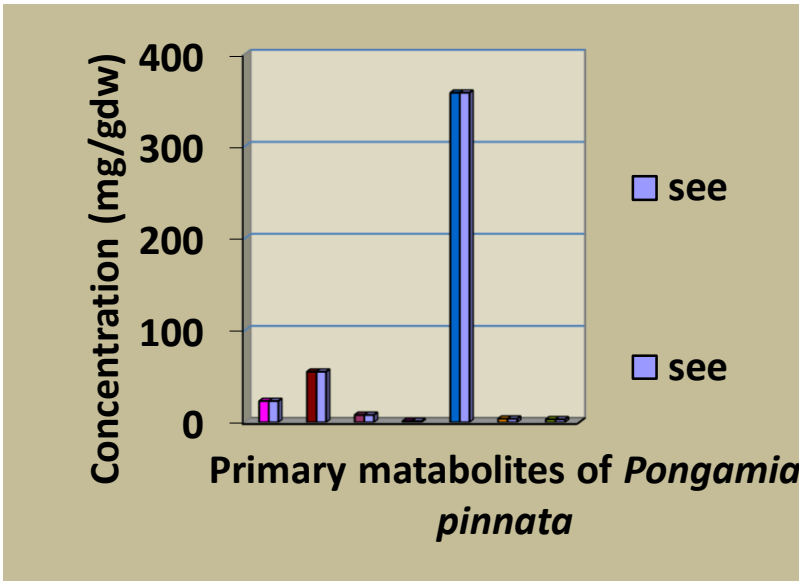

Fig. 1-Concentration of primary metabolites of *Pongamia pinnata* seeds

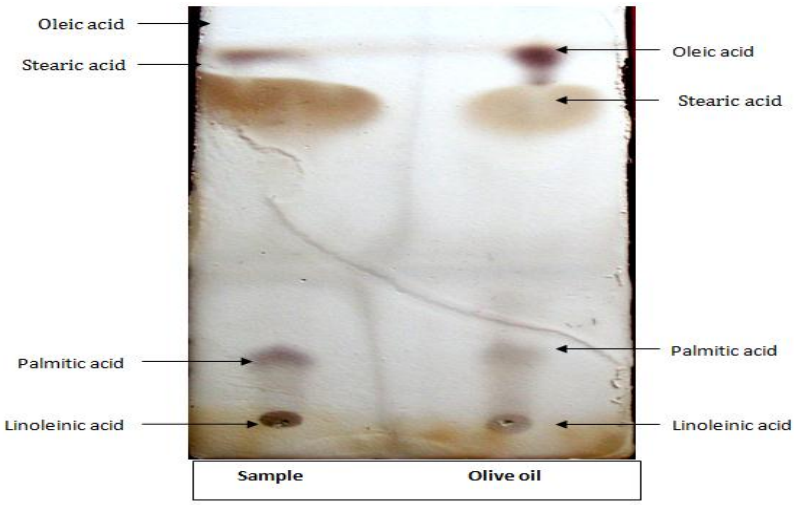

Fig. 2-Fatty acids separation

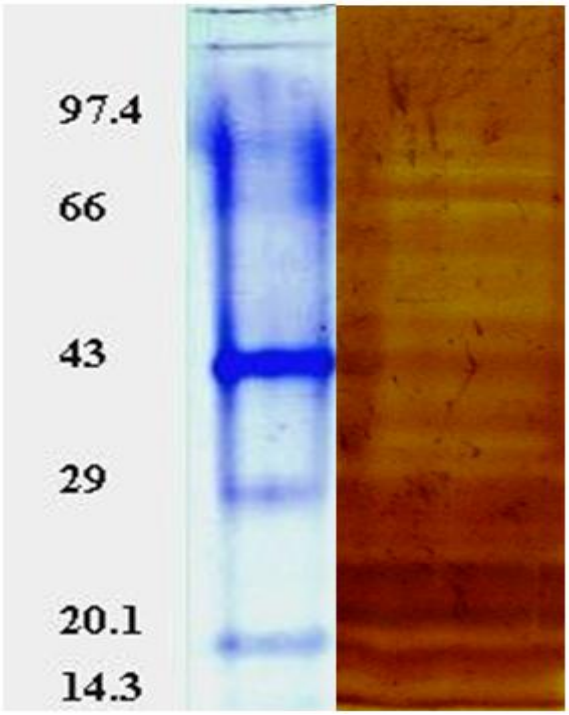

Fig. 3- Protein profile