Research Article

Evaluation of Phenol Content from a Medicinally Important Plant – *Artocarpus Heterophyllus*

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ABSTRACT

The medicinal plants have been the object of research in both classical and advanced areas of plant sciences. *Artocarpus heterophyllus* from the family Moraceae is an important medicinal plant. Many parts of the plant including the bark, roots, leaves, and fruit are attributed with medicinal properties. This plant produces bulges on the bark when it is about to die. Stem bark bulges, in the form of extracts, are used as folk medicine to cure some diseases. Local people believe that these bulges are used as *Sanjeevani*. The present study was designed to investigate the phenol content of acetone extract along with sub fractions. The content of total phenolics in the acetone extract of bulges and its fractions were determined spectrometrically according to the Folin-Ciocalteu procedure and calculated as catechol equivalent. The results of the present study indicates that acetone extract and sub fractions showed presence of high amount of phenolic content from the bulges of the medicinally important plant- *Artocarpus heterophyllus.* Further, it also revealed that the content of total phenolics in the sub fractions was greater than the parent acetone extract. Further work is under way to confirm the anti- oxidative effect of these promising plant extracts by using other methods and to characterize the active phenolic anti-oxidants.

Keywords: *Artocarpus heterophyllus,* Moraceae, Phenolic Content.

INTRODUCTION

Plants are able to synthesize a multitude of organic molecules / phytochemicals, referred to as "secondary metabolites".[1-2] These molecules play variety of role in the life span of plants, ranging from structural ones to protection.

Phenolic compounds are regarded as one such group that is synthesized by plants during development[3] and in response to conditions such as infection, wounding, UV radiations[4-5] etc. Approximately 8000 naturally occurring compounds belong to the category of "phenolics". Phenols are associated with diverse functions, including nutrient uptake, protein synthesis, enzyme activity, photosynthesis; structural components and allelopathy.[6-8] Phenolics show an array of health promoting benefits in human health. They are of current interest due to their important biological and pharmacological properties, especially the anti-inflammatory[9], antioxidant[10], antimutagenic and anticarcinogenic activities.[11-12] They are widespread in plant based foods and human consume it. The estimated range of consumption is 25mg to 1g per day, depending on diet.[13]

Jackfruit (*Artocarpus heterophyllus*), belonging to family Moraceae, is one of the most significant tree in tropical home gardens and useful tree in the important genus *Artocarpus*.[14] It is a medium-size evergreen tree typically reaching 8–25 m (26–82 ft) in height.

Many parts of the plant including the bark, roots, leaves and fruit are attributed with medicinal properties.

The Chinese consider *Artocarpus heterophyllus* pulp and seeds tonic, cooling and nutritious. The seed starch is given to relieve biliousness and the roasted seeds are regarded as aphrodisiac. The ash of leaves, burned with corn and coconut shells, is used alone or mixed with coconut oil to heal ulcers. The root is a remedy for skin diseases and asthma. An extract of the root is employed in cases of fever and diarrhea. The bark possesses significant anti-inflammatory activity.[15] The crude methanolic extracts of the stem and root barks, fruits along with sub fraction butanol exhibited antibacterial activity.[16] Foodborne pathogens of *Artocarpus heterophyllus* leaves extract show antioxidant and antibacterial activities.[17]

Owing to these properties, the present study was undertaken to evaluate phenolic content of bulges of *Artocarpus heterophyllus*.

MATERIALS AND METHODS

Plant Material

The plant material was collected from the jungles near Shri Sondavadiraj Math, Sonda, District Sirsi, Karnataka, India. It was authenticated at Botanical Survey of India, Pune, India. Its authentication number is BSI/WRC/Tech./2010/86.

Extraction Procedure

Air shade dried and pulverized bulges (100g) was extracted with acetone (600ml, 1: 6w/v) by keeping it for 48 hours at room temperature. The solvent was

evaporated to dryness in vacuum using a rotary evaporator to yield crude acetone extract (0.76%). This acetone extract **(A**) was used for assessment of phenolic content.

Fractionation of Acetone Extract (A)

The acetone extract **(A)** was stirred with different solvents of increasing polarity from non polar (Hexane-**B**) to polar (Methanol- **F**) for 6 hours at room temperature and filtered. The filtrate was evaporated to dryness in vacuum to acquire dry crude extract.

Estimation of Total Phenolic Content[18]

The total phenolic contents of bulges were determined according to the method developed by Malik and Singh.[18] The Folin ciocalteau reagent and sodium carbonate were added in alkaline solution of test sample. A blue coloured complex was developed due to phosphomolybdic acid, which is present in Folin-ciocalteu reagent. Calibration plot was expressed as pyrrocatechol (2-10 µg/ml) equivalent of phenol per gram of sample. Experiments were performed in triplicates and results were recorded as mean ± SEM (Standard Error Mean).

RESULTS AND DISCUSSION

The amount of total phenol for test samples are summarized **(Table 1)**.

Table 1: Total Phenol Content of Test Samples

Extract/ Sub-fractions	Total Phenolic Content mg/g ± SEM
Extract A - Acetone	22.55 ± 0.31
Sub-fraction B - Hexane	92.49 ± 0.54
Sub-fraction C - Chloroform	215.63 ± 1.32
Sub-fraction D – Ethyl Acetate	288.85 ± 0.62
Sub-fraction E – Acetone	248.33 ± 0.78
Sub-fraction F - Methanol	373.02 ± 0.99

Each value represents mean ± SEM (n =3).

The result of the present study indicates that acetone extract and all sub fractions showed presence of high amount of phenolic content. Further, it also revealed that the content of total phenolics in the sub fractions was greater than the parent acetone extract.

CONCLUSION

This study indicates that acetone extract along with sub fractions showed presence of high amount of phenolic compounds from the bulges of the medicinally important plant- *Artocarpus heterophyllus*. In the longer term, the constituents of bulges may be identified as having high phenolic potential. This may be useful to design further studies for isolation of bio active secondary metabolites.

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