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Antioxidant Properties of Papayasayanam Extract of *Carica papaya* Stem Straw

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ABSTRACT

Medicinal plants used in the traditional medicine are well-known significant sources of natural antioxidants. Antioxidants are compounds which inhibit the oxidation and in general prolong the life of the oxidizable matter. Majority of the diseases are predominantly linked to oxidative stress due to free radicals. The free radicals are species with very short half-life, high reactivity and damaging activity towards macromolecules like proteins, DNA and lipids. The present study was aimed to evaluate the antioxidant properties of Papayasayanam extract of *Carica papaya* stem straw. The results of the present research has showed that the Papayasayanam extract of *Carica papaya* stem straw has highest hydrogen peroxide scavenging activity and reducing power activity when compared to control Ascorbic acid. So, these results indicated that the Papayasayanam extract of *Carica papaya* stem straw exhibited free radical scavenging activity against hydrogen peroxide and reducing power. Therefore, the papayasayanam extract of *Carica papaya* stem straw could be a potential source of natural remediates that would have great importance as therapeutic agents.

Keywords: Medicinal plants, *Carica papaya,* Therapeutic agents and Natural remediates.

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1. INTRODUCTION

Naturally occurring phytochemicals from medicinal plants contain a wide range of chemical elements with important healing properties which have acquired substantial contribution in the treatment of deadly diseases. According to the World Health Organization, more than 80 % of the world's population relies on modern medicine for their primary health care needs [1]. Antioxidants have the property to stabilize free radicals leading to cytoprotection from the deleterious effects of free radicals. Antioxidant phytoingredients such as phenolics, flavonoids, tannins, saponins and proanthocyanidines are commonly present in numerous medicinal plants, vegetables and fruits indicating their antioxidant potential [2]. Medicinal plant extracts contain various types of bioactive compounds known as phytochemicals. Traditional medicine can be used in treatment as anticancer, antimicrobial, antioxidant, antiinflammatory agents. The studies show that these phytochemicals are safe, broadly effective and have less adverse effects [3].

Carica papaya belongs to Caricaceae family and it is also called as pawpaw with potential medicinal values and has been cultivated in most of the tropical countries. *Carica papaya* is a huge tree like herbaceous perennial plant with soft single stem growing up to 5 m - 10 m height, with sparely arranged leaves at the top of the trunk, lower trunk is scarred where leaves and fruits are born. The plants are usually short-lived, but can produce fruits for more than 20 years. *Carica papaya* leaves, fruits, seeds, peel, roots and flowers have multiple bioactive compounds and used for treating various diseases and disorders. Papaya is a berry fruit type with parietal placentation, it is well known for its food and nutritional values. It is also called as "fruit of a common man", known as popular fruit *Carica papaya* Plant grows rapidly and have weak and soft stem which yields latex and have large and long stalked leaves [4]. Hence, the present study to investigate the Antioxidant properties of Papayasayanam extract of *Carica papaya* stem straw.

2. MATERIALS AND METHODS

Collection of Plant Material

Carica papaya straws were collected Tirupattur, Vellore district, Tamil Nadu, India. The collected straws were washed thoroughly in tap water, shade dried and finely powdered.

Preparation of plant extract

Hundred grams of papaya straw dried in shade for 30 minutes and fried in Ghee of required quantity. Then, it was ground kalvam to get the fibre free confection of 50 grams of cheerakam fruit of *C. cyminum* is cleaned, fired and then pound in to the fine powder and then it was added to 150 gm of Charkkaraithe above said papaya confection and minced well for 2 hours in order to get the fiber free formulation namely papayasayanam.

Hydrogen peroxide scavenging activity

Hydrogen peroxide assay was done by following the procedure described by [4]. The Hydrogen peroxide assay was done for the determination of antioxidant activity of compounds by their ability to scavenge the oxidant hydrogen peroxide. The reaction mixture contained Phosphate buffer (pH 7.4) and Hydrogen peroxide in phosphate buffer (40 mM). A solution of Hydrogen peroxide (40 mM) was prepared in phosphate buffer. Plant extracts at the concentrations ranging from 20, 40, 60, 80 and 100 µg was added to a hydrogen peroxide solution (0.6 ml, 40 mM). The total volume was made up to 3 ml. The absorbance of the reaction mixture was recorded at 230 nm. The blank solution contained phosphate buffer without hydrogen peroxide. The percentage of hydrogen peroxide scavenged by the plant extract was calculated as follows:

$$\text{Percentage of scavenged } H_2O_2 = A0 - A1 \times 100/A0$$

Where, A0 - Absorbance of control; A1- Absorbance in the presence of plant extract

Reducing Power assay

Reducing Power assay was done by following the procedure described by [5]. Different concentration of plant extract in 1 ml of distilled water was mixed with phosphate buffer (2.5 mL, 0.2 M, pH 6.6) and potassium ferricyanide $[K_3Fe(CN)_6]$ (2.5 ml, 1 %). The mixture was incubated at 50 °C for 20 min. Trichloroacetic acid (10 %) of 2.5 ml was added to the above mixture, which was later centrifuged at 3000 rpm for 10 min. The upper layer of the solution (2.5 ml) was mixed with distilled water (2.5 ml) and $FeCl_3$ (0.5 ml, 0.1 %) and the absorbance was measured at 700 nm. Ascorbic acid was used as the reference material. All the tests were performed in triplicate and the results averaged. Increased absorbance of the reaction mixture indicates increase in reducing power.

3. RESULTS AND DISCUSSION

The free radical scavenging activity of papayasaynam extract of *Carica papaya* stem straw were assessed by its ability to scavenge H_2O_2 and reducing power. The IC_{50} value of Papayasayanam extract of *Carica papaya* stem straw has showed maximum Hydrogen peroxide scavenging activity when compared to control Ascorbic acid. The IC_{50} values of these extracts were found to be 48 µg and 52 µg were respectively (Figure - 1). The reducing power of papayasaynam extract of *Carica papaya* stem straw has showed dose dependent concentration manner. The papayasaynam extract of *Carica papaya* stem straw showed good reducing power of activity when compared to control Ascorbic acid (Figure - 2).

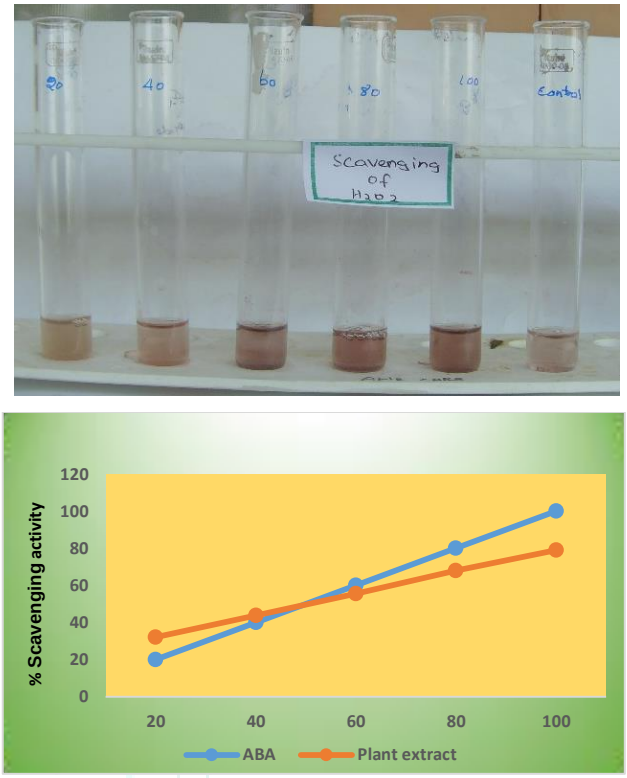

Figure - 1: Hydrogen peroxide scavenging activity of Papayasayanam extract of *Carica papaya* stems straw

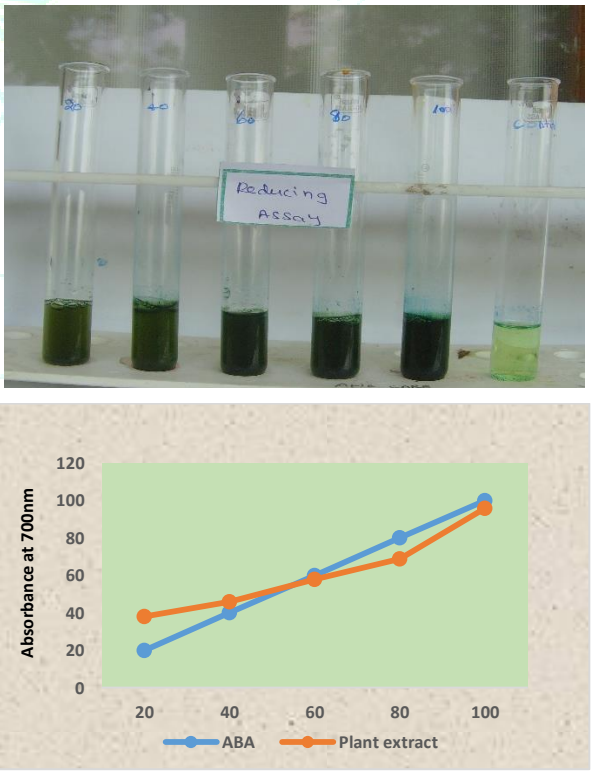

Figure - 2: Reducing Power activity of Papayasayanam extract of *Carica papaya* stem straw

4. CONCLUSION

In general, the Reactive Oxygen Species (ROS) circulating in the body tend to react with the electron of other molecules in the body and these also affect various enzyme systems and cause damage including cancer, ischemia, aging, respiratory distress syndromes and rheumatoid arthritis. A

plant based diet protects against chronic oxidative stress related diseases. So, the Papayasayanam extract of *Carica papaya* stem straw is an antioxidant rich plant extract serves as sources of nutraceuticals that alleviate the oxidative stress and therefore prevent or slow down the degenerative diseases.

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