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A pharmacological review on *Breynia retusa*

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Abstract

Breynia retusa is commonly known as common name: cup saucer plant, cupped coral-berry tree is a shrub with spreading branches. The common names of this plant originate from this. *Breynia* is a plant genus in the family Phyllanthaceae, first described as a genus in 1776. *Breynia retusa* is native to southeast asia, china, they are found throughout tropical and subtropical regions of the world. It has long been used in indian folk medicine to treat broad spectrum of diseases. Which are concentrated in parts like bark, leaves, roots, seeds. Plants of this family have been used to treat cancer. So far, various phytochemical reported from in this review importance of this species and scope for taking research with this plant is discussed. phytochemical studies on *Breynia retusa* disclosed major chemical constituents including this species such as reducing sugars, phenolics (most abundant phenols are gallic acid, ellagic acid, coumaric acid, ferullic acid and vanillic acid), alkaloids, tannins, glycosides, flavones and saponins, proteins. A research report on *Breynia retusa* reveals for its dysentery, toothache, skin inflammation, hyperglycemia, diarrhoea and as astringent and diuretic, anti-arthritic effect. Hence in this article, we discuss the biochemical constituents, traditional uses and therapeutic potentials of *Breynia retusa*

Keywords: *Breynia retusa*, polyphenols, antioxidant activity, hepatoprotective

1. Introduction

Herbal medicines are a valuable as well as a precious gift from nature. They were existing even before human beings made their appearance on the earth. Wherever we are born we have around us herbs, shrubs, and plants useful to us [1]. It is gratifying to note that in India, the importance and relevance of herbal system (Ayurveda, Unani, Sidda) is increasingly being realised for the last few decades. It is apparent that the sleeping giant of ayurveda is finally waking up [2]. Medicinal trees have been used both in the prevention and cure of various diseases of humans and their pets with the advent of human civilization many system of therapy have been developed primarily based on plants. Herbal medicine is still the mainstay of about 75-80% of World population, mainly in the developing countries for primary health care because of better cultural acceptability, better compatibility with human body and lesser side effects. The chemical constituents present in them are a part of the physiological function of living flora and hence they are believed to have better compatibility with human body. Ancient literature also mentions herbal medicine for age related diseases namely memory loss, osteoporosis, diabetic wounds, immune and liver disorder etc. for which no modern medicine or only palliative therapy is available. Man has been using herbs and plant products for combating diseases since times immemorial. The Indian subcontinent is enriched by a variety of flora- both aromatic and medicinal plants. This extensive flora has been greatly utilized as a source of many drugs in the Indian traditional system of medicine. In India, the earliest mention of the use of medicinal plants is to be found in Rigveda which was written between 4500-1600 BC.2.

Breynia retusa is a shrub with spreading branches. It grows abundantly in Bangladesh [6], India, Sri Lanka, Thailand, China, Bhutan, Cambodia, Laos, Malaysia, Nepal and Vietnam [7]. In Bangladesh, it is widely distributed in different parts of Bangladesh such as scrub forests of Sylhet and Chittagong Hill Tracts.

2. Description of the Plant

Breynia retusa (Dennst.) Alston. is a shrub with spreading branches, 1-2 m high. Leaves 1.25-2.5 cm long, distichous, broadly elliptic. Flowers small, axillary on filiform pedicels, the males in the lower and females in the upper axils. Male flowers pale yellow. Fruit depressed-globose, 13-17 mm diam.

The plant is beneficial in inflammations and diseases of the blood. It is also effective as astringent to the bowels. Leaf of this plant is fruitful in case of hasten suppuration. The juice of the stem is used in conjunctivitis [6].

2.1. Chemical Composition/Key Active Constituents

Various phytochemical reported from this species such as reducing sugars, phenolics (most abundant phenols are gallic acid, ellagic acid, coumaric acid, ferullic acid and vanillic acid), alkaloids, tannins, glycosides, flavones and saponins, proteins. In this review importance of this species and scope for taking research with this plant is discussed (Kumar and Balakrishnan, 1996; Jothi *et al.*, 2008).

3. Pharmacological Review

3.1. In-Vitro Anti-Arthritic Activity

For the assesment of *in vitro* anti-arthritic activity of *B. Retusa* and *A. hookerianum*, the method used was "inhibition of protein denaturation" [4-7] using diclofenac sodium a standard. The test solution (0.5 ml) consists of 0.45 ml of bovine serum albumin (5% w/v aqueous solution) and 0.05 ml of test solution (methanolic extract of *B. retusa* and *A. hookerianum*). The test control solution (0.5 ml) consists of 0.45 ml of bovine serum albumin (5% w/v aqueous solution) and 0.05 ml of distilled water. Product control (0.5 ml) consists of 0.45 ml of distilled water and 0.05 ml of test solution. Standard solution (0.5 ml) consists of 0.45 ml of bovine serum albumin (5% w/v aqueous solution) and 0.05 ml of diclofenac sodium. Various concentrations (31.25, 62.5, 125, 250, 500, 1000 µg/ml) of methanolic extract of *B. retusa*, *A. hookerianum* and diclofenac sodium (standard) were taken, respectively. All the solutions were adjusted to pH 6.3 using 1 N HCl. Samples were incubated at 37 °C for 20 min and the temperature was increased to keep the samples at 57 °C for 3 min. After cooling, 2.5 ml of phosphate buffer was added to the previous solutions. The absorbance was measured using UV-Visible spectrophotometer at 416 nm. The control represents 100% protein denaturation. The % inhibition of protein denaturation can be calculated with,

$$\% \text{ of Inhibition} = [100 - (\text{OD of test solution} - \text{OD of product control standard})] \times 100$$

OD = Optical density, the results were compared with Diclofenac sodium as standard.

3.2. In-Vitro Antioxidant Activity

3.2.1. Dpph Radical Scavenging Assay Method

Extracts of three different drugs (*Rivea hypocratreiformis*, *Breynia retusa*, *Woodfordia fruticosa*) were subjected to viewing for their probable antioxidant activity. The two corresponding test systems, specifically DPPH free radical scavenging along with reducing power, were use for the chemical analysis. DPPH is a stable free radical with a distinguishing absorption at 517nm. It was used to swot the radical scavenging effects of extracts. As antioxidants contribute protons to these radicals, the absorbance decreases. The diminish in absorbance is engaged as a evaluate of the extent of radical scavenging. Free radical scavenging capacity of the extracts as well as standard (Ascorbic Acid), measured by DPPH assay was observed. Also the Phytochemical screening of these plants bares a few differences in which *Woodfordia fruticosa* possess a large amount of alkaloids, flavonoids and saponin.

The incidence of flavonoids in the plants is likely to be responsible for the free radical scavenging effects observed. As a result, this type of study suggest that these plants obtain antioxidant activities which can neutralize the oxidative damage induced by the parasites.

% Radical scavenging activity = $\frac{[A_{\text{Control}} - A_{\text{sample}}]}{A_{\text{control}}} \times 100$

3.3. Neuropsychological and Neurodegenerative Activity

Common neuropsychological and neurodegenerative disorders along with involved mechanisms and associated biological changes are stipulated. Based on the assembled data, the herbal treatments are classified under various categories, herbal drugs used in Schizophrenia, Alzheimer's disease, Parkinson's disease, Depressive disorders, herbal drugs used as Sedatives and Hypnotics, common Ayurvedic single herbs used in wide range of neurological disorders, and important Ayurvedic Polyherbal formulations used in various neurological disorders. With upsurge in lifestyle disorders, the cases of neurodegenerative diseases are supposed to rise further in future. The mechanism of its development and pathogenesis is not fully decoded which impede researchers in understanding and developing proper treatment regimens for the sufferers. Herbal remedies are gaining popularity owing to their preventive, curative and promotive roles in therapy, with lesser untoward effects. This attributes to the fact that chemical constituents of botanicals are large in number having unique healing properties. These chemicals when separated and purified would also provide choice of selecting active ingredients for the experimental models of research. In Ayurveda-drug discovery uses 'Reverse pharmacology', in which drug candidates are first identified, based on large scale use in the population and validated in clinical trials. Herbal remedy for human brain disorders is much preferred over synthetic drugs because of various side effects of synthetic drugs ranging from sleep disorders to withdrawal syndromes. Herbal treatment not only improves patient compliance but also there are possibilities of enhancing the bioavailability of many drugs. Active constituents extracted from specific parts of various herbs have proved to be beneficial.

3.4. In-Vitro Diabetes Activity: A thorough study of literature shows the folklore claim of *B. retusa* in treatment of diabetes. However, there has been no experimental proof for the same. Hence this study is the first of its kind in establishing the anti-diabetic effect of *B. retusa*. Traditional medicament plays an important role in our day to day life in spite of overwhelming influence of modern medicine in treatment of various disorders like diabetes, viral infection, rheumatic disease, allergic condition, obesity, respiratory diseases, cardiovascular diseases, etc. Although numbers of poly herbal formulations are used in traditional system, only a few are accepted in modern medicine due to lack of accurate method for their standardization and evaluation. The findings of this study partially justify the traditional claim of the medicinal uses of *B. retusa*. The antidiabetic activity test results with α -Amylase inhibition method.

4. Conclusion

It could be concluded that *B. retusa* leaves have maximum anti-oxidant activity and anti-arthritic activity and it could be natural, Diabetic, antioxidant activity and anti-arthritic source and thus could be useful as therapeutic agents in preventing these diseases. Further studies are needed for their active principle to elucidate.

Breynia retusa bark has been used traditionally in Indian medicine for the treatment of broad spectrum of disorders. The present study scientifically demonstrated the *Breynia retusa* leaf possess moderate anti-arthritic and promising membrane stabilizing activity ex-vivo. All the above mentioned activities may be attributed due to presence of steroids, triterpenoids, tannins and flavonoids as a major phytoconstituents.

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