Determination of Physicochemical parameters and DPPH radical scavenging activity of *Chenopodium album* Linn

Yogesh Shivhare[1]*, Priya Singh[2], Utkarsh Upadhyay[1], Sumit Sharma[1], Shivakant Shukla[2], Akhlesh K. Singhai[2], Prashant Soni[1]

[1]Department of Pharmacognosy, RKDF College of Pharmacy, Bhopal (M.P.).462001, [2]Department of Pharmacognosy, Lakshmi Narain College of Pharmacy, Bhopal (M.P.).462001

ABSTRACT

Aim: The existing study was conceded out to offer requisite detail of Phytochemical and Physicochemical parameters and radical scavenging activity of the plant *Chenopodium album* Linn. **Materials and Method:** In the present work, different extracts of *Chenopodium album* Linn (*C.album*) were prepared and tested for the presence of secondary metabolites and various physico-chemical parameters for the phytochemical analysis of plant. All polar extract were tested for the free radical scavenging activity. **Results:** The pharmacognostical results exposed the presence of flavonoids, tannins and alkaloids in the plant and significant physico-chemical values. Utmost free radical scavenging activity was found to be in butanol fraction and lowly in dichloromethane extract. **Conclusion:** It may be concluded that *C. album* Linn could be a source of therapeutic and natural scavenging agent.

Key words: *Chenopodium album;* Extractive values; Sulphated ash; Antioxidant activity.

INTRODUCTION

Natural products have played a significant role throughout the world in treating and preventing human diseases. Natural product medicines have come from various source materials including terrestrial plants, terrestrial microorganisms, marine organisms, and terrestrial vertebrates and invertebrates and its importance in modern medicine has been discussed in different reviews and reports.[1-6]

Freshly there has been a move in universal trend from synthetic to herbal medicine, which we can say 'Return to Nature'. Nature has bestowed our country with a huge prosperity of medicinal plants; therefore India has often been referred to as the Medicinal Garden of the world. In the series of potent medicinal plant, *Chenopodium album* Linn (family- Chenopodiaceae) is an herbaceous plant commonly known as Bathua Sag in Hindi, Vastukah in Sanskrit, and Wild Spinach in English. The plant is small odorless herb up to 3.5 m in height, erect or ascending. The leaves are variable in size and shape, Oblong, rhombic and deltoid or lanceolate. The seeds are 1.5 mm in diameter, orbicular and compressed with an acute margin.[7] According to traditional literature, *Chenopodium album* Linn is sweet, acrid, digestive, carminative, laxative, anthelmintic, diuretic, aphrodisiac and tonic. The plant is also useful in vitiated conditions of pittic, peptic ulcer, helminthiasis, dyspepsia, flatulence, strangury, seminal weakness, haemorrhoids, cardiac disorders and general debility.[8] A thorough survey of literature indicates that a good number of pharmacological studies have been explored on *Chenopodium album* Linn *(C.album)*. The present study is therefore undertaken to recognize physicochemical parameters and free radical scavenging activity using standard procedures.

***Address for correspondence;**
Mr. Yogesh Shivhare, M. Pharm,
Lecturer,
30, Gomati colony, Nehru Nagar, Bhopal (M.P.)
Mobile No.: 09926225738
Email id: yogesh_aot@rediffmail.com

DOI: ****

MATERIALS AND METHODS

Plant material

The plant of *C. album* Linn were identified and collected from the local market of Bhopal. The plant was authenticated by Dr. A.S Yadav, Professor in Department of Botany, M.V.M Government College Bhopal (M.P.), where a voucher

specimen is deposited. The plant was washed, shade dried, pulverized into moderately coarse powder and stored in airtight container for further studies.

PREPARATION OF C.ALBUM EXTRACTS

Physicochemical analysis

The pulverized plant material was packed in soxhlet apparatus for successively hot continuous extraction with petroleum ether, methanol, ethanol and water as solvent. All the extracts finally reduced to dryness at 40° C by Rotavapour. The traces of the solvents were removed by keeping the dried extracts in to desiccators. The concentrated extracts were weighed and percentage of yield (w/w) was calculated.

DPPH radical scavenging assay

To the methanolic crude extract 500 ml of cold acetone was added and the mixture was placed on a stir plate overnight in a cold room. The acetone extraction produced heavy precipitation consisting mostly of proteinaceous material, which was removed by centrifugation. The remaining solution was concentrated under reduced pressure and was sequentially extracted with a series of organic solvents ranging from least polar to most polar (hexane, diethyl ether, dichloromethane, ethyl acetate and n-butanol). The polar extract was partitioned five times with 250 ml (5 × 250 ml) of five solvents. Solvents from each fraction were evaporated to dryness and lyophilized. Each polar fraction was tested for free radical scavenging activity.

Phytochemical analysis

Phytochemical screening means to examine the plant material in terms of its active constituents. All the extracts obtained from *Chenopodium album* Linn were subjected to various qualitative tests for the identification of phytoconstituents by using standard phytochemical procedures.[9-10]

Physicochemical parameters

Physicochemical parameters such as percentage of total ash, acid insoluble ash, water soluble ash and sulphated ash were calculated based upon standard procedures.[11, 12]

Total ash

About 2 gm accurately weighed powdered drug was incinerated in a silica dish at a temperature not exceeding 450° C until free from carbon. It was then cooled and weighed. The percentage w/w of ash with reference to the air-dried drug was calculated.

Acid insoluble ash

Ash is boiled with 25 ml dilute HCL (6N) for five minutes. The insoluble matter collected on an ash less filter paper, washed with hot water and ignited at a temperature not exceeding 450° C to a constant weight.

Water soluble ash

Ash is dissolved in distilled water and the insoluble part collected on an ash less filter paper and ignited at 450° C to constant weight. By subtracting the weight of insoluble part from that of the ash, the weight of soluble part of ash is obtained. Percentage of water soluble ash was calculated with reference to the air dried drug.

Sulphated ash

2 g of powdered samples are taken in crucibles and ignited at 450° C in a muffle furnace until the material gets thoroughly charred. The crucibles along with ash are taken out in desiccators and cooled. 1 ml H_2SO_4 is added to each crucible in order to moisten the residue. Heat gently until white fumes was no longer evolved and ignites at 800° C until black particles were disappeared. The crucibles are removed from the muffle furnace to desiccators, cooled and weighed to give the sulphated ash content.

DPPH radical scavenging assay

The free radical scavenging potential of extracts was evaluated by spectrophotometric assay, quantifying their capacity to bleach a purple solution of 2,2-diphenyl-1-picrylhydrazyl (DPPH) in methanol.[13] Different concentration of *C.album* extract were prepared in methanol and 3ml of each solution was mixed with 1ml of 0.1mM methanolic DPPH solution. After a 30 min incubation period at room temperature, each absorbance (A) was determined at 517 nm. Inhibition percentage of DPPH (I %) was calculated as follows:

$$I\ \% = \frac{(A_{control} - A_{sample})}{A_{control}} \times 100$$

Where $A_{control}$ is the absorbance of a control solution containing only the DPPH reagent, and A_{sample} is the absorbance of the sample reaction. The effective dose of 50% inhibition (ED_{50}) was obtained from a plot of percentage inhibition verses extract concentration. These determinations were carried out in triplicate and mean values were calculated. Ascorbic acid and Butylated hydroxyl toluene (BHT) was used as positive control.

Statistical analysis

Experimental data are expressed as mean ± SEM (n = 3), and were compared using one-way analysis of variance (ANOVA), followed by Dunnet's pairwise test, with p values < 0.05 being considered significant.

RESULTS

Extractive values

Extractive values obtained from *C. album* Linn using different solvents were recorded in table 1. The ethanolic extract has maximum yield (16.56g) as compared to other fractions.