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RESEARCH ARTICLE

PHYTOCHEMICAL SCREENING AND NUTRITIONAL VALUE OF (LEAVES) *MORINGA OLEIFERA*

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ABSTRACT

Moringa oleifera (Moringaceae) is a large succulent plant used for nutrition and in medicines. These plants are used in the tropical and subtropical areas as foods and medicinal compounds. Its leaves, flowers and fruits all are very useful. In the present study phytochemical screening and nutrition value of the leaf extract of Moringa oleifera was analyzed. The chemical constituents of leaf was extracted with various solvent with different polarity strengths. It showed the presences of protein, amino acid, vitamins, minerals, total fat and crude fiber. The results indicate that ethanol is the promising solvent showing good results of Phyto constituents. The extract of leaves of this plant is being used for further analysis in rural population of subcontinent since many centuries. This experiment will help to highlight the importance of these valuable chemical and nutrient compounds found in this plant. The objective of this study was to assess the Phytochemical and nutritional values of *Moringa oleifera.*

Key words: *Moringa oleifera,* Ethno medicinal plant, Nutrition Properties, leaf.

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INTRODUCTION

Medicinal plants are incredibly important to human as well as animals and are also capable of treating various diseases. The inbuilt medicinal property of the plants might be because of the presence of biologically active molecules known as phytochemicals. Various plant constituents consist flavanoids, tannins, terpenoids, alkaloids and glycosides (Evans, 2002). Nature has been a source of medicinal agents since times immemorial. The importance of plants in the management of human ailments cannot be over emphasized. It is clear that the plant kingdom harbors an inexhaustible source of active ingredients invaluable in the management of many intractable diseases. However, these complementary components give the plant as a whole a safety and efficiency much superior to that of its isolated and pure active components (Shariff, Z.U. (2001).). *Moringa oleifera* belongs to family Moringaceae and it is native to India and northern Europe this is very tolerable plant and it grows best in dry sandy soil. It is a source of medicinal compounds and has components of high nutritive value such as protein, amino acids, carbohydrate minerals, vitamin and organic acids (Madukwe, 2013; Raja, 2013; Arise, 2014). Moringa leaves have a high nutrient value and is also used in anti-bacterial and anti-inflammatory, gastric ulcers and diarrhea fevers, bronchitis, eye and ear infections, and inflammation of the mucus membrane. Moringa plant is locally knows as Sahjanfali, Drum stick. The leaves are good food sources for those suffering from malnutrition due to the high protein and fiber content. The leaves are reportedly prescribed for anemia problem Solutions because it is rich in iron content, leaves are the most nutritious part of the plant, being a significant source of B vitamins, vitamin C, provitamin A as beta-carotene, vitamin K, manganese, and protein, among other essential nutrients (10,11).

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MATERIALS AND METHODS

The research study was conducted at the Department of Life science Rabindranath Tagore University Bhopal. Madhya Pradesh (India).

Sterilization of the equipment's and disinfection: All the equipments were disinfected with cotton wool soaked in methylated spirit so as to maintain sterility throughout the process. Conical flasks and beaker test tubes and other glassware were sterilized by hot air oven at 160 ºC for 45 minutes, whereas moisture insensitive materials were sterilized by autoclaving at 121ºC for15 minutes.

Source of the plant material: The plant material of *Moringa oleifera* was collected in the month of September, 2018 from the tree growing inside the garden of BHEL public home Bhopal.

Preparation of Samples: After collection fresh plant materials were washed under running tap water, air dried, followed by oven drying. Finally, the samples were crushed and converted into powdered form and stored in airtight bottles for further analysis.

Phytochemical analysis of Plant extract The phytochemical screening of the plant extract was carried out to detect the presence or absence of certain bioactive compounds. Different samples of this plant were analyzed for Alkaloid, Carbohydrate, Fats and oil, Flavonoid, Glycoside, Saponins, Tannins, Steroid and B vitamins, vitamin C, provitamin A as beta-carotene, vitamin K, manganese, and protein, among other essential nutrients.

Experiment Methods of Extraction: The fresh leaves were cleaned freeze-dried and grounded into fine powder using an electric blender. The powder was dried in an oven at 40°C for 24 h, then the fine powder was sieved through 24-mesh. The fine powdered sample (10g) was extracted with 250 ml 80% methanol in water at room temperature (.25°C) for 24 h in a shaking water bath. The extract was filtered by a Millipore filter with a 0.45µm nylon membrane under vacuum at 25°C. The samples were stored at 4°C until use. For aqueous extract the fine powdered sample (10g) was extracted with 100ml of distilled water.

Phytochemical screening: The tests were done to find the presence of the active chemical constituents such as alkaloids, glycosides, terpenoids and steroids, flavonoids, reducing sugar and tannin by the following procedure.

Alkaloid: Alkaloids are basic nitrogenous compounds with definite physiological and pharmacological activity. Alkaloid solution produces white yellowish precipitate when a few drops of Mayer's reagents are added. Most alkaloids are precipitated from neutral or slightly acidic solution by Mayer's reagent (Evans WC (2002).The alcoholic extract was evaporated to dryness and the residue was heated on a boiling water bath with 2% hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of Mayer's reagent. The samples were then observed for the presence of turbidity or yellow precipitation.

Carbohydrate: Treat the test solution with few drops of alcoholic alpha napthol. Add 0.2ml of con. Sulfuric acid slowly through the sides of the test tube, a purple to violet color ring appears at the junction.

Fats and oil: Add a few drops of 0.5N of alcoholic potassium hydroxide to small quantities of various extracts along with a drop of Phenolphthalein separately and heat on a water bath for 1-2 hrs. The formation of soap or partial neutralization of alkali indicates the presence of Fixed oils and Fats.

Flavonoid: Four milliliters of extract solution was treated with 1.5 ml of 50% methanol solution. The solution was warmed and metal magnesium was added. To this solution, 5 - 6 drops of concentrated hydrochloric acid was added and red color was observed for flavonoids and Orange color for flavones (Siddiqui and Ali, 1997).

Glycoside: Glycosides are compounds which upon hydrolysis give rise to one or more sugars (glycones) and a compound which is not a sugar (aglycone or genine). To the solution of the extract in glacial acetic acid, few drops of ferric chloride and concentrated sulphuric acid are added, and observed for a reddish brown coloration at the junction of two layers and the bluish green color in the upper layer (Siddiqui and Ali, 1997).

Saponins: The ability of saponins to produce frothing in aqueous solution and to haemolyse red blood cells is used as screening test for these compounds.

Tannins: To 0.5 ml of extract solution 1 ml of water and 1 - 2 drops of ferric chloride solution was added. Blue color was observed for Gallic tannins and green black for catecholic tannins.

Steroid: Four milligrams of extract was treated with 0.5 ml of acetic anhydride and 0.5 ml of chloroform. Then concentrated solution of sulphuric acid was added slowly and red violet color was observed for terpenoid and green bluish color for steroids (Siddiqui and Ali, 1997).

Determination of total nutrients value

Carbohydrate: Carbohydrates determination using simple sugar using dilute hydrochloric acid and hot acidic medium glucose is dehydrated to hydroxyl furfural. This compound forms with anthrone a green colored product with an absorption maximum at 635 nm.

Crude fiber: Extract 5 g of material with petroleum ether to remove fat and then boil with sulphuric acid for 30 min. then filter and wash with water. Boil with 250 ml of sodium hydroxide solution for 15-20 min, filter and wash with water and 50 ml alcohol. Remove the residue and transfer to a washing dish ,pre weight dish W1, Dry the residue for 3 h at 130°C cool and weigh W2. Ignite for 20 min at 500°C then cool and weight W3. Determination of essential amino acids (16) 5 g of the test samples were macerated in 50% alcohol until all pigment was extracted and concentrated under reduced pressure at 40°C. 10 ml NaCl (10%) was added to the extract, stirred for one hour then 10 ml of trichloroacetic were added and filtrated. The precipitate was collected by centrifugation, washed and dried in desiccato 20 mg of protein were refluxed with 6 N HCl (10 ml) for 20 h and the acid removed by evaporation under reduced pressure, the residue was dissolved in 10% isopropanol for amino acids identification using the method (Eppendorf-Germany Lc 3000) Amino acid analyzer.

Determination of vitamins: The vitamins are extracted using a suitable organic solvent. The extract is evaporated with additional BHT at a controlled temperature. Both normal-phase and reversed-phase HPLC can be used for the separation. In normal-phase separations measurement is usually by Brubacher et al.

RESULTS AND DISCUSSION

Data presented the results of *Moringa oleifera* leaf extract nutritional value per 100 g (3.5 oz), Carbohydrate 8.20 g, Dietary fiber 3.1 g, fat 2.7 and protein 9.1. These results conformity with those obtained in previous studies (Raja, 2013). vitamin content in *Moringa oleifera* such as vitamin A 70µg thiamine (B1) 0.75 mg, Vitamin C 9.6 mg .Calcium 95.1 mg Iron 1.3 mg Magnesium 30.1 mg Manganese 0.119 mg Phosphorus 80.8 mg Potassium 400 mg Sodium 70 mg Zinc 0.85 mg .Results were in related with in previous studies

(Arise, 2014).The results of essentials amino acids (ug/ml) content in *Moringa oleifera* leaf extract is approximately similar to previous studies (10). Conclusion Based on the results ofthis study it can be concluded that *Moringa oleifera* leave extract had highly nutritive and chemical value. Eating Moringa food products is good for those suffering from malnutrition.

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