



PHYTO CHEMICAL ANALYSIS OF ALL SPICE PIMENTA DIOICA LEAF EXTRACT

Nirmala Babu Rao*¹ and O. Sita kumari²

¹Department of botany, University College for women, koti, osmania university, Hyderabad, Telangana, India.

²Department of Botany, R.B.V.R.R College, Narayanaguda, Osmania University, Hyderabad, Telangana, India.

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*Correspondence for Author

Nirmala Babu Rao

Department of botany,
University College for
women, koti, osmania
university, Hyderabad,
Telangana, India.

ABSTRACT

Extracts from leaves of all spice (*pimento dioica*) are investigated for phytochemical constituent and anti oxidant activity. Leaf Extract with ethyl alcohol revealed the presence of tannins, anthraquinones, flavonoids, alkaloids, terpenoides, saponins, cardiac- glycosides, reducing sugars and phlobatanins. In view of the presence of antioxidant properties of the plant, it is aimed to understand whether the plant can be use of in fighting the malignancy, other cancer causing agents and for other disease management usages.

KEYWORDS: Phytochemistry, *pimento dioica*, antioxidant properties, medicinal plants.

INTRODUCTION

Botanical name of all spice is *Pimenta dioica* (L.) Merr. and it belongs to Myrtaceae family. It possesses an aromatic taste and flavor resembling a mixture of cinnamon, cloves and nutmeg, hence the name allspice¹ (Neal, 1965; Weiss, 2002). In India, the leaves of *Pimenta* are used to flavor rice which gives it a typical aroma. Allspice is considered as a very important spice in the meat industry which utilizes the powder of the berries for tenderizing of meat² (eidemann, 2005; Sharma, 2003). The essential oil of berries of *Pimenta dioica* has been reported to contain the following, limonene, 1,8 cineole, terpinolene, β -caryophyllene, β -selinene and methyl eugenol. The Jamaican Pimento leaf oil contains eugenol, methyl eugenol, myrcene and β -caryophyllene³ (Tucker et al., 1991). Allspice leaf oil from Jamaica

was reported to contain β -caryophyllene, eugenol, methyl eugenol, and Myrcene as the major constituents and is also reported to have good antioxidant activity⁴ (L.Jirovetz et al). Allspice was used by the early Central American civilizations as flavouring for chocolate. Amongst almost all of the aromatic spices, Allspice has a worldwide importance and was first brought to Europe by Christopher Columbus in the 15th century, who found it in Jamaica, its true country of origin. It was first known as 'Piment', probably from the word "Pimento", which was used in the Middle ages for every spice⁵ (Sarah Garland et al). The evergreen dried fruits and leaves of *Pimenta dioica* tree are used worldwide as valuable spices. They are commonly known as allspice, Jamaica pepper and Pimento. This spice possesses the characteristic flavour and aroma of clove, nutmeg, cinnamon and black pepper, all combined in this one spice, hence named all spice⁶ (Vilas A. Kamble et al). The essential oils of *P. dioica* leaves and fruits are utilized in food industry mainly meat and tanning industries as well as in perfumery compositions and cosmetic products. In India, it is used as an aromatic stimulant and as an adjuvant to tonics and purgatives⁷ (Siju EN et al). It is a slow growing, beautiful little tree with aromatic leaves. Oil pressed from the fruits is used in perfumes and cosmetics. Allspice is also be found in essential oil form eugenol. In many countries *P. dioica* are used in edible food plants, which may be used as iron rich leafy condiment in our country⁸

MATERIALS AND METHODS

Plant material was collected from the college campus. Chemicals such as wagner's reagent, chloroform, 2% H₂SO₄, Concentrated sulphuric Acid, 10% Lead acetate, Benedict's reagent, 0.1% ferric chloride, Fehling's solution, dilute NaOH, 2% HCL, 10% Ammonia, 10% HCL, distilled water, Ethyl Alcohol are provided by the management of the college.

PREPARATION OF SOLUTIONS

a) Fehling's solution:- A mixture of equal volume of copper sulphate, sodium potassium tartar ate and sodium hydroxide is prepared in a beaker.

b) Wagner's Reagent:- Mixing 2gm of Iodine, 6gm of potassium iodide in 100ml of water.

Collection of sample: Healthy leaves of All spice were taken and washed under running water to remove the dust and other external pollutants. The plant leaves were air dried for few days (normally 15 to 21 days).

Grinding the sample: The dried leaves are grinded to a fine powder in a mixer and the powder is collected in clean polythene bags.

Preparation of plant extract with ethyl Alcohol: Taken 10 gms of leaf powder and added 50ml of ethyl alcohol stirred it constantly for 30 minutes and the solution was kept at room temperature for 24 hours (minimum) and then filtered. The filtered solution is again filtered with watman filter paper No.3 and then it was stored at 4 degrees centigrade (in a freezer) until use.

TESTS AND RESULTS

a) Phyto chemical screening: Chemical test is carried out on the ethyl alcohol extract of All spice using standard procedures to identify the constituents.

b) Procedure for alkaloids: 2ml of extract is taken and added 2ml of wagner's reagent a brownish precipitate indicate the presence of alkaloids.

c) Cardiac glycosides: 2ml of extract is dissolved with 2ml of chloroform and concentrated sulphuric acid is carefully added to form a layer. Deep reddish brown colour at the inter face of steroid ring indicates the presence of cardiac glycosides.

d) Flavonoids: 2ml of extract is treated with 2 ml of 10%lead acetate. Yellowish green colour indicates the presence of flavonoids.

e) Saponins: 2ml of extract is dissolved with 2ml of Benedicts reagent. Blue black ppt of indicates the presence of saponins.

f) Tanins: 2ml of extract is treated with 0.1% of ferric chloride. Brownish green indicates the presence of tannins.

g) Terpenoides: (Salkowski test)2ml of extract is dissolved with 2ml of chloroform and concentrated sulphuric acid is carefully added to form a layer. A reddish brown colour indicates the presence of terpenoids.

h) Anthraquinones: 1ml of extract is boiled with 10% HCL for few minutes in a water bath. It is filtered and allowed to cool. Equal volume of CHCl₃ is added to the filtrate few drops of 10% Ammonia is added to the mixture and heat. Formation of rose pink colour indicates the presence of anthraquinones.

i) Reducing Sugars: The extract was shaken with distilled water and filtered. The filtrate was boiled with Fehlings solution A and B for few minutes an orange red ppt indicates the presence of reducing sugars.

j) Glycosides: The extract was hydrolysed with HCl solution and neutralized with NaoH solution. A few drops of Fehling's solution A and B are added, red ppt indicates the presence of glycosides.

k) Phlobatanins: The extract is dissolved in distilled water and filtered. The filtrate is boiled with 2% HCL solution. Red precipitate shows the presence of phlobatanins.

HUMAN USAGE AND DISEASE MANAGEMENT

- Alkaloids are anaesthetic agents and found in medicinal plants.
- Cardiacglycosides are strong and direct action on the heart, kidneys and used for diuretic and lowering the blood pressure.
- Flavonoids are anti oxidant elements strengthen capillary volves of heart and improve blood circulation.
- Saponins are useful as expectorants, anti bacterial and anti viral.
- Tanins draw the tissue closure together and fights infection.
- Terpenoids are useful as aromatic agents and used for flavouring the food.
- Anthraquinins are having laxative properties and useful to large intestine.
- Flavonoids are identified with antioxidant properties retards breast cancer growth and progression.

CULTIVATION

Allspice is propagated through seeds, which are collected from fruits of high yielding trees. Fruits are soaked overnight in water, rubbed and seeds are extracted. The seeds are sown in nursery beds, pots or basins. To enhance germination, the beds are mulched with dried leaves, straw, paper or gunny bags. Seeds germinate by 9-15 days. Allspice can be propagated vegetative by grafting, budding, approach grafting and top working. Tissue culture methods are also employed for their propagation. Six to ten -months old seedlings are ideal for field planting. They are planted at a spacing of 6m x 6m or even closer. Three seedlings are planted in a single hole of 60cm³ size. The female and male plant ratio in a garden should be 8:1 to ensure good pollination. Shade and regular irrigation should be provided at young stage of the plants. Manuring, weeding and mulching should be undertaken at regular intervals. Necessary plant protection measures should be adopted.

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