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FLUORESCENCE ANALYSIS OF TWO MEDICINAL PLANTS – *PSIDIUM GUAJAVA* L AND *CITRUS AURANTIUM*

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ABSTRACT: The plants used for the present study viz., *Psidium guajava* L and *Citrus aurantium* belong to the family Myrtaceae and Rutaceae respectively. Guava is native to tropical America. The young leaves are used as tonic in digestive disorders. Bitter orange is native of South Eastern Asia; grow in Tamil Nadu, Karnataka, Maharashtra, Punjab and Uttar Pradesh. It is a rich source of provitamin A. The present investigation on the fluorescent characters of the leaf powder showed varied colours like green, pale green, dark green, brown and yellow under different chemical treatments in both the medicinal plants used for the study.

INTRODUCTION: Plants are now occupying important position in allopathic medicine, herbal medicine, homoeopathy and aromatherapy. Medicinal plants were used by people of ancient cultures, without the knowledge of their active ingredients. Some medicinal plants are used for remedy at household level. Medicinal plants have proved to be effective for prevention and cure of various disorders. Their use against digestive disorders is very common at household level. Usually herbal medicines are widely perceived by the public as being natural, healthful and free from side effects [1]. Medicinal plants are the most exclusive source of life saving drugs for majority of the world's population [2]. The use of medicinal plant extract increases the body's immune system and lowers the allergies and also asthma [3].

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It is generally known that the consumption of a variety of local herbs and vegetables by man contributes significantly to the improvement of human health, in terms of prevention, and or cure of diseases because plants have long served as a useful and natural source of therapeutic agents[4].

The species *Psidium guajava* is an example of plants commonly used in popular medicine. *Psidium guajava* L. belongs to the family Myrtaceae. Guava fruit contain high Vitamin 'C' than citrus fruits and also appreciable amounts of vitamin A as well. Guava is commonly known for its food and nutritional values and the fruit considered as poor man apple of tropics.

Citrus aurantium plant belongs to the family Rutaceae. *C. aurantium* is commonly known as bitter orange. Leaf, fruit and fruit juice are used to make medicine. The bitter orange flower and bitter orange oil are used for gastrointestinal (GI) disorders including ulcers in the intestine, constipation, diarrhea, blood in faeces, drooping anus or rectum and intestinal gas. The citrus plants

have been widely used as antioxidants. Citrus fruits are one of the important horticultural crops, with worldwide agricultural products of over 80 million tons per year [5]. In pharmaceutical industries, they are employed as flavouring agents to mask the unpleasant taste of drugs. The extract of bitter orange has been marketed as dietary supplement purported to act as a weight –loss aid and appetite suppressant.

Phytochemicals are responsible for medicinal activity of plants and they have protected human from various diseases [6]. Phytochemicals are defined as bioactive non-nutrient plant compounds found in fruits that have been attributed to reduce the risk of major chronic diseases [7]. The major constituents of phytochemical consist of carbohydrates, aminoacids, proteins, and chlorophylls, while, secondary metabolites consist of alkaloids, saponins, steroids, flavonoids, tannins, etc.[8]. Fluorescence is the phenomenon exhibited both in visible and UV- light by various chemical constituents present in the plant material. Some crude drugs are often assessed qualitatively in this way and it is an important parameter of pharmacognostical evaluation [9]. The main objective of the present study is to analyze the fluorescent characters of the two medicinal plants.

MATERIALS AND METHODS:

In the present study, dry leaf powder of two medicinal plants was used. The medicinal plants are *Psidium guajava* and *Citrus aurantium.* Fluorescent analysis of the leaf powder of the two plants was carried out.

Collection of Plant Samples:

The fresh leaves of *Psidium guajava* and *Citrus aurantium* were obtained from Kengarai village in Nilgiri District of Tamil Nadu, India.

Preparation of Leaf Powder:

The leaves of the medicinal plants taken for the present study were collected, cleaned and air dried, under shade for about three weeks. After drying, the leaves were then blended using a household electric blender. This fine powder was analyzed for the fluorescent characters **(Plate- 1)**.

FIGURE: 1 A. *PSIDIUM GUAJAVA* **B. *CITRUS AURAMTIUM***

Fluorescence Analysis:

The behaviour of the leaf samples with different chemical reagents and fluorescence characters of *Psidium guajava* and *Citrus aurantium* were observed under ordinary and long ultra violet light at 245nm adopting various method [10, 11].

RESULTS AND DISCUSSION: The experiments conducted in *Psidium guajava* and *Citrus aurantium* for analysis of fluorescent characters showed the following results.

Fluorescence Analysis:

The leaf powder of the plant samples were extracted in acetic acid, picric acid, H_2SO_4, $FeCl_3$, 1N HCl, HNO_3, NaOH and H_2O. The fluorescence analysis of these leaf extracts were observed under ordinary visible light and also under UV light (245

nm) and recorded in **Tables 1** and **2.** The fluorescence analysis of leaf powder of *P.guajava* showed green colour under UV light when treated with acetic acid, $FeCl_3$ and water, as well as, when the powder is used as such. Pale green colour was observed under visible light when the leaf powder was treated with $FeCl_3$ and water, as well as, the powder without any chemical treatment. Dark green colour was observed in picric acid and NaOH under UV light. The leaf powder showed brown colour under UV light in HNO_3 treatment. Various colours like pale yellow, orange, light green and dark brown were also observed under different light conditions **(Table 1)**.

The fluorescence analysis of *C.aurantium* showed pale yellow under both the light when the leaf powder was treated with picric acid. Similarly, the leaf powder showed pale green colour under both light conditions in treatment with water. Pale orange and orange was observed under visible light when the leaf powder was treated with 1N HCl and HNO_3. Brown colour was seen in $FeCl_3$ and NaOH treated leaf powders when observed under visible light. When the leaf powder was observed under UV light, it showed varied colour viz., pale green, pale brown and dark green under different chemical treatments **(Table 2)**

TABLE 1: FLUORESCENCE ANALYSIS OF *PSIDIUM GUAJAVA*

Treatment	Leaf Powder	Treatment with chemical reagent	Observation	
			Visible light	UV light (245nm)
T_1	Leaf Powder	Acetic acid	Brown	Green
T_2	Leaf Powder	Picric acid	Pale Yellow	Dark Green
T_3	Leaf Powder	H_2SO_4	Dark brown	Dark brown
T_4	Leaf Powder	$FeCl_3$	Pale Green	Green
T_5	Leaf Powder	1N HCl	Brown	Light green
T_6	Leaf Powder	As such powder	Pale Green	Green
T_7	Leaf Powder	HNO_3	Orange	Brown
T_8	Leaf Powder	NaOH	Dark Brown	Dark Green
T_9	Leaf Powder	H_2O	Pale Green	Green

TABLE 2: FLUORESCENCE ANALYSIS OF *CITRUS AURANTIUM*

Treatment	Leaf Powder	Treatment with chemical reagent	Observation	
			Visible light	UV light (245nm)
T_1	Leaf Powder	Acetic acid	Green	Pale Green
T_2	Leaf Powder	Picric acid	Pale Yellow	Pale Yellow
T_3	Leaf Powder	H_2SO_4	Dark brown	Pale brown
T_4	Leaf Powder	$FeCl_3$	Brown	Dark Green
T_5	Leaf Powder	1N HCl	Pale Orange	Pale Green
T_6	Leaf Powder	As such powder	Green	Dark Green
T_7	Leaf Powder	HNO_3	Orange	Green
T_8	Leaf Powder	NaOH	Brown	Green
T_9	Leaf Powder	H_2O	Pale Green	Pale Green

Fluorescence is the phenomenon exhibited by various chemical constituents present in the plant material. Some show fluorescence in the visible range in daylight. The ultraviolet light produces fluorescence in many natural products (e.g. alkaloids like berberine) which do not visibly fluoresce in daylight. Some of the substances may be often converted into fluorescent derivatives by using different chemical reagents though they are not fluorescent, hence we can often assess qualitatively some crude drugs using fluorescence as it is the most important parameter of pharmacognostical evaluation [9, 12]. The results of fluorescent analysis of leaf powder of the medicinal plants viz., *Psidium guajava* and *Citrus aurantium* showed characteristic colouration in treatment with various chemical reagents. These results are supportive with *Cajanus cajan* leaf extracts [13].

CONCLUSION: A number of chemicals isolated from guava plant like quercetin, guaijaverin, flavonoids and galactose-specific lecithins have shown promising activity in many human trials. In this regard, further studies need to be carried out to explore *P.guajava* L for its potential in preventing and treating diseases. The fluorescent analysis of

powdered drug plays an important role in the determination of quality and purity of the drug.

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