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Biochemical analysis of leaves of medicinal plant i.e. Azadirachta indica.

Arish Khanam

Department of Botany, St. John's College, Agra

Email. arishkhanam@yahoo.in

Abstract

India is endowed with a rich wealth of medicinal plants. India recognized more than 2500 plant species which have medicinal values. In recent decades, the low cost and milder side effects of herbal medicines, compared to conventional synthetic drugs have enhanced their worldwide use. Plants are like natural laboratories where a great number of chemicals are biosynthesized and infect them may be considered the most important source of chemical compounds. Laboratory evaluations were made to access the study of chlorophyll a, chlorophyll b and carotenoids in leaves of Azadirachta indica collected from different areas i.e. industrial area (Sikandara), residential area (Vibhav Nagar) commercial area (Sadar Market), public area (St. Peter's School) and hospital area (Lady Loyal) of Agra region. The highest amount of chlorophyll a 0.361 mg/g, chlorophyll b 0.645 mg/g in residential area (Vibhav Nagar) and carotenoids 0.250 mg/g was observed in public area (St. Peter's school). Similarly lowest amount of chlorophyll a 0.183 mg/g, chlorophyll b 0.132 mg/g and carotenoids, 0.209 mg/g was observed in industrial area (Sikandara).

Key Words: Carotenoids; Chlorophyll; Synthetic drugs

Introduction

Medicinal plants are the most exclusive source of saving for the majority of the world's population. The pigments which are involved in the process of photosynthesis are called photosynthetic pigments. The pigments are coloured compounds that have capacity to absorb certain wavelength of light and reflect to others. The formation of chlorophyll is physiological process that occurs only in living cells [1] .Medicinal plants are widely used for treatment of diseases all over the world. According to world health organization report about 80% of the world populations are taking interest in indigenous medicinal plant remedies. Herbal medicines have usually been used in the form of fruit and vegetable, drugs or their extract for the treatment of the disease and for maintaining health [2].

Azadirachta indica (L.) is commonly known as "Neem" tree and it is a member of family Meliaceae. Each part of neem is used in medicines and thus commercially exploitable. It is also considered to be a natural source for a medicines and industrial products. Neem bark is cool astringent, bitter, acrid and refregent. It is useful in cough, fever, loss of appetite, worm infestation. It heals wounds and vitiated conditions of kapha, excessive thirst, vomiting and diabetes. Neem leaves are beneficial for insect poisons and eye disorders. It treats vatic disorder. It is antipyretic and anti inflammatory [3] .Neem fruits are purgative, bitter antihemorhoids and antihelmintic [4].

Method and Material

The plant material of *Azadirachta indica* collected from different areas of Agra region. Chlorophyll a, chlorophyll b and carotenoids were extracted from the flucked leaf using 80% acetone. Optical densities were recorded at 480, 510, 645 and 663 nm. The amount of chlorophyll a, chlorophyll b and carotenoids were calculated in terms of mg/g of fresh leaves by using the following formula given by Arnon [4] as modified by Krick [5].

$$\text{Chlorophyll a (mg/g)} = (12.7\ D663 - 2.69\ D645) \times \frac{V}{100} \times \frac{1}{wt}$$

$$\text{Chlorophyll b (mg/g)} = (22.9\ D645 - 4.68\ D663) \times \frac{V}{100} \times \frac{1}{wt}$$

$$\text{Carotenoids (mg/g)} = (7.6\ D480 - 1.49\ D510) \times \frac{V}{100} \times \frac{1}{wt}$$

Where V = volume of acetone
W = weight of material
D = optical density

Results and Discussion

A.indica (L.) is a scared tree of India and is one of the major ingredients of ampucare. It is bitter tonic, antimicrobial, antifungul, astringent, antiperiodic; useful in wounds and skin infections. Chlorophylls and carotenoids are essential pigments of higher plant assimilatory tissues. Moreover, thus play important role in photosynthetic capturing light energy which is converted into chemical energy. Chlorophyll is the most indispensable class of primary compounds as they are the only substances that capture sunlight and make it available to plant system for its cultivation on photosynthesis. Carotenoids are a class of natural fat-soluble pigments found principally in plants, algae and photosynthetic bacteria, where they play a critical role in the photosynthetic process and also protect chlorophyll from photo-oxidative destruction .The maximum amount of chlorophyll a 0.36 mg/g, chlorophyll b 0.645 mg/g in residential area and carotenoids 0,250 mg/g in public area.

Conclusion

Medicinal plants are used in India for treatment of various diseases. The plants having bitter astringent, cooling diuretic, stomachic, febrifuge and antiseptic properties. Neem, one of the most famous plant found throughout India, has strong health alleviating activity. It has been used as a tonic and astringent that promotes healing. The extract has shown anti-spasmodic action. In present study it was found that found *A. indica* is outstanding source of chlorophyll and carotenoids which suggests that the plant *A.indica* helps in blood formation (because chlorophyll is the precursor of hemoglobin) and as a cure of insect poisons and eye disorder. Carotenoid is also preventing age related eye disease. Neem leaves are carminative and expectorant lessen inflammation and are useful in syphilitic sores and blood impurities. It is believed to toxins from the body, neutralize free radicals and purify the blood. It is used as anticancer agent and it has hepato-renal protective activity and hypolipidemic effect.

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Table 1: Biochemical analysis of *A.indica* in selected areas of Agra City

S.No.	Name of areas	*Azadirachta indica*		
		Chlorophyll a	Chlorophyll b	Carotenoids
1	Residential area (Vibhav Nagar)	0.361	0.645	0.248
2	Industrial area (Sikandara)	0.168	0.132	0.209
3	Commercial area (Sadar Market)	0.348	0.300	0.239
4	Public area (St. Peter's School)	0.288	0.484	0.250
5	Hospital area (Lady Loyal)	0.202	0.350	0.207

Figure 1: Biochemical analysis of *A.indica* in selected areas of Agra City