ORIGINAL RESEARCH PAPER

Botany

DETERMINATION OF CHLOROPHYLL CONTENT IN SOLANUM XANTHOCARPUM SCHARD& WENDL IN DIFFERENT SOIL

KEY WORDS: Head and Neck Cancers, Concurrent Chemo Radiation, Topical application of Honey, Radiation induced Mucositis.

Dr. Kritika Jyoti Namdeo Assistant Professor Botany Govt. K.H. College Abhanpur, Raipur (C.G.)

ABSTRACT

Concentration of Leaf chlorophyll is an important factor that is regularly measured as an indicator of chloroplast content, photosynthetic mechanism and of plant metabolism. In this study chlorophyll a (Chl. a) and b (Chl. b) Total chlorophyll and carotenoids were determined in different soil such as Kanhar soil, Bhata soil and Matasi soil in *Solanum xanthocarpuum*. The quantative difference of chlorophyll a (Chl.a) and b (Chl.b) Total chlorophyll and carotenoids content were observed. Maximum amount of chlorophyll a, chlorophyll b, total chlorophyll and carotenoids were found with plants grown in Kanhar soil, Bhata soil and Matasi soil respectively.

INTRODUCTION

Solanum xanthocarpum, commonly known as '*Bhatkatiya*' is a member of the family *Solanacea*. It is annual prickly diffuse herb. According to the Chhaterjee and Prakash(1995), the whole plant is alternative, antiasthematic, digestive,febrifuse, bitter and pungent. The fruits flower and stems are bitter and carminative and associated with a vesicular and watery eruption. The leaves are considered anodyne and their juice with black pepper is prescribed in rheumatism (Chopra *et al.* 1996). There is a fair demand of different parts of this herb in homeopathic pharmacies. This herb is present in Chhattisgarh since generations with a rich medicinal knowledge of natives and traditional healers about the plant. The chlorophyll is also plays important role in plant physiology and it can be act as nutrition in decline blood sugar conditions, detoxification, digestion, excretion and decreasing allergens (Srichaikul *et al*., 2011, Singh *et al*., 2011).

MATERIAL AND METHODS

Planting *Solanum xanthocarpum*:

Collected seeds were sown in nursery beds to raise the seedlings in the month of Jan-feb. Seedlings attended attended a height about 4-5cm. After one month of sowing i.e. in the month of March, seedlings of equal size were now taken and transplanting from nursery to experimental area. Twenty five seedlings were planted in each of the plot area, spacing 20×20 cm in a row.

Estimation of Chlorophyll Content:

Quantitive estimation of chlorophyll content was made following Aron (1949) whilecaritenoids were estimated following Duxdury and Yentsh (1956). 1gm fresh leaf material was homogenized with excess of 80% acetone and centrifused at 3000rpm. Supernatent volume was adjusted to 100ml. The optical density of this extract was measured at 480, 510, 645 and 663nm.

$$\text{Chl.a mg/g} = \frac{12.7 \times A663 - 269 \times A645 \times V}{a \times 1000 \times w}$$

$$\text{Chl.b mg/g} = \frac{22.9 \times 645 - 4.68 \times A663 \times V}{a \times 1000 \times w}$$

$$\text{Total Chl. mg/g} = \frac{20.2 \times A64 + -8.02 \times A663 \times V}{a \times 1000 \times w}$$

$$\text{Carotenoidesmg/g} = \frac{7.6 \times A480 - 1.49 \times A510 \times V}{a \times 1000 \times w}$$

Where,

a = Length of light path in the cell (1cm)
V = Volume of extract in ml
W = Fresh weight of sample in gm

Result and Discussion:

In cancer therapy chlorophyll or chlorophyll derivatives can be utilized as a photodynamic agent. (Brandis *et al.,* 2006). Chlorophyll fluorescence parameters and evaluation of chlorophyll content and relationships between chlorophyll a and b were determined in Dezful olive trees (khaleghi,*et al,* 2012). José Francisco *et al.,* (2008) determined Chlorophyll Concentrations in tropical tree species by portable Chlorophyll meter with appropriate adjustment equations. The amount of chlorophyll a and chlorophyll b in normal leaf was less when compared to the regenerated leaf. Indira Priyadarsini *et al*., 2015. Chlorophyll is an antioxidant compounds which are present and stored in the chloroplast of green leaf plants and mainly it is present in the green area of leaves, stems, flowers and roots (Mirza *et al.,* 2013; Srichaikul *et al.,* 2011).

Maximum amount of chlorophyll a, chlorophyll b, total chlorophyll and carotenoids were found with grown in Kanhar soil with 0.306± 0.007 mg/gm, 0.089 ± 0.009mg/gm, 0.396± 0.016 mg/gm and 0.272 ± 0.016 mg/gm respectively followed by value with plants grown in Bhata soil 0.284±0.004mg/ gm, 0.108± 0.085 mg/gm,0.382±0.006 mg/gm and 0,183±0.01respectively. The minimum amount of chlorophyll a, chlorophyll b, total chlorophyll and carotenoids were found with plants grown in grown in Matasi soil was 0.270±0.032mg/gm, 0.055±0.01 mg/gm, 0.326±0.036 and 0.159±0.011mg/gm respectively.

TABLE 1: Estimation of Chlorophyll Content in *S. xanthocarpum* grown in Kanhar, Bhata and Matasi Soil:

Soil type	Chlorophyll a (mg/gm)	Chlorophyll b (mg/gm)	Total Chlorophyll (mg/gm)	Carotenoids
Kanhar Soil	0.306± 0.007	0.089 ± 0.009	0.396± 0.016	0.272 ± 0.016
Bhata Soil	0.284±0.004	0.0108±0.085	0.382±0.006	0.183±0.01
Matasi Soil	0.270±0.032	0.055±0.01	0.326±0.036	0.159±0.011

REFERENCES:

[1] Aron D, 1949. Copper enzymes isolated chloroplasts, polyphenoloxidase in Beta vulgaris. Plant Physiology. 24: 1-15.
[2] Brandis, A. S., Y. Salomon, and A. Scherz, (2006). Chlorophyll Sensitizers in Photodynamic Therapy, Advances in Photosynthesis and Respiration, 25, 461–483.
[3] Chatterjee, A. & S.C. Pakrashi. (1995). The Treatise on Indian Medicinal Plants, V.H. Publications and Information Directorate, C.S.I.R., New Delhi.
[4] Chopra, R.N., L. Nayer, & I. C. Chopra (1956). Glossary of Indian Medicinal Plants. Publication and Information Directorate, C.S.I.R. New Delhi.
[5]. Dey, A.K.; Sharma, M.; Meshram, M.R. (2016). An Analysis of Leaf Chlorophyll Measurement Method Using Chlorophyll Meter and Image Processing Technique. Procedia Comput. Sci85, 286–292. [CrossRef]
[6] Indira P, Shamshad AS and PM John. (2015). The effect of air pollution on some biochemical factors of some plant species growing in Hyderabad. Int. J. Pharm. Bio. Sci. 6:1349 – 1359.
[7] Khaleghi. E, Arzani. K, Moallemi.N, Barzegar.M,(2012). Evalution of chlorophyll content and chlorophyll Fluorescence parameters and Relationships between chlorophylla, b and chlorophyll content Index under water stress in Olea europaea cv. Dezful, World Academy of science, Engineering and Technology 68 1154-115
[8] Mirza, H., Kamrun N., Md. Mahabub A., 2, Roychowdhury R., Fujita M. (2013): Physiological, Biochemical, and Molecular Mechanisms of Heat Stress Tolerance in Plants. Int. J. Mol. Sci., 14, 9643-9684.
[9] Saberioon, M.M.; Amin, M.S.M.; Anuar, A.R.; Gholizadeh, A.;Wayayok, A.; Khairunniza- Bejo. S. , (2014) Assessment of rice leaf chlorophyll content using visible bands at different growth stages at both the leaf and canopy scale. Int. J. Appl. Earth Obs. Geoinform. 32, 35–45. [CrossRef]
[10] Srichaikul, B., Bunsang, R., Samappito, S., Butkhup S., and Bakker, G., (2011): Comparative study of chlorophyll content in leaves of Thai Morus alba Linn. Species. Plant Science Research, 3, 17-20.