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RESEARCH ARTICLE

BIOCHEMICAL EVALUATION OF "*Coriandrumsativum*" L. (CORIANDER).

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Abstract

Many important nutrient aspects are essential for the human bodies which are studied through biochemical compositions. The seasonal variation of carbohydrates, fats, content have been investigated from leaf, stem & root of *Coriandrumsativum* L. which is one of the most enrich leafy vegetable used by people in the globe. Carbohydrate content was seen in decreasing order of leaf>stem>root during monsoon, winter & summer respectively. Fats content was seen in decreasing order of leaf>stem>root during monsoon, winter & summer respectively.

Introduction: -

First attested in English in the late fourteenth century, the word coriander derives from the Old French: coriandre, which occurs from Latin, Coriandrum, in turn from Ancient Greek: koriannon. The earliest attested form of the word is the Mycenaean Greek, composed in the Linear B syllabic script, (reconstructed as koriadnon), (similar to the name of Minos's daughter Ariadne) which later on evolved to koriannon or koriandron. Cilantro is the Spanish word for coriander, also deriving from Coriandrum. It is the common term in North American English for coriander leaves, due to their large scale usage in Mexican cuisine. Coriander grows wild over a spacious arena of Western Asia and southern Europe, prompting the remark, "It is difficult to determine precisely where this plant is wild and where it just recently made itself." Fifteen desiccated markups were found in the Pre Neolithic B level of the NahalHemar Cave in Israel, which may be the oldest archeological find of coriander. Almost half a liter of coriander markups was recovered from the tomb of Tutankhamen, and because this plant does not spring up wild in Egypt, Zohary and Hopf interpret this finding as proof that coriander was cultivated by the ancient Egyptians.

Whole constituents of the plant are edible, but the unused leaves and the dried seeds are usually used in cooking. Coriander is commonly found in Indian, Middle Eastern, South Asian, Southeast Asian, Tex-Mex, Latin American, Brazilian, Portuguese, Caucasian, Central Asian, Mediterranean, Chinese and African food.

Coriander leaves are the great source of vitamin C and A. The green herbs contain vitamin C up to 160 mg/100 g and vitamin A up to 12 mg/100 g (Girenko, 1982). Cilantro plant has regenerative capacity and hence 2-3 cuttings can be taken very easily. Menon and Khader (1997) and Thapa (1999) indicated that leaf plucking of the coriander seed crop at early phases can provide an additional income to the cultivators. Sharangi et al. (2011) presentet that, a foliar spray of nitrogen (2.5%urea) may be favorable for coriander leaf production under multicut system and the crop is fragile to rainfall, photo temperature, and morning humidity.

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Materials and methods: -

The required species of Coriander was collected from the local market and was used for preparing the dry powder. Before sun drying it was separated into leaf, stem & root. The fresh material was used for chlorophyll estimation. The remaining was dried & converted into powder form. This particular procedure was carried out in seasonal format i.e., summer, monsoon & winter respectively.

Quantitative estimation of TotalCarbohydrates: -

Carbohydrates were estimated by methods suggested by McGready (1950), and Nelson (1941).

Reagents: -

- Somogy's reagent (4 gm. $CuSO_4$ +24 gm. anhydrous Na_2CO_3 +16 gm. Na-K tartarate (Rocheette salt) + 180gm Anhydrous Na_2SO_4.
- Nelson aresenomolybdatereagent: - (24gm $(NH_4)_6MO_7O_{24}$, $4H_2O$ Ammonium molybdate) + (3gm Na_2SO_4, $7H_2O$).
- Both solutions were mixed and incubated at 370C for 24 hours before use and they were stored in brown bottle.
- Standard sugar solution was prepared by dissolving 10 mg glucose in 100 ml distilled water.

Procedure: -

1gm. of sample was crushed with 10ml 80% ethanol in mortar and pestle by adding acid free sand, and then filtered through Wathman filter paper. The filter and residue were collected separately.

The alcohol residue was taken in 250 ml in conical flask. 150ml distilled water and 5ml conc. HCL were added in it. Hydrolysed for 30 minutes and cooled to room temperature. Na_2Co_3 was added bit-by bit until the extract became neutral (pH=7). The extract was filtered. Residue was discarded. Total volume of filtered was served as a sample for starch. First filtrate was taken in conical flask and condensed on water bath up to 2-3 minutes then distilled water was added to the filtrate, and then filtered, after mixing residue was discarded and the volume of filtrate was served for reducing sugar.

20 ml of this filtrate was taken in 150 ml conical flask, 2ml of conical flask; 2ml of conc. HCl was added to it and corked. It was then hydrolysed for 30 minutes and cooled at room temperature. Na_2CO_3 was added bit-by –bit until the extract became neutral (pH=7). Then this extract filtered and residue discarded. The final volume of the filtrate was measured. It was served as a sample for total sugar.

0.5 ml of aliquot sample was taken in each test tube and 1 ml of Somogy's reagent was added in it. All test tubes were placed in boiling water bath for 30 minutes, cooled the tubes to room temperature and 1ml of aresenomolybdate reagent which is poisonous was added to it. The content was mixed thoroughly. Then the content was diluted to a volume of 10ml and its absorbance measured OD at 560 nm in spectrophotometer.

Quantitative estimation of Fats: -

A small quantity of free acids is usually present in oils along with the triglycerides. The free fatty acid content is known as acid number/acid value. It increases during storage. The keeping quality of oil therefore relies upon the free fatty acid content.

Reagents: -

1. 1% phenolphthalein in 95% ethanol
2. 0.1N potassium hydroxide
3. Neutral solvent: Mix 25ml 95% alcohol and 1ml of 1% phenolphthalein solution and neutralize with N/10 alkali.

Procedure: -

Dissolve 1-10g of oil or melted fat in 50ml of the neutral solvent in a 250ml conical flask. Add a few drops of phenolphthalein. Titrate the content against 0.1N potassium hydroxide. Shake constantly until pink color which persists for fifteen seconds is obtained.

Result &Discussion: -

Total Carbohydrates: -

The total carbohydrate content of leaves, stem & root were usually higher in summer as compared to winter and monsoon.

The range of total carbohydrate content of leaves was 6.25mg/g dry wt. to 4.66 mg/g dry wt. where in summer accumulation of total carbohydrates was (6.25 mg/g) than in winter (4.72 mg/g) and in monsoon it was found lowest (4.66 mg/g).

Where as in stem it ranged from 5.80 mg/g to 5.42 mg/g dry wt., in Monsoon it was recorded lowest (5.42 mg/g) & highest in summer (5.80 mg/g) whereas modest in winter (5.74mg/g).

The range of total carbohydrate in root was ranged from 6.87mg/g to 6.39mg/g dry wt., in summer it was highest (6.87 mg/g) compared to monsoon (6.39 mg/g) & winter (6.75 mg/g).

Fats: -

The fats content of leaves was found in the range of 0.084 to 0.010 mg/g dry wt., in summer it was highest (0.084mg/g) compared to winter (0.032 mg/g) and monsoon (0.010mg/g).

Where as in stem it ranged from 0.092 to 0.017 mg/g dry wt. in monsoon it was lowest (0.017 mg/g), in winter was modest (0.050 mg/g) & in summer was highest (0.092 mg/g). The concentration of fats was highest in root as compared to leaf & stem. It ranged from 0.093 to 0.025 mg/g dry wt., in summer it was highest (0.093 mg/g), in winter it was modest (0.087 mg/g) & in monsoon was lowest (0.025 mg/g). The comparison can be seen in the following table no.2.

Table 1: - Seasonal variation in total carbohydrates.

Sr. No.	Plant Parts	Seasons (Total Carbohydrates) (Mg/g dry wt.)		
		Summer	Monsoon	Winter
1	Leaf	6.25	4.66	4.72
2	Stem	5.80	5.42	5.74
3	Root	6.87	6.75	6.39

Table 2: - Seasonal variation in.

Sr. No.	Plant Parts	Seasons (Fats) (Mg/g dry wt.)		
		Summer	Monsoon	Winter
1	Leaf	0.084	0.015	0.032
2	Stem	0.092	0.017	0.050
3	Root	0.093	0.025	0.087

Conclusion: -

From this experiment it is concluded that the percentage of carbohydrates & fats changes according to seasons. . The amount of these entire constituent is high in summer as compare to winter & monsoon. Because all these activities would totally depend on the photoperiod i.e. duration of light. As compared to summer & winter moisture content was high in monsoon. This work is useful for the production of medicinal plant for their particular properties. This is useful for the study of native medicinal plants, and their characteristics. It is useful for the study of biochemical composition of plants ethno botanically important. So it useful for the extraction of medicinally important component from the plant at the particular seasons.

References: -

1. Cox. H.E. and Pearson, D. (1962): The chemical analysis of foods Chemical publishing Co Inc New York p 420.
2. Das Chowdary, T. K., Lahiri, B., Bhattacharya, N. and R. N. Basu. (1967). A note on the estimation of free amino acids, sugars and organic acids from gummy and resinous plant material. Ind. J. PI. Physiol.10; 196-201.
3. Dave, Y., A.R.S. Menon and V. Thomas. 1992. A comparative study of oil canals in the pericarp of some Indian Umbelliferae. FeddesRepert. 103:71-75.
4. Girenko MM (1982). Initial material and basic trends in breeding of some uncommon species of vegetables. J. Bull. VIR im. Vavilova, 120:33-37.
5. GOLDSCHMIDT, E.E., 1999. Carbohydrate supply as a critical factor for citrus fruit development and productivity. HartScience 34,1020-1024.

6. GOLDSCHMIDT, E.E. & GOLOMB, A. 1982. The carbohydrate balance of alternate-bearing citrus trees and the signiticance of rcserves for flowering and fruiting. .f. Amer. Soc. Hart. Sci. 107,206-208.
7. Meier zuBeerentrup, H.M. and G. Röbbelen. 1987. Screening for European productions of oilseed with unusual fatty acids. Angew. Bot. 61:287-303.
8. Menon R. &Khader M.A. 1997. Effect of leaf plucking on the growth & yield of coriander. Indian Cocoa, Arecanut& Spices J. 21(3): 74-75
9. Mhemdi H, Rodier E, Kechaou N, Fages J (2011). A supercritical tuneable process for the selective extraction of fats and essential oil from coriander seeds. J. Food Engg. 105(4):609-616.
10. Mironova, A.N., G.I. Filippova, N.I. Fedina, Z.D. Volkova, V.L. Kozlova,T.B.Alymova,E.I. Gorkova and S.F. Bykova. 1991. Study of the chemical and biological properties of coriander fatty oil [in Russ.]. Voprosypitanija 1991:59-62.
11. Nelson, N. (1941): "A Photometric adapt ion of the somogyi method for the Determination of Glucose," J.Biol.Chem. 153: 375
12. Sharangi, A.B., 2011. In search of allelopathy from common alliaceae crops for managing weeds in coriander: an overview. Int. J. Agric. Res.,6:209-217
13. Thapa, U., 1999. Nutrient management of some leaf vegetables. Ph.D. Thesis, Bidhan Chandra KrishiViswavidyalaya, Mohanpur, Nadia, West Bengal.