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EFFECT OF STORAGE ON THE VITAMIN C CONTENT OF SOME MEDICINAL PLANTS.

KEYWORDS

Medicinal plants, Environmental botany, Vitamin C content, Storage.

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ABSTRACT Herbal medicines are known to mankind as one of the oldest form of healthcare. The leaves of some plants such as *Ocimum sanctum* L., *Ocimum basilicum* L., *Coriandrum sativum* L, *Mentha viridis* L. contain Vitamin C content which is known to be responsible for curing cardiovascular diseases, prenatal health problems, eye disease, skin wrinkling and protection against immune system deficiencies. These medicinal plants are highly valued for their medicinal and aromatic properties in the traditional as well as modern pharmacological system. In the present work, the effect of storage and seasons on the vitamin C content of four, very common medicinaly important plants i.e, *Ocimum sanctum* L., *Ocimum basilicum* L., *Coriandrum sativum* L. And *mentha viridis*L. was studied. The vitamin C content in all these plants studied was found to be maximum during winter season.

Introduction:-

Herbal medicines are a major component in all Ayurvedic, homeopathic, naturopathic, traditional oriental, and Native American Indian medicine.

Vitamin C is a water-soluble vitamin that is necessary for normal growth and development. The balance amounts of the vitamin leave the body through the urine. That means a continuous supply of such vitamins is needed in our diet.

Vitamin C is one of many antioxidants. Antioxidants are nutrients that block some of the damage caused by free radicals. Free radicals may play a role in cancer, heart disease, and conditions like arthritis.

Vitamin C is one of the safest and most effective nutrients. The benefits of vitamin C may include protection against immune system deficiencies, cardiovascular disease, prenatal health problems, eye disease, and skin wrinkling.

cimum sanctum L. (Tulsi) plant has a lot of significance for mankind, it is considered to be antibacterial, antifungal, antispasmodic, carminative, diaphoretic, digestive, expectorant, stimulant, stomachic, refrigerant etc.

Mentha viridis L. also known as Mint has one of the highest antioxidant properties of any food. It contains small amounts of potassium, magnesium, calcium, phosphorus, vitamin C and vitamin A.

Coriandrum sativum L. has proved its worth as an important medicinal herb as studied by different herbal scientists the herb has a great importance in treating disorders such as diabetes, increased cholesterol, arteries blockage leading to high blood pressure, ulcers, urinary tract problems, anti-anxiety, anti-bacterial and anemia prevention, skin problems, swelling prevention, anti-osteoporosis, liver diseases etc.

Due to the abundant medicinal uses of these plants it was thought necessary to find out whether storage periods and seasons have an effect on the medicinal properties of these plants. Thus in the present investigation, the effect of storage and seasons on the vitamin c content of four, very common medicinaly important plants i.e, *Ocimum sanctum* L., *Ocimum basilicum*L., *Coriandrum sativum*L. And*mentha viridis*L. was studied.

Material and Methods:-

Four most commonly used medicinal plants that is*Ocimum sanctum* L., *Ocimum basilicum* L, *Coriandrum sativum* L, *Mentha viridis* L. were collected from Mumbai during the rainy and winter seasons and they were analysed for Vitamin C content.

I] Vitamin C estimation

Vitamin C content was estimated from these four plants collected during rainy and winter season.

by the DCPIP titration method

II] Storage period

The leaves of the above mentioned four plants were collected and they were analyzed for vitamin C content after storing in the refrigerator and room temperature for varying periods i.e., after 1 day, 3 days and 6 days. The experiments were run in triplicate.

Observation:-

It was observed that the maximum amount of vitamin C content was observed during winter season compared to rainy season. Among all the four plants, Minimum amount was observed in *Ocimum sanctum* L. in fresh sample i.e. without any storage. (Table 1)

When the plants were stored at room temperature for 1 day it was observed that maximum amount of vitamin C was found in *Menthe viridis* L. (10.4 mgs/gm) , *Ocimum sanctum* L. (9.2 mgs/gm) and *Ocimumbasilicum* L. (8 mgs/gm). As the storage period goes on increasing vitamin C content goes on decreasing. (Table 2)

When the plants were stored in refrigerator for same period of time. Maximum amount of vitamin C was observed in the plants stored for 1 day i.e in *Ocimum basilicum* L. and *Mentha viridis* L. (Table 3)

It was observed that minimum amount of vitamin C was observed during rainy season. Among all the four plant maximum amount of vitamin C content was found in the plants of *Ocimum basilicum* L. (18.4 mgs/gm), *Mentha viridis* L. (16mgs/gm) and *Coriandrumsativum* L.(16 mgs/gm) and minimum amount of vitamin C content was observed in *Ocimum sanctum* L. (Table 4)

When the plants were stored at room temperature for 1 day, 3days and 6 days, the maximum amount of vitamin C content was observed in the plants stored for 1 day i.e, in *Ocimum basilicum* L., *Mentha viridis* L. and *Coriandrum sativum*. As the storage period goes on increasing the vitamin C content goes on decreasing. (table 5)

When the plants were stored in refrigerator for 1 day. It was found that maximum amount of vitamin C was observed in *Ocimum basilicum* L. (6.4 mg/gm) and minimum amount was observed in *Ocimum sanctum* L., *Mentha viridis*L. and*Coriandrumsativum* L. (4

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mg/gm). When the plants was stored in refrigerator for 3 days and 6 days the amount of vitamin C content goes on deceasing. (Table 6)

Table 1: Vitamin C content in the plants collected fresh (winter season)

Plant selected	Vit C in mg/gm
***Ocimum sanctum* L.**	16±6.92
***Ocimum basilicum*L.**	20±4.61
***Mentha viridis*L.**	20±4.61
***Coriandrum sativum*L.**	20±4.61

***Values given are mean ± SD**

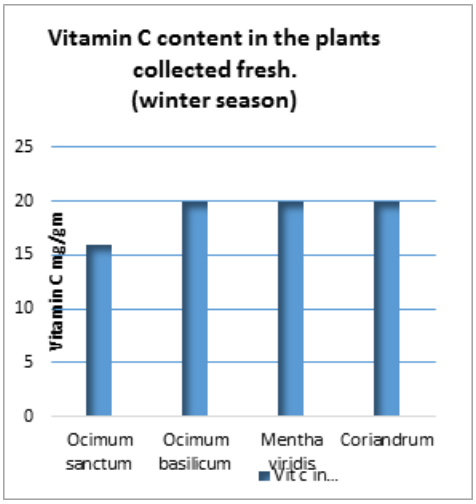

Table 2: Effect of storage period on vitamin C in the plants stored at room temperature (winter season).

Plant selected	Day 1	Day 3	Day 6
Ocimum sanctum L.	9.2±6.11	6.4±4.61	4±0.02
*Ocimumbasilicum*L.	8±4.09	8±4.09	4±0.09
*Menthaviridis*L.	10.4±8.32	8±4.10	4±0.09
*Coriandrumsativum*L.	4±0.01	4±0.12	4±0.01

***Values given are mean ± SD**

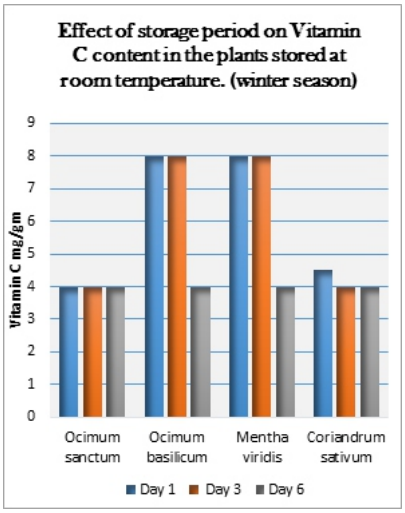

Table 3: Effect of storage period on vitamin C content in the plants stored in refrigerator

(winter season).

Plants selected	Day 1	Day 3	Day 6
Ocimum sanctum L.	6.4±2.30	5.2±2.30	4±0.02
Ocimumbasilicum L.	8±4.01	4±0.10	4±0.03
Menthaviridis L.	8±4.01	8±4.01	4±0.02
Coriandrumsativum L.	4±0.10	4±0.01	4±0.01

*Values given are mean ± SD

Table 4: Vitamin C content in plants collected fresh (rainy season).

Plants selected	Vit. C in mg/gm
***Ocimum sanctum* L.**	12±4
***Ocimumbasilicum*L.**	18.4±10.06
***Menthaviridis*L.**	16±6.92
***Coriandrumsativum*L.**	16±2.30

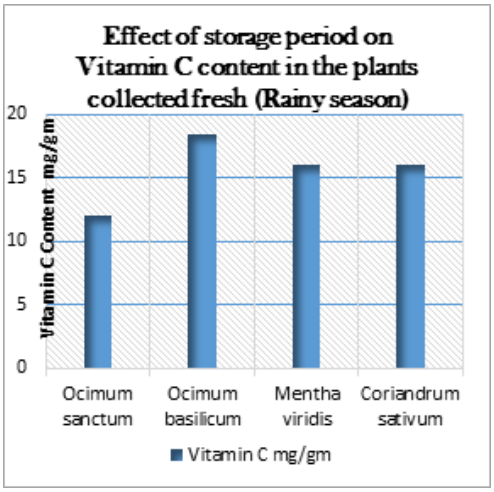

Table 5.Effect of storage period on Vitamin C content in the plants stored at room temperature (Rainy season).

Plants selected	DAY 1	DAY 3	DAY 6
***Ocimum sanctum* L.**	4±0.01	4±0.02	4±0.02
***Ocimumbisilicum*L.**	8±4.21	4±0.01	4±0.01
***Menthaviridis*L.**	8±4.01	4±0.01	4±0.01
***Coriandrumsativum*L.**	8±4.02	4±0.01	4±0.01

***Values given are mean ± SD**

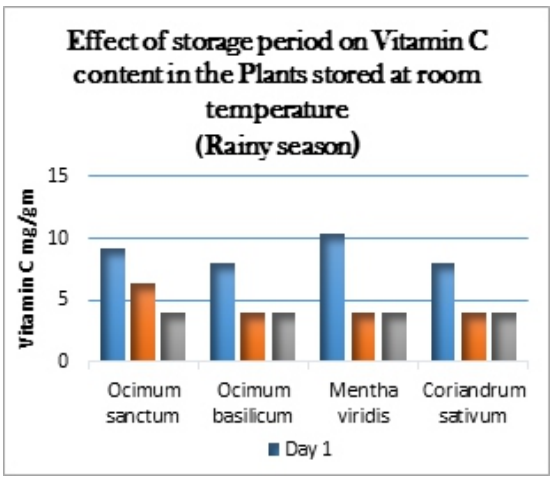

Table 6.Effect of storage period on vitamin C in the plants stored in refrigerator (Rainy season).

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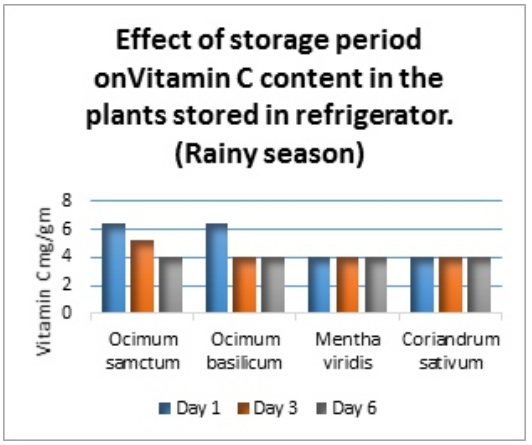
Plants selected	Day 1	Day 3	Day 6
***Ocimum sanctum* L.**	4±0.01	4±0.01	4±0.02
***Ocimumbisilicum*L.**	6.4±4	4±0.01	4±0.02
***Menthaviridis*L.**	4±8.32	4±8.32	4±0.01
***Coriandrumsativum*L.**	4±2.30	4±0.01	4±0.02

*Values given are mean ± SD

Result and discussions:-

Vitamin C or L-ascorbic acid, or simply ascorbate is an essential nutrient for humans and certain other animal species. Vitamin C is a cofactor in at least eight enzymatic reactions, including several collagen synthesis reactions that, when dysfunctional, cause the most severe symptoms of scurvy. In animals, these reactions are especially important in wound-healing and in preventing bleeding from capillaries.



In the present work it was observed that the vitamin C content in all the plants studied was more during winter season as compared to the Vitamin C content in the plants observed during rainy season. (Table 1,2,3,4,5 and 6). JethmalaniMegha (2014) has reported higher amount of Vitamin C content in the plants of *Ocimum sanctum* collected from kerala compared to plants collected from Maharashtra. She has also observed that the maximum amount of Vitamin C was observed in the plants collected during winter season.

Carol Reiss (1993) has reported higher Vitamin C content in cabbage placed in cold water as compared to the Vitamin C content of cabbage placed in boiling water. He stated that when cabbage was placed in cold water, and the temperature was slowly raised, the total amount of Vitamin C decreased as the temperature rises. In the present investigation also, the Vitamin C content was found to be more during winter season when the temperature is much lower.

Reuther and Nauer (1972) showed that 'Frost Satsuma' mandarins contained more vitamin C when grown under cool temperatures (20–22°C day, 11–13°C night) than hot temperatures (30– 35°C day, 20–25°C night). In the present work, Vitamin C content was observed to be more in plants stored at room temperature as compared to the plants stored in refrigerator.

In present work it was also observed that the maximum amount of Vitamin C content was more in winter season. Seung K. Lee and Adel K. (2000) reported Grapefruits grown in coastal areas of California generally contain more vitamin C than fruit grown in desert areas of California and Arizona.

It was observed that the maximum amount of Vitamin C content was observed in the plants of *Ocimum sanctum* L., *Ocimumbasilicum*L., *Menthaviridis* L. and *Coriandrumsativum* L. collected fresh than in the plants after storage. Seung K. Lee and Adel K. have also Stated that freshly harvested fruits and vegetables contain more vitamin C than those held in storage. Temperature management is the most important tool to extend shelf-life and maintain quality of fresh fruits and vegetables.

Zepplin and Elvehjein (1944) found that leafy vegetables held at 6°C lost 10% of their AA content in 6 days while those held at room temperature lost 20% in only 2 days. In the present work as the storage period increase the Vitamin C content of all the plants studied decreased. Wu et al. (1992) found that L-ascorbic acid (AA) decreased rapidly in green beans kept at 5°c after 3 days, but remained stable in broccoli. Esteve et al. (1995) showed that AA concentration in fresh green asparagus stored at 4°c increased 2 days after harvest. Generally, fruits and vegetables show a gradual decrease in AA content as the storage temperature or duration increases (Adisa, 1986).the iron content in the fruits of *phylanthus emblica* showed a decrease with storage under different conditions(Gadekar2016)

Conclusion:-

The maximum amount of Vitamin C content was found in winter season as compared to rainy season in the plants of *Ocimum sanctum* L., *Ocimumbasilicum*L. and *Menthaviridis* L. and the least amount of Vitamin C was observed in *Coriandrum sativum* L. In all the plants studied storage period had an adverse effect on Vitamin C content. As the storage period in refrigerator increased the Vitamin C content decreased. The vitamin C content is best preserved in room temperature. These aspects can be thus utilized while preparing herbal medicines using these plants.

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