Short Communication

STABILITY OF VITAMIN C OF IRRADIATED ONIONS *ALLIUM CEPA. L* DURING STORAGE

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SUMMARY: The stability of vitamin C (ascorbic acid) in onions irradiated with three different doses of γ rays and stored at two different temperatures was studied.

Gamma radiation of bulbs with 0.10; 0.15 and 0.31 KGy causes losses of 10%, 13% and 20% of vitamin C contents respectively.

During storage vitamin C decreased over 12 weeks in both control and irradiated bulbs and at both temperatures. After 12 weeks and till the end of storage period, vitamin C content increased in each share but the final content was lower than the initial. In all cases, no differences were noted in evolution of vitamin C at each temperature and in both untreated and treated bulbs during storage.

Key Words: Irradiation, Vitamin C, Storage, Allium cepa.

INTRODUCTION

Several investigations have been carried out throughout the world on the application of ionizing radiation for sprout inhibition of onions grown under varying agro-climatic conditions. Results have shown that treated bulbs could be stored for several months without heavy spoilage (11,12).

Storage conditions are important factors in determining the storage behaviour of onions (5). Onions are generally consumed for their flavours but their nutritive value has been appreciated only recently (9).

Ascorbic acid constitutes a major vitamin in the bulb (14) and its degradation occurs during several treatments such as heating, freezing (4,5).

Molco and Padova (7) have shown that the content of vitamin C in onions irradiated at 0.07 KGy and stored at ambient temperature was essentially the same as that of untreated bulbs one day after irradiation and during the next 5 months storage period.

Murray (8) found that onions treated with 0.02 to 0.06 KGy in the presence of air resulted in some conversion of ascorbic acid to dehydroascorbic acid without significantly affecting the nutritional value. The purpose of this study is to elucidate the rate of vitamin C destruction as a function of both irradiation doses and temperatures during long term storage.

MATERIALS AND METHODS

Onion *Allium* cepa.L var: Rouge Amposta, harvested in August and dried in the field are examined.

Irradiation was carried out at the Cen Algiers. Bulbs were treated with 0.10 and 0.30 KGy of gamma radiation dose from a Co 60 source at room temperature.

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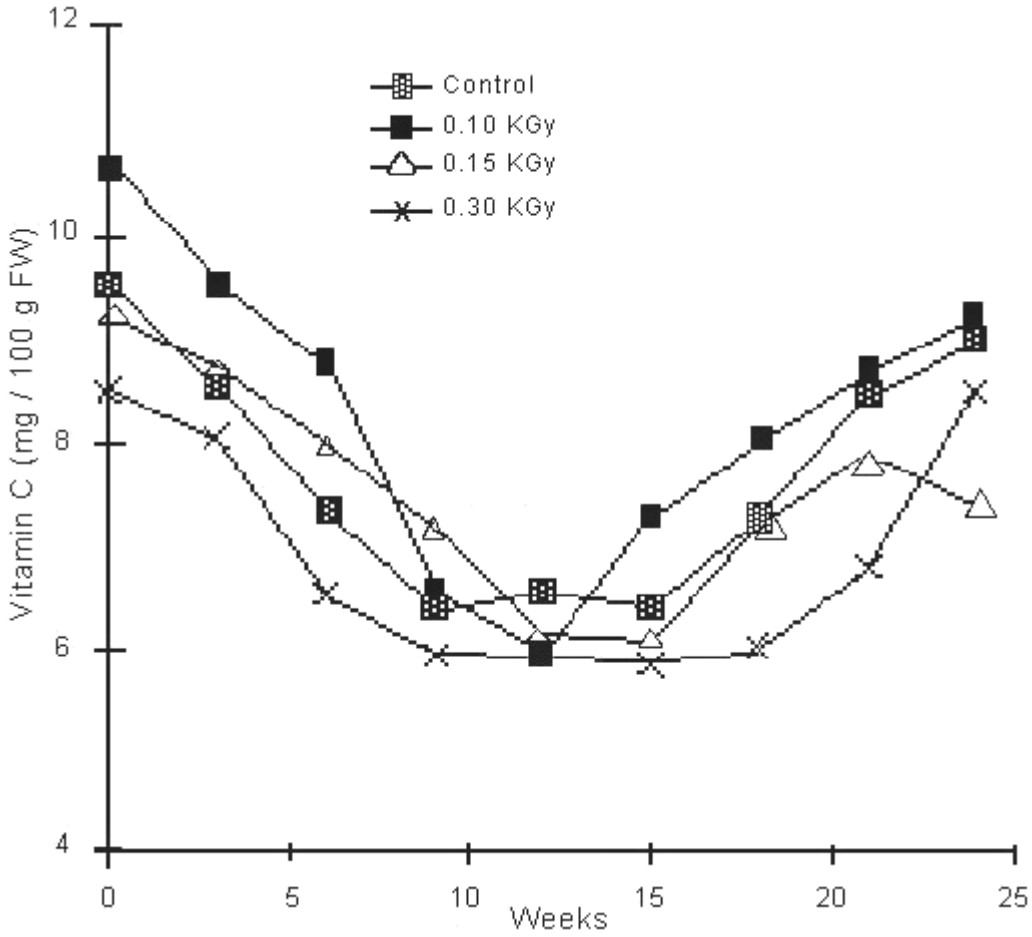
Figure 1: Evolution of vitamin C in irradiated onions during storage at 18°C.



Storage: the treated onions were stored in ambient air temperature (18°C, HR 75%) and refrigerated room (4°C, HR 75%).

Extraction: Approximately 25 g of dried onions tissues were weighted and homogenized for 2 mins in 100 ml of aqueous 3% metaphosphoric acid solution.

The slurry was centrifuged for 10 mins at 1100 x g and the supernatant filtered through Whatman n°4 filter paper. The solution was used for vitamin C analysis.

Vitamin C determination: AA was determined by the 2.6 dichlorophenol indophenol volumetric method (1).

RESULTS AND DISCUSSION

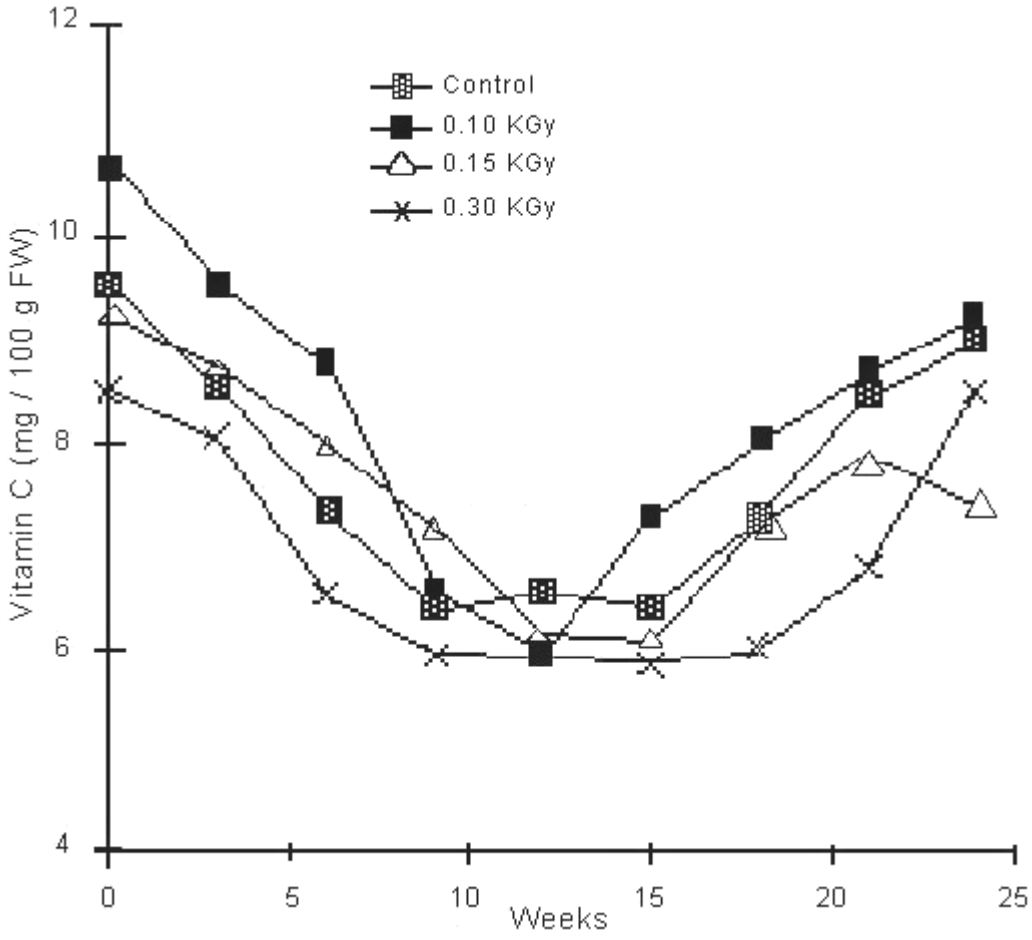
Table 1 shows vitamin C contents in control and irradiated onions. Fresh bulbs contained 10.64 mg of vitamin C per gram of fresh weight. Immediately after irradiation, onions showed a loss in vitamin C yield proportional to the dose of ionizing treatment. These losses reached 20% at dose of 0.3 KGy.

Ghods *et al.* (2) reported similar results after irradiation of onions, 30% of vitamin C was lost with 0.03 KGy treatment. Lewis and Mathur (5) reported no significant difference after irradiation of bulbs.

Table 1: Effect of Gamma Radiation on vitamin C content of onions.

	Control	0.1 KGy	0.15 KGy	0.3 KGy
Vitamin C mg/100g F.W	1064	9.50	9.25	8.51
Losses (%)	-	10	13	20

Figure 2: Evolution of vitamin C in irradiated onions during storage at 4°C.



During storage, level of vitamin C content decreased over 12 weeks, but after the first three months vitamin C increased in both control and irradiated bulbs and at both temperatures (Figure 1 and 2).

The decreasing is due to the lability of vitamin C.

Whereas the increase of vitamin C in the bulbs is due mostly to dessication of the bulbs' tissues during sprouting, and secondary to the possible reconversion of a part of dehydroascorbic acid to ascorbic acid by the present sulfhydril compounds.

Several authors noted a decrease in vitamin C in both stored irradiated or unirradiated onions and/or over vegetable crops (5,9,10,13). Increase in vitamin C content in onions after two months of storage under optimal conditions was reported by Matkovics (6).

CONCLUSION

Gamma radiation causes a notable damage on vitamin C of fresh onion bulbs but the changes which occured during storage of irradiated bulbs were similar to those of the non irradiated bulbs at both temperatures: 18°C and 4°C.

It seems that stability and evolution of the vitamin C during storage in onions does not depend on the treatment and/or storage conditions but on other factors such as; reaction kinetics (3) and water activity (4).

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