RESEARCH ARTICLE

FOOD SCIENCE RESEARCH JOURNAL;
Volume 2 Issue 2
(October, 2011) Page : 161-163

Received : June, 2011; Revised: July, 2011; Accepted : September, 2011

Identifying loses of vitamin-C and moisture content during storage of leafy vegetables

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ABSTRACT

Leafy vegetables are an important source of vitamin 'C'. Considerable losses may occur during storage, as vitamin 'C' is relatively unstable and easily oxidized. The vegetables are required to be kept in cool temperature to retain vitamin 'C'. The investigation was undertaken with an objective to find out losses in vitamin 'C'. The moisture content of leafy vegetables was undertaken when vegetables were stored in cooling devices for one week. Investigation was undertaken in College of Home Science, Marathwada Agricultural University, Parbhani. For this investigation cooling deveice was developed. It was observed that maximum losses of moisture content and vitamin C content occurred in spinach and coriander stored in control conditions. The minimum loss of moisture content and vitamin C was observed when spinach and coriander leaves were stored in cooling devices (models) up to seven days storage period.

Yeole, S.N., Harode, S.M. and Khogare, D.T. (2011). Identifying loses of vitamin-C and moisture content during storage of leafy vegetables, *Food Sci. Res. J.,* **2** (2) : 161-163.

Key Words : Cooling devices, Vitamin C, Moisture content

INTRODUCTION

Leafy vegetables are an important source of vitamin 'C' in Indian diets. Considerable loss of vitamin 'C', which is relatively unstable and easily oxidized, was observed during storage of vegetables. They need to be kept in cool temperature. Green leafy vegetables lose more than 50 per cent vitamin C on storage (Ranganathan, 1996).

Moisture is a major factor contributing to the loss o vitamin 'C'. There is positive relationship between retention of vitamin 'C' and moisture content in green leafy vegetables stored in refrigerator. This was observed during the study of effect of house hold storage methods on ascorbic acid level in relation moisture content in green leafy vegetables (Varghese and Umapathy, 1997).

Nutrient losses in most of the leafy vegetables can be minimized if these are stored in just above freezing temperature. It is also necessary to find out some cheap cooling device for household vegetable storage using inexpensive technique of evaporative cooling to reduce the temperature and build up humidity to control the transpiration losses. The investigation was undertaken with an objective to find out losses in vitamin 'C' and moisture content of leafy vegetables was undertaken when vegetables were stored in cooling devices for one week.

METHODOLOGY

Present study was conducted in cool and well ventilated room for seven days in College of Home Science, Marathwada Agricultural University, Parbhani (peak summer).

Development of cooling devices :

A simple technique regarding the temperature and building up the humidity to control the transpiration losses was used to develop the cooling devices. Based on the principle of evaporative cooling, five different models were made using locally available materials. The basic frame of square prism shape having 40 x 70 sq cm area was made from bamboo sticks. Water holding trays of 18 gauge aluminum sheet were made of size 41 x 41 cm with a depth of 5 cms. At the bottom of the tray, 4 mm diameter holes were drilled adjacent to exterior material of the frame. These trays were placed on top of basic frame. Exterior material of sides each of 40 x 60 cm size were prepared from gunny cloth (A), gunny bag with charcoal (B), Khus curtains (C), gunny bag with spagum moss (D) and desert bag cloth (E).

Vegetable selection :

Two leafy vegetables such as spinach (*Spinacia*

oleracea) and coriander leaves (*Coriandrum sutisum*) were selected. The selected vegetables were procured from the local vegetable market of Parbhani. To avoid variation in quality, the purchasing was done in a lot in fresh condition and in quantity more than required. Three lots each of 350 g spinach and 50 g of coriander leaves were weighed separately using single pan balance. One control sample kept in room and another sample were kept in cooling devices. Thus in each of the device three replications of each of the vegetable in each condition were maintained.

Percentage of moisture content in the vegetables was determined daily following air oven method of A.O.A.C. Per cent moisture content of the vegetable was calculated by using the formula :

$$\text{Per cent moisture content} = \frac{W_1 - W_2}{W_1} \times 100$$

where,

W_1= Weight of sample before drying.

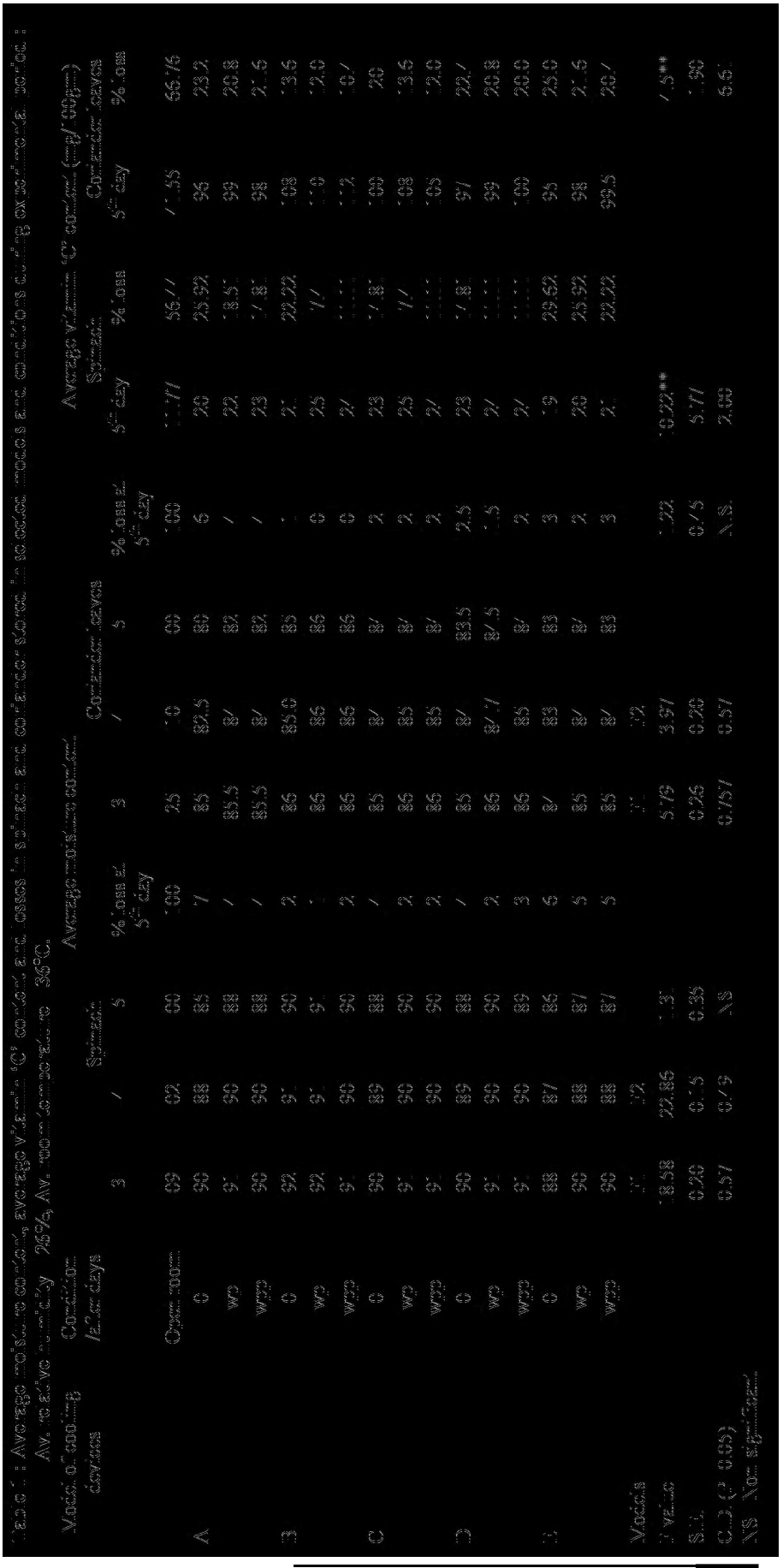
W_2 = Weight of sample after drying.

Vitamin 'C' content in vegetables:

Ascorbic acid content of vegetables was estimated by 2-6 dichloro-indophenol method. Statistical analysis of the data was carried out by applying Factorial Randomized Block Design.

OBSERVATIONS AND ASSESSMENT

As viewed from the Table, at the end of 3rd day moisture losses were observed 91 to 93 per cent in control sample. Minimum moisture losses were observed in all the models and conditions. Among all the five models minimum moisture loss was observed in model B *i.e.* 1 to 2 per cent moisture



loss in spinach and 1 per cent in coriander leaves after 5th day. Minimum moisture loss was noted in unperforated polythene bags.

Statistically difference in moisture content loss among the models and conditions were highly significant. Moisture losses in coriander leaves were maximum in controlled condition. The minimum loss moisture was observed in model B and maximum to 6 per cent in model A. Moisture content was retained to maximum in wrapped polythene condition in all the models after fifth days of storage. Further storage in open treatment accompanied more losses than perforated and non-perforated. Statistically average moisture losses among the models and the conditions were highly significant.

The average loss of vitamin C content of spinach and coriander leaves is delineated in Table 1. As evident in control sample, models and conditions, the initial quantity of vitamin 'C' was lowered down in 5th day of experiment. Comparatively maximum losses were observed in model E *i.e.* 22.22 to 29.62 per cent followed by a lower percentages were noted in B, C and D models. In all models, average vitamin 'C' losses were more in spinach stored in open condition.

The statistical analysis confirmed the variations of vitamin 'C' among models as highly significant in spinach stored in different models.

In case of coriander leaves, the average vitamin 'C' losses were minimum in model B which was 10.4 to 13.6 per cent at the end of 5th day where as in the models E and A, vitamin C content was reduced to 23.20 to 25.00 per cent, respectively. Least vitamin C losses were observed to 10.4 and 12.00 per cent in model B and C when coriander wrapped in polythene with perforation. The average loss in vitamin C in different models were statistically significant. It is concluded that minimum vitamin C losses occurred in the coriander stored in wrapped polythene with perforation in all the models where as it was lowest in model B.

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