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Research Paper :

Evaluation of keeping quality of spinach in low cost cooling devices

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ABSTRACT

The present study was undertaken for testing the keeping quality of spinach in low cost cooling devices. Five models of low cost cooling devices were compared in terms of temperature, humidity and keeping quality of the spinach stored in three different conditions. One was open condition (C_1), second was perforated polythene bags (C_2) and third was unperforated polythene bags (C_3). The results indicated that considering temperature, humidity and keeping quality model 'D' (covered with gunny bag filled with charcoal) is better to store spinach. Among the storage conditions (C_2) condition (perforated polythene bag) was found to be satisfactory in all models. Also, it was found that moisture and vitamin 'C' retention was more in model 'D' with 'C_2' condition (perforated polythene bags).

Key words : Low cost cooling device, Keeping quality, Spinack

The importance of vegetables in the diet is well known. Vegetables and fruits are the only natural sources of protective foods, as they supply nutrients, vitamins and minerals. Vegetables contain most of the nutrients that are essential for food health.

Vegetable are perishable products. They have high moisture content and they are tender in nature. They continue to respire after they are harvested. The freshness of the vegetables as observed through their firm, crisp texture and bright colour, is lost with the loss of moisture, which causes vegetables to wilt and become limp. Therefore, the process of respiration must be slowed during storage by control of temperature and relative humidity (Mudambi and Rajgopal, 1987).

Best storage conditions for storage of vegetables and fruits are provided in electric refrigerator by control of temperature and humidity which retard natural respiration and microbial spoilage (Medved, 1986). However, refrigerator is costly and is not within the reach of low income urban and rural families. The low-income families practice the vegetable storage by wrapping in the gunny and other cloth material. Wrapping certain vegetables and fruits in polythene or cellophane or coating them with wax improves the keeping quality (Begum, 1989). Wrapping vegetables in perforated polythene bag is advised to have aeration and better keeping quality.

Therefore, an inexpensive device that will provide lowering down of temperature to create cooling effect storage of vegetables is a need for low-income families. The investivations were carried out with the following objectives : to find out the effect of different cooling materials used in the devices on the keeping quality of the spinach and to estimate the moisture content and vitamin 'C' content of the spinach stored in the selected devices and stored in different conditions.

METHODOLOGY

Five models of the low cost cooling devices were selected for the study. The low cost cooling devices were rack made of iron rods with shelves, placed in a galvanized iron tray with water. One galvanized iron tray with water was kept at the top of the rack having holes from all four sides. The rope was inserted in the holes for slow but continuous flow of the water on the gunny bag to keep it moist. The height of the device was 3 feet. The racks were covered with the different materials from all the four sides. Model 'A' was covered with khas material, model 'B' was covered with desert bag cloth, model 'C' was covered with thin gunny bag filled with moss. Model 'D' was covered with thin gunny bag with charcoal and model 'E' was covered with thick gunny bag.

All five models were compared in terms of temperature, humidity and keeping quality of the spinach stored in 3 different conditions; one was open condition (C_1), second was perforated polythene bags (C_2) and third was imperforated polythene bags (C_3).

Fresh spinach (350 g) was cleaned and stored in each low cost cooling device using 3 different containers. The keeping quality was adjudged by evaluating the physical characteristics such as colour, aroma, texture and overall freshness on 5 point scale by a panel of 10 judges. Data obtained were evaluated by using variance

test. The experiment was conducted for 5 days.

FINDINGS AND DISCUSSION

Average room temperature ranged between 26 to 27^{0}C. Average temperature observed in model 'D' was the lowest (16.15 to 17^{0}C) and temperature in 'A', 'B', 'C' and 'E' models were in between 17.69^{0}C to 19.98^{0}C during experimental period. Average humidity ranged between 30-36 per cent during the experiment period. Humidity in the model 'D' indicated 84 to 86 per cent and in model 'A' , 'B', 'C' and 'E' it was in between 80 to 85 per cent during experiment period.

Data in Table 1 indicate the mean scores for the selected characters on 5th day for spinach. As seen from the data, model 'D' has obtained maximum scores for selected characters such as aroma, texture and overall

Table 1 : Means for selected characters on 5th day for spinach stored in selected models and conditions

Models	Condition	Characters			
		Colour	Aroma	Texture	Over all freshness
A	C_1	3.66	4.30	3.46	2.00
	C_2	4.56	3.53	4.10	4.46
	C_3	4.26	3.73	4.03	4.10
B	C_1	3.90	4.40	3.66	3.86
	C_2	4.60	3.56	4.20	4.50
	C_3	4.50	3.70	4.08	4.33
C	C_1	4.20	47.30	3.90	4.03
	C_2	4.63	3.70	4.43	4.58
	C_3	4.36	3.83	4.40	4.43
D	C_1	4.53	4.40	4.06	4.06
	C_2	4.60	3.83	4.50	4.60
	C_3	4.63	4.10	4.46	4.43
E	C_1	2.70	4.23	2.03	1.83
	C_2	3.63	3.66	3.90	4.26
	C_3	3.93	3.76	3.73	4.00
Means of condition	C_1	3.80	4.32	3.42	3.16
	C_2	4.40	3.66	4.22	4.48
	C_3	4.34	3.82	4.14	4.26
F values of models		46.56**	1.04 NS	60.35**	74.63**
SE of models		0.06	---	0.05	0.05
CD of models		---	---	0.16	0.15

Table 2 : Average moisture content and vitamin 'C' content (g) of spinach stored in selected models and conditions on initial and 5th day

Mode I	Initial moisture content	Conditions			Initial vitamin 'C' content	Condition		
		C_1	C_2	C_3		C_1	C_2	C_3
A	87.48	26.30	31.23	30.10	113.16	56.66	63.23	60.83
	(100%)	(30.06)	(35.69)	(34.40)		(50.07)	(55.87)	(53.75)
B	87.48	30.33	33.76	31.46	113.16	64.33	69.16	68.16
	(100%)	(34.67)	(38.59)	(35.96)		(56.84)	(61.11)	(60.23)
C	87.48	32.76	36.73	34.16	113.16	66.26	72.76	70.01
	(100%)	(37.44)	(41.98)	(39.04)		(58.55)	(64.29)	(61.86)
D	87.48	33.96	37.26	34.46	113.16	72.50	74.66	73.70
	(100%)	(38.82)	(45.59)	(39.39)		(64.06)	(65.97)	(65.09)
E	87.48	23.13	26.43	26.10	113.16	52.16	59.00	59.00
	(100%)	(26.44)	(29.83)	(29.83)		(46.09)	(52.13)	(52.13)

freshness for spinach, followed by model 'C', model 'B', model 'A' and model 'E'. For the storage condition perforated polythene bag (C_2) obtained maximum mean scores followed by 'C_3' condition and 'C_1' condition.

Model 'D' obtained maximum scores for colour (4.60), texture (4.50) and overall freshness (4.60) for spinach in 'C_2' condition. Model 'D' obtained maximum scores for aroma (4.40) in 'C_1' condition.

Data in Table 2 are about average moisture and vitamin 'C' content of spinach stored in selected models and conditions on initial and 5th day of experiment. It is evident that 87.48 per cent initial moisture content of spinach had been reduced in all the models and conditions. The moisture retention was highest in perforated condition (C_2 condition) in all the models as compared to imperforated (C_3 condition) and open condition (C_1 condition). The maximum moisture retention was model 'D' (38.82 per cent in open condition) and minimum in model 'E' 26.44.

Vitamin 'C' retention in model 'C' and 'D' for all conditions was nearly equal and was highest. Whereas in model 'E', it was lowest. The results are in accordance with the findings of Nandanwar (1999) who reported that low cost cooling device was very good for storing the vegetables *viz.,* tomato, brinjal and ridgegourd etc.

REFERENCES

Begum, R. (1989). *A Text Book of Foods and Nutrition*. Sterling (P.) Ltd., New Delhi (India) pp. 90-132.

Jadhav, A.N. (1997). Designing and testing of low cost cooling device. M.Sc. (Home Science) Thesis, Marathwada Agricultural University, Parbhani (M.S.).

Medved, E. (1986). *Food Preservation and Theory*. Kent State University, New Jersey, pp. 166, 181, 186.

Mudambi, S.R. and Rajagopal, M.V. (1987). *Fundamentals of goods and nutrition.* Wiley Estern Limited, New Delhi (India) pp. 89-96.

Nandanwar, A.K. (1999). Modification of developed low cost cooling device for storage vegetables. M.Sc. Thesis, Marathwada Agricultural University, Parbhani (M.S.).

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