"SHELF-LIFE OF VERMICELLI (RAGI VALUE ADDED PRODUCT) AGAINST *CORCYRA CEPHALONICA* ON DIFFERENT STORAGE STRUCTURE"

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Abstract: Finger millet, *Eleusinecorcana* (L.) is a small millet and quick growing crop, particularly suited to a dry continental climate. Finger millet value added products enhances the bioavailability of nutrients, but also improves the overall nutritional quality of grains. Diversification of diet is necessary to overcome the nutritional situation in the country. As ragi value added products are infested by the storage pests leads to the qualitative and quantitative losses, to overcome this losses, Study was conducted to know the shelf-life of Vermicelli against *Corcyra cephalonica* on different storage structure like cloth bag, polythene cover, mud container, glass container and steel container and observed Vermicelli which is stored in the cloth bag at 30 days recorded less insects that is 3.00 and more at 180 days that is about 52.00 insects was less and Vermicelli stored in steel container at 30 days recorded no insects and at 180 days about 26 insects. Shelflife of of Vermicelli in cloth bag was less, whereas Vermicelli stored in steel container shows longer shelf-life.

Keywords: *C. cephalonica,* Shelf-life, Storage structure, Vermicelli.

Introduction: In india finger millet (*Eleusinecorcana* L.) is popularly known as ragi and few other vernacular names. It is one of the important small millet with quick growing capacity, particularly dry zones of different continents. This is widely grown in India, Africa, srilanka, Malaysia, china and japan. In india finger millet occupies an area of 1387.1 ha with an annual production of 1.89 m.t. The area of finger millet in Karnataka was 833.0 ha and production is 1394.0 tonnes.

Finger millet value added products enhances the bioavailability of nutrients, but also improves the overall nutritional quality of grains. It is a storehouse of digestive enzymes and low molecular weight carbohydrates reduces the water holding capacities of foods. Consequently, the liquid food will be low in dietary bulk but high in nutrient density. Diversification of diet is necessary to overcome the nutritional situations especially in the developing countries like India. More so micronutrient malnutrition is affecting the working capacities and also the serious consequences like growth deficits, child deaths, cognitive development etc.

People are now becoming very health conscious and would like to consume foods containing high fiber, low fat and other protective nutrients. Some of the ragi value added products made from millets contain high fiber content and low fat and expected to find a place among healthy foods. Enrichment of value added products with proteins, vitamins, minerals, micronutrients and other vegetable sources such as pulses and soybeans further increases its nutritive value.

About 15 % of the grains stored after each harvest is believed to be lost due to the ravages of rats, insects, mites and other microbial agents (Walter, 1971). Neelakanthan (1972) claimed that the annual loss of food grains in the Indian godowns as a result of insect infestation was about 5 million tons.

In case of ragi value added product Vermicelli infested by thepest*C.cephalonica* and there by quantitative as well as qualitative losses occur. To safe guard the quality and quantity of Vermicelli, there is a need to manage this pest very effectively in the storage. Hence to manage this pest , study was designed to improve the shelf-life of Vermicelli by identifying a suitable storage structures.

Material and methods: The present investigation was conducted during 2009-2010 at Entomology laboratory of the Project Co- ordination Centre of the All India Co-ordinated Small Millet Improvement Project, University of Agricultural Sciences, Gandhi KrishiVignana Kendra, Bengaluru (AICRP on small millets, UAS, GKVK, Bengaluru).

Two hundred grams of ragi value added product Vermicelli was taken in a different containers such as cloth bag (T1), polythene cover (T2), glass container (T3), mud containers (T4) and steel container (T5). It was replicated four times. These samples were observed at an interval of 30 days to 180 days to assess the pest infestation. The data thus collected in the study was analyzed statistically using CRD two factorial designs.

Results: The Vermicelli stored in cloth bag (T1) infested with *C. cephalonica*at 30 days, recorded 3.00 insects followed by 15.00, 23.00, 31.00, 43.00 and 52.00 insects at 60, 90, 120, 150 and 180 days respectively and differed significantly. While the same produce stored in polythene covers (T2) recorded (2.25) insects at 120 days followed by 12.00 and 23.25 insects at 150 and 180 days respectively, which also differed significantly.

When the produce stored in glass container (T3) recorded 5.25 insects at 180 days and differed significantly at an duration period. Similarly, the produce when stored in mud containers (T4) the *C.*

*cephalonica*incidence was 5.00 at 90 days followed by 16, 22 and 29 insects at 120, 150 and 180 days respectively and differed significantly.

However, the produce stored in steel container (T5) is free from *C. cephalonica*attacktill 150 days. However recorded lower (1.00) incidence at 180 days and differed significantly.

Among the different storage structures, the produce stored in cloth bag (T1) attacked by *C. cephalonica*at 30 days, while in othercontainers, no incidence of insect attack anddiffered significantly. Almost, the similar trendwas observed among the storage structures at60 days after storage. At 90 days cloth bag (T1)recorded the maximum of 23 insects followedby mud container (T4) and differed significantlywhile there was no incidence in othertreatments. Similarly, at 120 days, cloth bag(T1) recorded the maximum (31.00) *C. cephalonica*attack followed by mud container (T4) and polythene cover (T2) and differed significantly. There was no incidence of *C. cephalonica*in glass (T3) and steel (T5). At 150 and 180 days also the produce stored in cloth bag (T1) recorded the maximum number of insects followed by mud container (T4) and polythene cover (T2). There was less incidence in Glass (T3) and steel container (T5) and differed significantly (Table I).

Discussion: Vermicelli stored in cloth bag was infested with *C. cephalonica* at 30 days and gradually increased up to 52.00 insects/sample at 180 days (Fig. 1). While the same produce stored in polythene recorded free from insect infestation till 90 days and recorded the pest infestation up to 23.85 at 180 days; later gradually increased. Similarly the Vermicelli was stored in glass container was free from insect infestation till 120 days and infestation was recorded at 150 days. While the same stored in mud container infested at 90 days and gradually increased to 29.00 insects at 180 days. Further the produce stored in steel container was free from *C. cephalonica* attack till 150 days and later recorded lower incidence at 180 days (Fig. 1).

Among the different storage structures the produce stored in cloth bag was infested by *C. cephalonica* at 30 days while in other containers no insect attack was noticed. Almost similar trend was observed among the storage structure at 60 days after storage. Similarly the produce stored in cloth bag recorded the maximum infestation at 90, 120, 150, and 180 days after storage compared to other storage structures. Further lowest incidence was observed in steel containers followed by glass container, polythene cover and mud container.

The highest infestation was recorded in cloth bag, may be due to the increase in moisture content and oxygen requirement of insect was abundantly met and led to rapid multiplication. The lowest infestation was recorded in steel container, this may be due to the air tightness and low moisture content and that retarded the growth and development. The findings are in close agreement with Dhaliwal*et al.*(1977), ShankarDass (1977), Agrawal*et al.*(1981), Khound and Borah (1984), Sonelal and Srivastava (1985), Singh and Yadav (1995), who have also reported that the steel container is best; further, bag storage was the worst affected storage system.

The present study slightly; differ with Borikar*et al.* (1977), who have observed that the grains stored in kangi were heavily infested with rice weevil, lesser grain borer, pulse beetle and red flour beetle than bagged commodities. However, the infestation of grain moth, flat grain beetle and rice moth was more in bagged produce.

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Insect species	Storage Structure	Duration (days) 0	30	60	90	120	150	180	Mean
C. cephalonica	T_1	0.00 (0.70)	3.00 (1.86)	15.0 (3.93)	23.0 (4.84)	31.0 (5.61)	43.0 (6.59)	52.0 (7.24)	23.85 (4.40)
	T_2	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	2.25 (1.63)	12.0 (3.53)	23.25 (4.87)	5.35 (1.83)
	T_3	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	1.00 (1.18)	5.25 (2.39)	0.89 (1.01)
	T_4	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	5.00 (2.34)	16.00 (4.06)	22.00 (4.74)	29.00 (5.43)	10.28 (2.67)
	T_5	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	1.00 (1.18)	0.14 (0.77)
	Mean	0.00 (0.70)	0.60 (0.93)	3.00 (1.35)	5.60 (1.86)	9.85 (2.54)	15.60 (3.35)	22.10 (4.22)	
		F- value*							
		A		B		AB			
	SEM±	0.13		0.11		0.30			
	CD@P=0.01	0.37		0.31		0.84			

Figures in parenthesis were √x+0.5 transformed values

T_1. Cloth bag T_4. Mud container

T_2. Polythene cover T_5. Steel container

T_3. Glass container

Table I: Shelflife of Vermicelli against *Corcyra cephalonica*

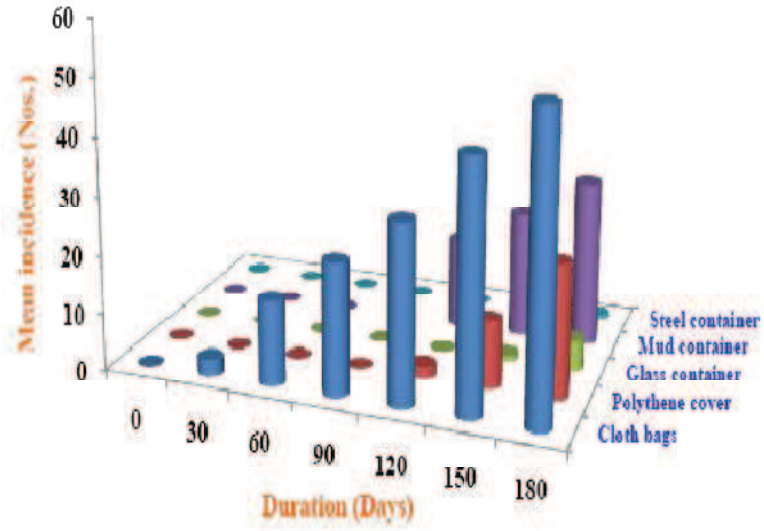

Fig. I. Shelf-life of Vermicelli against *C.cephalonica*on different storage structure

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