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Evaluation of Moisture content in Eco Holi Colours Stored in Hermetic Bag

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ABSTRACT: An important alternative to traditional storage techniques is the hermetic bag. It is airtight and blocks the exchange of moisture with the surroundings. In traditional storage procedures, insect infestation was enhanced by increased moisture, high temperature, and relative humidity. Germination and storage loss can be minimized, and quality and viability can be maintained, using a hermetic bag. A replacement for conventional technologies was the hermetic bag. The stored orange and yellow color was not maintaining the moisture content in control group when compared to experimental group. The results indicated that experimental bag was maintaining 80 per cent of moisture content of colors than control bag, which revealed that, a significant relationship exist among moisture content of colors (Green, Pink and Blue) and efficiency of hermetic bag. The storage of green, pink and blue colors was found suitable for hermetic bag than control bag. It states that except yellow, the four remaining Holi colors were suitable for storing in hermetic bag when compared to normal control bag. These bags were also helpful to store different kinds of seeds/grains and cost-effective to use.

Keywords: Color, color infestation, storage, hermetic bag, insects, moisture content.

INTRODUCTION

Maintenance of shelf life of any product, especially in small industries or units, which does not have much equipment is now a major concern for sellers and as well as producers. Losses during storage are caused due environmental conditions like high temperature and humidity may not only spoil the product but also loses its pigment quality i.e. change in the product color can be observed and sometimes reduction in weight of the product. As NDPIC, PJTSAU has faced such problem in storage of natural holi colors; at it is not good to add the synthetic preservatives to maintain the shelf life of the product and it may later harm the consumers. Hence, it was planned to test hermetic bag by storing these 5 natural holi colors and tests its efficiency. Hermetic bag made insecticide use redundant in grain or any powder forms storage to maintain seed viability. However, Hermetic bags may be adopted widely at farmers' level for ensuring quality and enhancing productivity.

REVIEWS

Dijkink *et al.* (2019) stated that when grains and legumes were stored, pests like insects, rodents, and fungi can harm the product and cause it to lose weight by producing toxins. Hermetic bags guard against a lot of bug invasion. Field tests were used to evaluate the impacts of hermetic bags for the storage of maize on food loss reduction and its impact on net greenhouse gas (GHG) emissions. The economic consequences are studied in many Sub-Saharan African nations. According to statistics from field trials, major product losses normally started to happen after 100 days with standard storage, but they were maintained to a minimum with hermetic bags. The situation was more complicated from an economic perspective; the success of interventions had largely depended on changes in the commodity's seasonal price. After 100 days, using hermetic bags was still more cost-effective than other storage methods for own consumption when quality is less of a concern. The return on investment was quicker when the maize was sold in the market because the quality of the grain was kept adequately by the hermetic bag. For nations with a small seasonal price difference, the investment cannot be recouped.

Williams *et al.* (2017) studied on Purdue Improved Crop Storage (PICS) bags that have been proven to be a successful way for smallholder farmers to manage insects on maize. PICS were put to the test by keeping sorghum seed for six months in Africa, and it was discovered that these bags preserved the seed's weight, germination rate and initial moisture level.

Likhayo *et al.* (2018) studied effects of Moisture and Pest Infestation on Maize Grain Stored in Hermetic

Bags. The study supports the Super Grain IV-RTM bag's value as a storage option. To reduce the origins and growth of insect pests and mould, grains should be processed and sieved to remove waste and broken grains. In polypropylene bags, the initial grain moisture content decreased while it remained unchanged. To prevent deterioration due to mould growth and grain discolouration, moist grains must be dried to a lower level before being stored for a longer period of time. Due to holes produced in the bags by *P. truncatus*, the respiration of grains and insects inside the bags did not significantly contribute to the evolution of carbon dioxide.

Nileshwari *et al.* (2018) carried out the investigation on the effect of hermetic storage on microbial and color quality of green gram and the results found that, the quality characters (microbiological and color analysis) were determined throughout the storage period and the changes in the quality of stored grain were evaluated in terms of these variables. The study also revealed that, when the gunny, white plastic and 200 PP bags were used as the packing material, it was clearly found that, 300 gauge poly propylene bag is better packaging material as far as spoilage due to bacteria was concerned that was followed by white PP-HDPE woven bag and the bags were has highest bacterial load. The maximum delta E value 44.28 color deviation in 200 PP bag and hermetic bag and minimum in delta E value 42.75 color deviation in 300 PP bag was found significant color difference in different type of storage materials.

Vijayalakshmi *et al*. (2020) conducted the study on performance evaluation of grain storage in hermetic bag. The research results states that, the hermetic bag used for storing grains as it protects from insect attack and moisture retention. It had retained the germination value of grains up to 75 % and cooking quality. Throughout the research experiment, it was found that, storing of pigeon pea and other cereal/pulse had stored and preserved in this bag. It had an advantage of occupying less space and used by small to large farm households to store the grains without polluting the environment.

Dalia *et al*. (2021) studied on the conditioning and safe storage of cowpea seeds using plastic hermetic bags and the results revealed that, the conditioning of cowpea seeds with infra-red heating of 882.67W/m^2 and exposure time of 15 min or UVC radiation of 3.538 mW/cm^2 and an exposure time of 40 min and storage seeds in hermetic bags (three or seven layers) was showed the good seed quality, prevention of the insects and microorganisms growth. But, the actual pre-treatment of UV and storage in 7 layers hermetic bag was recommended for the safe storing cowpea seeds with the final quality of seeds without deterioration.

Darby and Caddick (2007) analyzed and field evaluated the harvest bag technology in Australia. It was observed that the daily temperature oscillation decreased with the grain depth, being unnoticeable at 0.4 m from the surface and the relationship between the grain and ambient temperatures were characterized in several field experiments with different grains and under different climates showed that, the bulk grain temperature decreases during storage from summer to winter and increases from winter to summer.

METHODOLOGY

Research Design: Experimental Research Design was adopted to conduct the study.

Procedure: Holi Eco-friendly five colors were taken for the study. Each color was stored in both control and experiment bag for 9 months period. The stored colors were tested for every 3 months using moisture analyzer machine to estimate the moisture percentage in colors.

Selection of tool: T-test and P-values were analyzed,

Data analysis: mean and standard deviation used for data analysis

RESULTS AND DISCUSSION

Estimation of moisture content was done using moisture analyzer. The moisture analysis has different techniques for determining the moisture content of solids, liquids, or gases. Estimation of moisture content is very important to know the shelf life of the product. Total 5 holi colors were selected as sample and stored in control and experiment bag.

Table 1: Moisture content of colors during storage in control and experiment bag.

Colors	Control		Experimental		t-value	P-value
	Mean	S.D.	Mean	S.D.		
Green	14.5	0.002	13.9	0.006	5.5570	***0.011**
Pink	14.86	0.005	14.65	0.003	4.6198	***0.031**
blue	9.4	0.036	11.43	0.002	4.5570	***0.025**
Orange	22.93	0.064	15.18	0.015	0.5494	0.61
Yellow	14.88	0.013	14.41	0.015	0.6132	0.07

The above Table 1 stated that the moisture content of colors both control and experimental group. The finding of the study revealed that, the stored orange and yellow color was not maintaining the moisture content in control group when compared to experimental group. The results indicated that experimental bag was maintaining 80 per cent of moisture content of colors than control bag, which discovered that, a significant relationship between moisture content of colors (Green, Pink and Blue) and efficiency of hermetic bag exists. The storage of green, pink and blue colors was found maintaining moisture in hermetic bag than control bag.

CONCLUSIONS

From the above study it was concluded that, the hermetic bag offered an alternative to conventional technologies. The stored orange and yellow color was not maintaining the moisture content in control group when compared to experimental group. The results indicated that experimental bag was maintaining 80 per

cent of moisture content of colors than control bag, which revealed that, there exist a significant relationship between moisture content of colors (Green, Pink and Blue) and efficiency of hermetic bag. The storage of green, pink and blue colors was found maintaining moisture compared to orange and yellow in hermetic bag than control bag.

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