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# Quality Assessment of peeled garlic cloves packed in Plastic Punnet

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***Abstract:*** *Plastic punnets with different percent perforations i.e., 0 %, 1 %, 2 %, 3 %, 4 % and 5 % were used to pack peeled garlic cloves. Thicknesses of the punnet were taken as 100, 150 and 200 gauge for all percent perforation to assess the quality during storage. The Quality characteristics of garlic cloves such as physiological weight loss, pH, firmness and sensory parameter were determined at ambient and refrigerated storage condition. Overall acceptability was found maximum in treatment* $T_9$ *(150 gauge with 2 % perforation) and minimum in treatment* $T_1$ *(100 gauge with 0 % perforation). The 2 % perforations and 150 gauge thickness showed better result with respect to all quality parameters among different percent perforations and thickness.*

## I. Introduction

Garlic (Allium Sativum L.) is one of the important bulb crops and is used as spice or a condiment all over India. It is full of nutrients including 17 amino acids also, rich source of carbohydrates, protein, phosphorus, energy, sugar, fat and dietary fibre. It contains 84.09 % water, 13.38 % organic matter and 1.53 % inorganic matter (Brondnitz *et.al.,* 1971).Garlic is used for both medicinal as well as culinary purpose. Garlic has different applications as antimicrobial, antitumor, anti-arthritic and hypo-glycemic agent (Abdel-Salam *et al.,* 2008).

The use of perforated packaging system provides an alternative means to equilibrate in- package gas composition and to prevent condensation of water vapours inside the package. Perforation can be used to achieve safe and desired atmospheres inside package (Oloveria *et al.,* 1998).The area of perforations is a major factor controlling the exchange rate of relevant gases through the perforations (Gonzalez *et al.,* 2012).Shelf life of product increases by suitable packaging with proper ventilation. Hence study was undertaken to assess the effect of percent perforation on selected quality attributes of peeled garlic cloves.

## II. Materials and Methods

### Sample Preparation

Fresh garlic (Allium sativum L.) bulbs were procured from local market in the city. After cracking the bulbs, the defective and small were cloves were discarded. The healthy cloves were peeled and cloves free from physical damage were used for further experimentation.

The 50 g sample of fresh peeled garlic cloves were packed in plastic punnet of 100, 150 and 200 gauge thickness with 0 % to 5% perforation. All samples were stored at ambient temperature (35 ± 2 °C) and refrigerated (5 ± 2 °C) storage conditions.

### Quality Characteristics of peeled garlic cloves:

### Physiological loss in weight (PLW):

Sample was weighed accurately at zero day of storage and subsequent days. The difference in weight was considered as PLW (Umesh*et al., 2011*).

**1 % perforations**

**2 % perforations**

**3 % perforations**

**4 % perforations**

**5 % perforations**

**Fresh peeled garlic cloves packed in 1 % to 5% perforations packed in plastic punnet**

**pH:**

The pH was determined by using glass electrode pH meter (Haciseferogullari *et al*., 2005). 10 gm of crushed peeled garlic cloves was taken for measurements.

**Firmness:**

The firmness of peeled garlic clove was evaluated by performing a puncture test using TA-XT plus texture analyzer. A cylindrical flat probe of 2 mm diameter was used to penetrate the convex side of each clove to a depth of 5 mm at a rate of 1 mm/s with a 50 kg load cell (Dronachari *et al*., 2010).

**Sensory Characteristics**:

For sensory evaluation, peeled garlic clove samples packed in plastic punnet of different thickness with different percent perforation were evaluated by standard method (ISI) (1971 a – 1971 b) for various sensory parameter like colour and appearance, texture, aroma. All indexes were measured using a nine point hedonic scale. Overall acceptability of sample was determined from the scores obtained for colour, texture and aroma at regular interval during storage.

## III. Results and Discussion

Different quality characteristics of peeled garlic cloves were observed during ambient and refrigerated storage. It was observed that the effect of different percent perforations of different thickness (gauge) packed in plastic punnet was found significant at 1 % level of significance. Interaction effect between treatments T and storage days D, i.e. (T X D) was also found significant at 1 % level of significance.

**Physiological Loss in Weight, pH and firmness of peeled garlic cloves:**

The effect of different perforations in plastic punnet with 100,150 and 200 (gauge)thickness on physiological weight loss of peeled garlic cloves stored at ambient and condition are presented in Fig.1 and Fig. 2 respectively. It was observed that there was significant difference within the treatments and its interaction. The highest physiological weight loss was found in treatment $T_1$ (100 gauge with 0 % perforation) and lowest for treatment $T_9$ (150 gauge with 2 % perforation) for both storage condition. Overall weight loss varied between 4.44 to 6.80 % during ambient storage and 0.963 to 6.34 % during refrigerated storage. Similar observations for PLW were observed by Umesh*et al*., (2011) for peeled garlic cloves packed in plastic punnet.

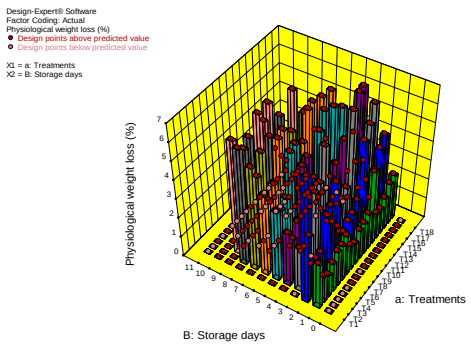


**Fig.1 Effect of percent perforations in plastic punnet of different thickness (gauge) on physiological weight loss of peeled garlic cloves stored at ambient condition**

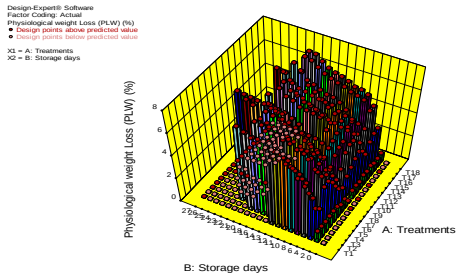


**Fig.2 Effect of percent perforations in plastic punnet of different gauge (thickness) physiological weight loss of peeled garlic cloves stored at refrigerated condition**

The pH and firmness value of garlic cloves packed in plastic punnet with different perforation during ambient and refrigerated storage were analysed and it was found that data differed significantly at 1% level among the treatments. From fig. 3 and Fig 4, it is revealed that the lowest pH was found for treatment $T_9$ (150 gauge with 2 % perforation) and highest for sample $T_1$ (100 gauge with 0 % plastic punnet of 150 gauge with 2 % perforation for both storage conditions. The firmness of all peeled garlic clove samples packed in plastic punnet decreased with increasing storage period.

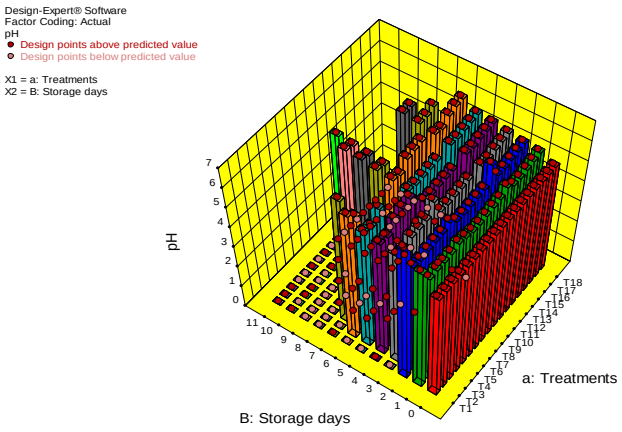


**Fig.3 Effect of percent perforations in plastic punnet of different thickness (gauge) on pH of peeled garlic cloves stored at ambient condition**

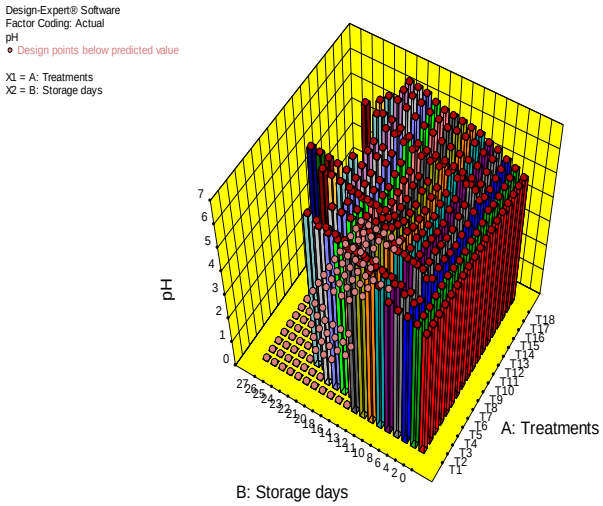


**Fig. 4 Effect of percent perforations in plastic punnet of different thickness (gauge) on pH of peeled garlic cloves stored at refrigerated condition**

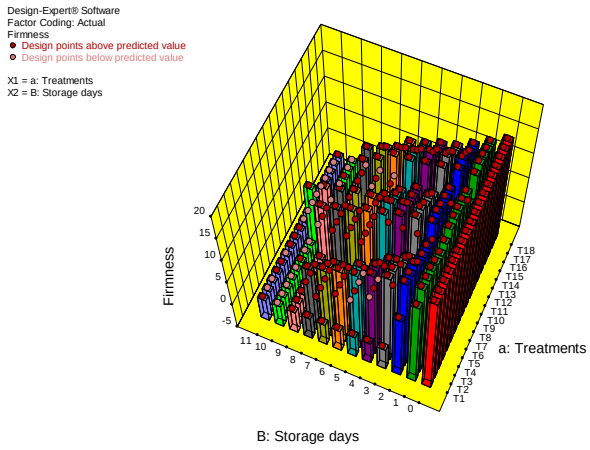


**Fig. 5 Effect of percent perforations in plastic punnet of different thickness (gauge) on firmness of peeled garlic cloves stored at ambient condition**

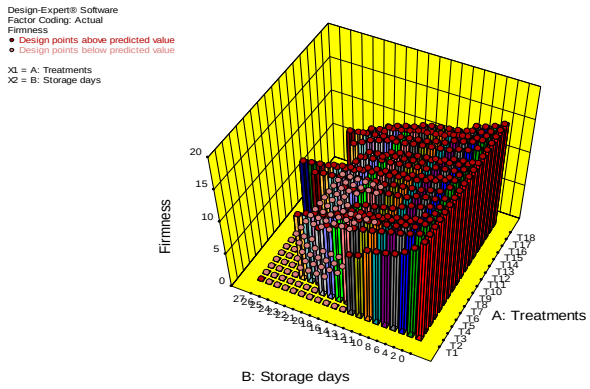


**Fig.6 Effect of percent perforations in plastic punnet of different thickness (gauge) on firmness of peeled garlic cloves stored at refrigerated condition**

**Overall Acceptability:**

The scores obtained for the samples packed in plastic punnet with 0 to 5 % perforations are presented in Fig 7 and 8. It was observed that score for overall acceptability were highest for 2 % perforations in 100, 150 and 200 thick plastic punnet. However 150 gauge plastic punnet showed maximum score as compared to 100 and 200 gauge plastic punnet at both storage condition. The samples of treatment $T_9$ and $T_1$ was not acceptable and discarded by judges after 3$^{rd}$and 11$^{th}$day of storage respectively for ambient storage condition. The sample stored at refrigerated condition was in acceptable condition up to 25 days and discarded by judges after 25$^{th}$ days of storage.

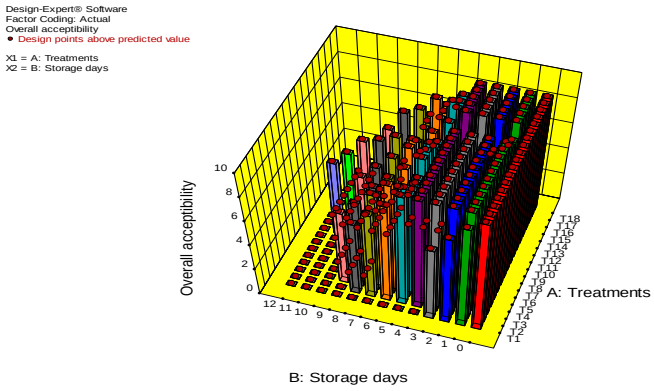


**Fig. 7 Effect of percent perforations in plastic punnet of different thickness (gauge) on overall acceptability (sensory parameter) of peeled garlic cloves stored at ambient condition**

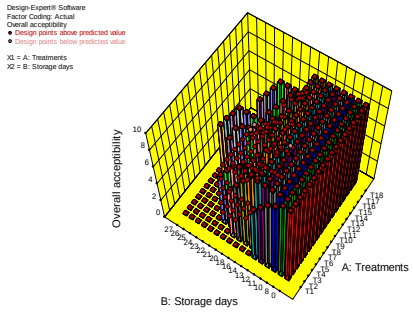


**Fig.8 Effect of percent perforations in plastic punnet of different thickness (gauge) on overall acceptability (sensory parameter) of peeled garlic cloves stored at refrigerated condition**

## IV. Conclusions

Plastic punnet of 150 gauge thickness with 2 % perforations showed highest score for overall acceptability and other quality parameters as compared to 100 and 200 gauge thickness for both ambient and refrigerated storage condition.

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