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A STUDY OF PERCENT WEIGHT LOSS IN CHITOSAN COATING WHOLE GUAVA

VINOD KUMAR P[1], SUCHARITHA K. V[2]

[1]Academic Consultant, Department of Food Technology, Yogi Vemana University, Kadapa

[2]Professor, Department of Home Science, Sri Venkateswara University, Tirupati

ABSTRACT:

The effect of chitosan coating on weight loss in fresh whole guava was investigated. Fresh guava (Psidium guajava L.) was dipped in chitosan solution 0.5% (Sample A) and 0.25% (Sample B) as coatings and air dried at 25°C for 30 min. Then the whole guava fruits were placed in a bowl and wrapped with cling film stored at 6°C. The percent weight loss was analyzed in the coated and controlled with guava samples. Significant ($p<0.05$) decrease in the percent weight loss was observed in the controlled guava sample. Increase in chitosan concentration significantly ($p<0.05$) decreased the percent weight loss in guava samples during the storage period of 30 days. The weight loss was high in control samples compared to coated samples. The coatings prevented respiration in the guava fruits which reduced weight loss and shrinkage. Hence chitosan coatings can be used safely to extend the shelf life guava in ambient Conditions.The present study was to analyze the percent weight loss in fresh whole guava coated with chitosan solution.

KEYWORDS: Chitosan, Shelf Life Guava, Weight loss

INTRODUCTION :

Guava (Psidium guajava L.) is an important subtropical fruit grown widely in tropical and subtropical regions of the world. Edible coatings act as barriers, thereby restricting water transfer and protecting fruit skin from mechanical injuries, as well as sealing small wounds and thus delaying dehydration. Weight loss occurs in fruits due to respiration and by transpiration due to the water vapor pressure difference between the fruit and the atmosphere (low relative humidity). Coating fruits with a film checks moisture loss keeping them fresh during storage. Fruit weight loss is mainly associated with respiration and moisture evaporation through the skin. The rate at which water is lost depends on the water pressure gradient between the fruit tissue and the surrounding atmosphere and the storage temperature. The emerging technology Edible coating is a thin layer of edible material applied on the surface of a food product with the purpose of generating a semi permeable barrier to gases, water vapor and volatile compounds. The ability of edible coatings to preserve the quality of fresh whole guava to extend shelf life and may vary depending on the composition and thickness of the

coating, type of product, variety and maturity, food surface coverage and storage condition. The present study was to analyze the percent weight loss in fresh whole guava was dipped in chitosan solution.

MATERIALS AND METHODOLOGY:

Fresh guava of local breed (Psidium guajava L.) with uniform size shape and moderately ripened fruits were collected from agricultural nursery.

Processing of Raw Materials

Fresh guavas were collected, washed with distilled water and were dipped in chitosan solution and air dried for 30 min at 25^0C. The whole guava fruits were placed in a bowl and over wrapped with cling film stored at 6^0C in a refrigerator for further study.

Preparation of Samples

Sample A

Weigh 5g chitosan and put into a 1000ml of standard flask, then slowly added 50 ml of glacial acetic acid and makeup the standard flask with 950ml of distilled water.

Sample B

Weigh 0.25g chitosan and put into a 1000ml of standard flask, then slowly added 50 ml of glacial acetic acid and makeup the standard flask with 950ml of distilled water.

Sample C

Control is a sample adds 50 ml of glacial acetic acid and then added 950 ml of distilled water in a 1000 ml of standard flask without any chitosan solution.

Shelf Life Studies

All the samples (A, B and C) were stored in refrigerator conditions at temperature 6^0C and studied for a period of 30 days. At an interval of every 3 days each sample (A, B and C) was taken and analyzed for percent weight loss.

Estimation of Weight loss:

Weight loss of the fruit is an important parameter in order to determine the quality of the fruits. Weight loss should be minimum otherwise there will be a loss of important nutrients from the fruits. Generally the weight loss of the guava fruit increases progressively during their storage and this kind of weight loss continue till the fruit attains fully ripened stage.

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Weight loss was determined by calculating the difference between the initial weight of the sample and the final weight of the sample after storage period.

Weight loss (g) = initial weight of sample – final weight of sample

Statistical Analysis

The analysis was carried out in three replicates for the control and experimental samples. The mean and standard deviation of means were calculated.

Two-way analysis of variance (ANOVA) of the data was carried out using the SPSS 17 for Windows (SPSS Statistical Software, Inc., Chicago, IL, USA) software package. Once ANOVA was found significant ($p<0.05$), Tukey's test was performed to mean difference levels to compare effects.

Result and Discussion:

In the present investigation, whole guava fruit was coated with two different concentrations of chitosan 0.25 % (AC) and 0.5% (BC) and whole guava without any coatings were taken as control samples (CC). All three samples were subjected for estimation of rate of respiration and transpiration of water by calculating weight loss for the chitosan coated and control samples. The data pertaining to the weight loss of guava samples (CC, AC & BC) during storage period of 30 days are presented in Table no: 1. It was observed that weight loss in the samples are significantly ($p<0.05$) different from each other initially as well as after 30 days of storage. The initial weight loss for all the 3 samples (CC, AC & BC) were recorded as 2.50 ± 0.05 %. Percent of weight loss increased significantly ($p<0.05$) for control samples (CC) over the period of 30 days and this can be observed from the data represent in the Table no: 1. Also, percent of weight loss for chitosan treated samples (AC & BC) were also found to be significantly ($p<0.05$) increased over 30 days of storage period but the increase was lesser in chitosan treated samples when compared with uncoated samples (CC). Chitosan coating is acting directly on to the reduction of weight loss in guava samples. The weight loss is lesser in the samples which are coated with higher percentage of chitosan.

Table No 1: Weight loss for chitosan coated samples and control

Storage period (Days)	Control (CC)	Chitosan 0.25 % (AC)	Chitosan 0.50 % (BC)
3	2.50 ± 0.05 ^{f,A}	2.20 ± 0.04 ^{i,B}	2.00 ± 0.06 ^{j,C}
6	3.20 ± 0.08 ^{e,A}	3.10 ± 0.04 ^{h,A}	2.50 ± 0.05 ^{i,B}
9	3.80 ± 0.04^{d,A}	3.30 ± 0.05 ^{h,B}	3.00 ± 0.07 ^{h,C}
12	4.80 ± 0.04 ^{c,A}	4.50 ± 0.08 ^{g,B}	3.40 ± 0.05 ^{g,C}
15	5.50 ± 0.03^{b,A}	5.00 ± 0.05 ^{f,B}	4.00 ± 0.07 ^{f,C}

18	7.30 ± 0.04^{a,A}	6.80 ± 0.07 ^{e,B}	4.60 ± 0.06 ^{e,C}
21		7.60 ± 0.03 ^{d,A}	5.20 ± 0.04 ^{d,B}
24		9.50 ± 0.04 ^{c,A}	8.50 ± 0.06 ^{c,B}
27		12.45 ± 0.17 ^{b,A}	10.43 ± 0.15 ^{b,B}
30		14.87 ± 0.16 ^{a,A}	11.45 ± 0.15^{a,B}

Values are expressed as means ±SD (n = 3).

$^{a–j}$Means within each row with different superscripts are significantly ($p \leq 0.05$) different.

$^{A–C}$Means within each column with different superscripts are significantly ($p \leq 0.05$) different.

Dipping of fresh fruits and vegetables with Chitosan Solution is a new approach to extend the storage life of fresh horticulture corps. In present study percent of weight loss for chitosan treated samples (AC & BC) were also found to be significantly ($p<0.05$) increased over 30 days of storage period but the increase was lesser in chitosan treated samples when compared with uncoated samples (CC). Weight loss occurs in fruits due to respiration and by transpiration due to the water vapor pressure difference between the fruit and the atmosphere (low relative humidity). Coating fruits with a film checks moisture loss keeping them fresh during storage.

CONCLUSIONS:

Considering the increasing demands of consumers, the use of safe emerging technologies like Edible Coatings will be an alternative for the waxes that has been used in coating fresh fruits and vegetables. The Edible coating technologies are applicable to extend the shelf life and ripening time of the guava.