RESEARCH PAPER | Food Processing | Volume : 5 | Issue : 5 | May 2015 | ISSN - 2249-555X

Study on Changes over *Musa Acuminate* And *Vitis Vinifera* By *Aloe Vera* Gel as an Edible Coating

KEYWORDS: Vitis vinifera, Musa acuminata, Aloe vera, edible coating, shelf life.

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ABSTRACT *The present study was carried out to evaluate the effect of Aloe vera gel as a coating material over Musa acuminata and Vitis vinifera. Fruits were divided into two equal quantity and quality, one was kept as sample and other as control at room temperature of 28±3oC. Aloe vera coating didn't show any change over Musa acuminata fruits, as there was no difference between control and the sample. But Vitis vinifera coated with gel showed good result of extended shelf life of 5 days. Physiological weight loss (PWL) found to be 19.14% and 20.29% for Musa acuminata sample and control on 7th day respectively. Considerably for Vitis vinifera PLW found to be 26.15% and 43.87% on 15th day. Similary reducing sugar, TSS found to get change with storge days. These derived parameters inferred that the acceptance of Vitis viniferas were extended to 15 days, while Musa acuminata didn't showed the expected result.*

Introduction

In agriculture, post harvest handling is one of the stages in crop production that immediately follows harvesting. The post harvest treatment largely determines the final quality, whether a crop is sold for fresh consumption or used as an ingredient in a processed food product. Post harvest losses of tropical fruits are the serious problem because of rapid deterioration during handling, transport and storage (Adetunji et al., 2012). Coatings are thin films that improve product quality and can be safely eaten as part of the product and do not add unfavourable properties to the food stuff (Borghani et al, 2012). Coatings provide a barrier for external elements and therefore increases the shelf life (Adetunji et al., 2012) by reducing gas exchange, loss of water, flavours and aroma and solute migration towards the cuticle. Water loss is another problem that can be controlled with edible coatings (Muhammad et al., 2008). Controlling respiration of these living tissues would improve storage and extend shelf life (Conforti and Totty., 2007) and protect them from harmful environmental effects. It has been emphasized based on the need for high quality and the demand for minimal food processing and storage technologies. In addition, edible coatings can carry functional ingredients such as antioxidants, antimicrobials, nutrients, and flavours to further enhance food stability, quality, functionality and safety (Gohlani and Bisen, 2012). Thus new technologies of bio degradable, harmless edible coatings were developed. *Aloe vera* provides a greener alternative to SO_2 and other synthetic coatings that may affect the consumer and aimed of health concerns.

The objective of this study was to determine the effect of *Aloe vera* edible coating on *Musa acuminata* and *Vitis vinifera*. Also, to analysis and compare various parameters including weight loss, total soluble solids, acidity, reducing sugars on *Aloe vera* coated and uncoated fruits of *Musa acuminata* and *Vitis vinifera*.

Materials and Methods

Preparation of *Aloe vera* gel

Matured leaves of *Aloe vera* plant were collected and washed with water. *Aloe vera* gel matrix was then separated from the outer cortex of leave and this colourless hydro parenchyma was grounded in a mixee. The resulting mixture was filtered to remove the fibres. The liquid obtained constituted fresh *Aloe vera* gel. The gel matrix was pasteurized at 70°C for 45min. The gel was cooled immediately to an ambient temperature and ascorbic acid (1.9 or 2.0 g L^{-1}) was added. Citric acid (4.5 or 4.6 g L^{-1}) was added to maintain the pH at 4. The viscosity of the stabilized *Aloe vera* gel and its coating efficiency was improved by using 1% pectin. It was further used as coating agent. (Adetunji et al., 2012).

Application of gel over *Musa acuminata and Vitis vinifera*

Musa acuminata and *Vitis vinifera* prepared for *Aloe vera* coating were cleaned with water to remove the external firms and dirt. The gel blended and prepared was filled in a bowl. The selected fruit with individual marking are dipped into the gel and turned over several times to ensure the coating done whole over the fruit. Then the fruit are kept immersed in the bowl for 5 to 10mins for fixing the gel over the fruits. Then the fruits are dried under fan for drying the film coated at ambient temperature of 30°C.

Results and Discussion

The control and sample fruits of *Musa acuminata show* similar values on all the analysed parameters. But the *Vitis vinifera* showed the different values for coated and uncoated, showed the increased shelf life of 15d. It shows the *Aloe vera* effect was good with *Vitis vinifera* on comparing *Musa acuminata.*

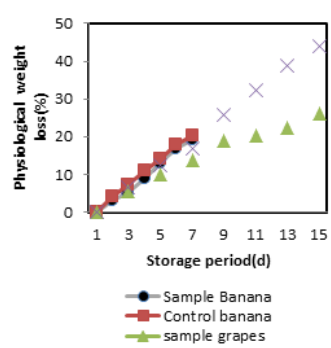

Figure 1 physiological weight loss at storage period of 7th day and 15th day for *Musa acuminata and Vitis vinif-*

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***era* at room temperature of 28±3°C**

Weight loss

This quality parameter is quite decisive, since every loss on weight is translated into a financial loss. The results showed that coating of *Aloe vera* gel in *Musa acuminata was* similar to each other with minute deviation, this shows similar result with Kittur et al. (2001), while *Vitis vinifera* shows a drastic reduction of weight loss with storage periods at ambient temperature. The physiological loss in weight (PLW) was shown in fig 1. The final value for weight loss of coated *Musa acuminata* and *Vitis vinifera* was 19.14% and 26.15% respectively, while vale for uncoated *Musa acuminata* and *Vitis vinifera* was 20.27% and 43.87% respectively. Aloe vera gel on the PLW of *Vitis vinifera* was significant compared to uncoated *Vitis vinifera*. These results show beneficial effects of aloe vera gel coating on increasing the shelf life of *Vitis vinifera* and for *Musa acuminata increases* the shelf life for one day. These coatings provide a semi permeable barrier to gases and water vapour and therefore, they can reduce respiration and water loss.

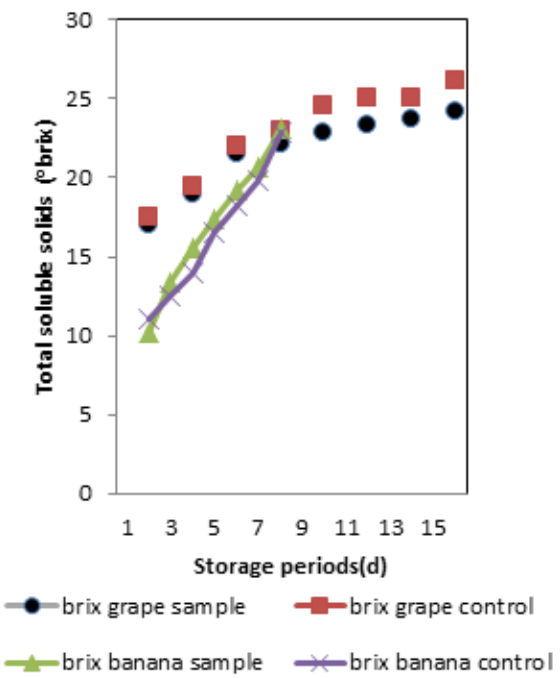

Figure 2 Total soluble solids at storage period of 7th and 15th day for *Musa acuminata and Vitis vinifera* respectively at 28±3°C

Total soluble solids.

It was found that for *Vitis vinifera*, the °brix value indicates delayed go up in value for sample and rapid in case of control fruits. Fig 2 shows that the value of TSS for coated and uncoated fruits including *Musa acuminata* and *Vitis vinifera*. In regard the *Musa acuminata fruit* seems that the °brix value has raised from 3 °brix to 10 °brix. The rate of conversion is same for control *Musa acuminata* and sample *Musa acuminata*. TSS concentration significantly increased during storage for control *Vitis vinifera*, from levels at initial of 19 °brix to 23.4 °brix. This conversion shows that TSS of *Aloe vera* coated Vitis *vinifera* has slow raise up and increases the acceptance of shelf life.

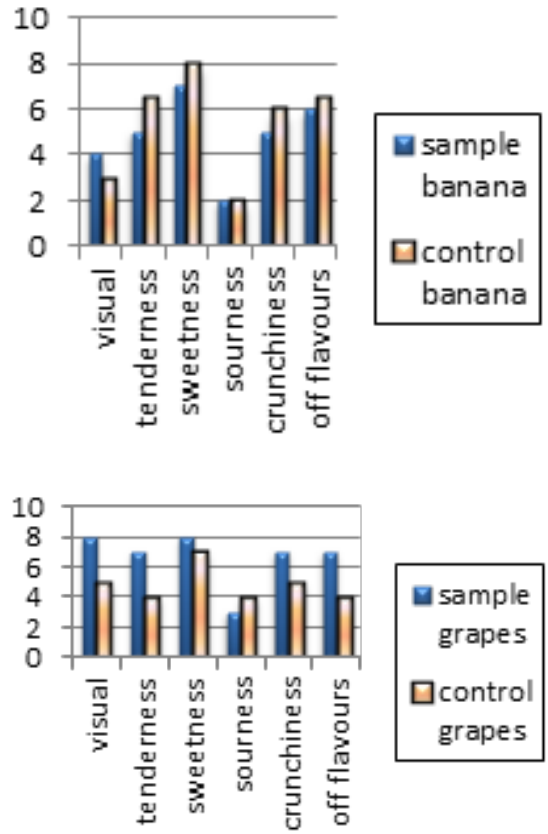

Figure 4 Assessment of sample and control fruits. *Musa acuminata* at 8th day and *Vitis vinifera* at 12th day at ambient temperature.

Sensorial Quality.

Panellists evaluated the visual aspect of the fruits and gave the highest scores to *Vitis vinifera* clusters and *Musa acuminata* fingers (coated and uncoated) as shown in fig 4. In case of *Musa acuminata* the enzymatic browning was similar for both the cases, but firmness of each control and sample gets differ. Coated *Musa acuminata* shows good firmness, but sweetness and taste found to be less similar on comparing the both. Uncoated *Musa acuminata* shows a lose firmness. In case of *Vitis vinifera* which became significantly different from day 7 of storage compared to treated clusters. These results indicated severe symptoms of dehydration and shrinkage in control *Vitis vinifera* after 7 days at ambient temperature and slight moderate effects for those clusters treated with *A. Vera* gel after 14 days of cold storage. The highest scores after 12 days of storage for berry aspect, firmness, crunchiness, juiciness, and sourness were given to the *Aloe*-treated berries compared with controls. An inverse tendency was found when sweetness was tasted, because control *Vitis vinifera* had significantly higher scores. Judges sensed the development of "off-flavours" in *Vitis vinifera* at 12 days of storage. Thus, for control fruits, of the panellists found bad aroma, whereas for those treated with *Aloe*, none of the panellists found the occurrence of "off-flavours.

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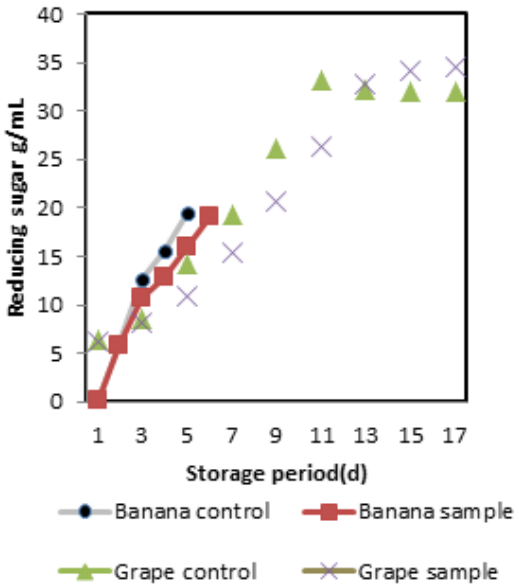

Figure 5 Rate of conversion of reducing sugars in *Musa acuminata* and *Vitis vinifera* 7th and 15th day of storage at 28±3°C

Reducing sugar

Reducing sugar of a fruit is based on the rate of respiration of such fruits. Ripening also indicates the conversion of starch to sugar. Such starch converted into reducing sugars which impart taste to the fruits. The rate conversion of reducing was shown in fig 5 which shows that sample *Vitis vinifera* reducing sugar conversion rate is slow on comparison with control *Vitis vinifera* fruits. Reducing of *Musa acuminata* shown in fig 5 says that reducing sugar was minimum at initial stage and maximum at ripened stage. Thus the day which attains the maximum of 34.2g/mL for *Vitis vinifera* and 19g/mL for *Musa acuminata* is inferred that slow conversion takes place on comparing with control fruits.

Conclusion

The results that derived above experimentally indicate that there is further scope to develop the *Aloe vera* edible coating to other perishable fruits. The experiment shows the different values for *Vitis vinifera* with various parameters like PLW, sensory etc. This experiment conclude that shelf life of *Vitis vinifera* can be extended to 15 days at ambient temperature (28±3°C) with coating of *Aloe vera* gel. But the experimental results found for the coating of *Musa acuminata* sample doesn't gave the satisfactory result. Further work has to be carried out in *Musa acuminata* for edible coating and extending the shelf life. Almost the result found with *Vitis vinifera* are satisfactory, however further work is required to optimize the coating type.

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