EFFECT OF CASSAVA STARCH – MUSHROOM (*Pleurotus pulmonarius*) EDIBLE COATINGS ON WEIGHT LOSS OF MINIMALLY PROCESSED CARROT

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Introduction

The application of edible coatings is one of the most innovative approaches to delay changes during storage of fresh vegetables. Carrot in this part of the world is packaged in polyethylene which constitutes environmental hazards because they are non-biodegradable. Vegetables and fruits are highly perishable as they contain 80–90% water by weight and when left without cuticle, the water quickly begins to evaporate, resulting in poor product shelf life [1]. When minimally processed they are "wounded" tissues and thus more tendency to deteriorate rapidly because their behaviour significantly differs from that of intact fruits and vegetables. Edible coating has been used to preserve fruits and vegetables by providing moisture barriers on product surfaces [2] thereby preventing moisture losses, quality changes and control exchange of various gases which takes place in respiration processes [3]. The objective of this study was to determine the effect of cassava starch and mushroom (*Pleurotus pulmonarius*) coatings on minimally processed carrot.

Materials and Methods

Cassava (TMS 30572) and mushroom were purchased from College of Agriculture Yandev Gboko, Benue State and LTC farms Oshogbo, Osun State, Nigeria, respectively. Cassava starch (CS) and mushroom flour (MF) were prepared using standard methods. The CS and MF flours were blended at different proportions (100:0, 90:10, 80:20, 70:30, 60:40 w/w). Briefly, 6 g of each blend was properly mixed with glycerol at 0, 2, 4, 6 and 8% level, respectively, using distilled water to form a suspension as guided by a preliminary study. The edible films produced were analysed for mechanical, barrier and sensory properties and the CS:MF at 90:10% at 2% glycerol, 90:10% at 4% glycerol and 80:20% at 4% had the best performance with respect to the mechanical, barrier and sensory properties. Thereafter, coating of carrots was carried out using these blends following dipping method [4]. Carrots of uniform size, colour and appearance were selected for treatments cut into thickness of 30 mm and average weight of 5g ±0.2. The slices were dipped in 200 ppm chlorine water for 3 min and then rinsed with potable water, drained and allowed to surface dry. The slices were randomly distributed into four lots; the lots were randomly coated with one of the following coating solutions, respectively. Non-coated lot served as control samples. The carrot slices were immersed in the coating solutions for 10 min and then allowed to drain for about 3h. The coated samples and the control were stored at ambient temperature (30±1°C) for evaluation over a period of 12 days.

Results and Discussions

The result of the effect of CS-MF edible coatings on minimally processed carrots is as shown in Figure 1. The effect of weight loss was assumed to be mainly through loss of water by evaporation. The weight loss of minimally processed carrot increased with storage duration for all the treatments. The observed weight loss of the coated carrots samples could be ascribed to the formation of coating on the surface thereby delaying moisture migration from carrot to the environment. The 83% weight loss was observed in the uncoated samples, while the percentage weight loss over the period of storage for the coated carrots were 54% (for edible coating containing 90% cassava starch, 10% mushroom and 2% glycerol), 52% (for coating containing 90% cassava starch, 10% mushroom and 4% glycerol) while 80% cassava starch and 20% mushroom had the lowest at 47%. The low weight loss may be as a result of the low water vapour permeability of the edible films at 80% cassava starch and 20% mushroom. Therefore, edible coating containing 80% cassava starch, 20% mushroom and 4% glycerol can be considered as coating agent in order to extend the shelf life of fresh cut carrots by reducing moisture and solute migration.

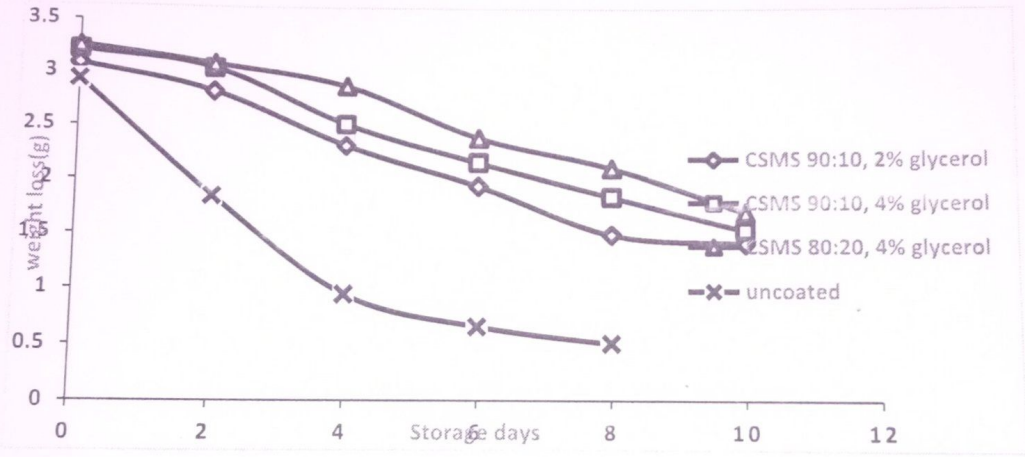

Figure 1. Effect of cassava starch and mushroom edible coatings on minimally processed carrot

Conclusion

The study demonstrated that cassava starch mushroom can be used to reduce weight loss of minimally processed carrot and hence shelf-life extension. Further research in cold storage should be carried out.

References

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