ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 08, Issue, 07, pp.21720-21723, July, 2018

ORIGINAL RESEARCH ARTICLE OPEN ACCESS

EVALUATION OF THE APPLICATION OF EDIBLE COATING THE BASE OF PROPOLIS IN GUAVAS PALUMA

[1,*]Amanda Arielle Rodrigues Diniz, [2]Ana Flávia de Melo Cândido, [2]Morgana Aragão Araújo, [3]Weverton Pereira De Medeiros, [4]Pedro Victor Crescêncio de Freitas, [4]Moisés Sesion de Medeiros Neto, [4]Tiago da Nóbrega Albuquerque, [4]Plínio Tércio Medeiros de Azevedo, [5]Alfredina dos Santos Araújo and [6]Maria do Socorro Araújo Rodrigues

[1]Engineer of Foods, UFCG, Pombal
[2]Student of master's degree of Systems Agroindustriais, UFCG, Pombal
[3]Bachelor of Science in Agrarian Sciences, UFPB, Bananeiras
[4]Student of Food Engineering, UFCG, Pombal
[5]Phd Teacher, UFCG, Pombal
[6]Student of Doctorate degree of Engineering of Processes, UFCG, Campina Grande-PB,

ARTICLE INFO

Article History:
Received 11st April, 2018
Received in revised form
19th May, 2018
Accepted 26th June, 2018
Published online 30th July, 2018

Key Words:
Coating, Sanitary Conditions, Guava.

ABSTRACT

Coatings from non toxic natural polymers have been signed as a new category for application as edible protectors on fruit and vegetables, especially those processed. With it comes the possibility of using a natural product. The 'Paluma' guavas were processed into slices and subjected to the coatings, being divided into three groups: F1 - Processed Guava slices without coating; F2 - Processed Guava slices with 3% of crude propolis extract; F3 - Goiaba processed into slices with 5% of crude propolis extract. Stored at two temperatures (7 and 30°C) where the microbiological analyzes were performed of coliforms at 35 and 45ºC, *Salmonella* sp., and filamentous fungi and yeasts, during a period of 0, 3, 9 and 12 days. The extracts of propolis added to coatings obtained better results when compared with control. According to the results obtained showed that the application of propolis extract had a positive effect for the reduction of filamentous fungi and yeasts, where the coating with the addition of 5% propolis extract was that obtained the best results, showing that the increase the concentration of propolis in the coating has expanded its effect reducing the proliferation of these microorganisms during the storage period.

Citation: AmandaArielle Rodrigues Diniz, Ana Flávia de Melo Cândido, Morgana Aragão Araújo, Weverton Pereira De Medeiros, Pedro Victor Crescêncio de Freitas *et al.* 2018. "Evaluation of the application of edible coating the base of propolis in guavas paluma", *International Journal of Development Research*, 8, (07), 21720-21723.

INTRODUCTION

Guava (*Psidium guajava L.*) is a fruit the climate, rich in vitamin C, carotenoids, potassium, fiber, calcium and iron, in addition to owning pro-vitamin A, B complex vitamins, low calorie content and great antioxidant potential, being considered an excellent fruit for human consumption. Despite its nutritional value, the world trade of guava is limited due to their limited shelf life (Gilla *et al*., 2016), since the stage of ripeness of the fruit affects their physical properties, chemical and biochemical changes. Thus, to prolong the storage period of fruits in the post-harvest the addition of edible coating is a promising method that works on the control of loss of moisture and flavor, inhibits the penetration of oxygen in the tissue of the plant and microbial growth (Chandrahasa; Laxmia, 2016). Edible coatings have been studied as good carriers for the incorporation of active compounds, such as vitamins, antioxidants and antimicrobials in food (SOUKOULIS *et al*., 2014). They are thin layers of edible biopoliméricos materials applied to the surface of foods, providing a barrier against the migration of moisture, oxygen, carbon dioxide, aromas and other solutes (MISIR *et al*., 2014). Coatings from non toxic natural polymers have been signed as a new category for

***Corresponding author:* Amanda Arielle Rodrigues Diniz,**
Engineer of Foods, UFCG, Pombal.

application as edible protectors on fruit and vegetables, mainly processed. with it comes the possibility of utilizáção a natural product, the propolis, that with the growing trends in research with flavonoids and anti-inflammatory activities of your statement and the fact of being considered as a medicinal product. Propolis is a resinous and heterogeneous material comprising resin collected bybees from the leaves, shoots and bark of certain tree species that pass through the process of enzymatic digestion by enzymes in the saliva of bees. While the composition of propolis seems to depend only on the bee, it also depends on the species of trees (Vyssotksi *et al*., 2017). In order to evaluate the potentiality of conservation through analíses microbiologicas, this work provides to investigate the best composition for the preparation of edible coating evaluating their barrier properties and the application as a cover, in the physiology and quality of guavas processed into slices, as well as the influence of cooling in storage of the same, characterizing how the physical condition and the prolongation of life.

MATERIALS AND METHODS

The experiment and microbiological analyzes were carried out in the laboratories belonging to the Federal University of Campina Grande, campus Pombal (CCTA). The steps of preparation of the experiment follow the flowchart described below. The and processing of raw propolis hydroalcoholic extract was performed following the methodology proposed by daugsch *et al*. (2008), with modifications. The coatings were produced following the methodology described by SOUZA (2010), modified by Silva *et al*., (2015).

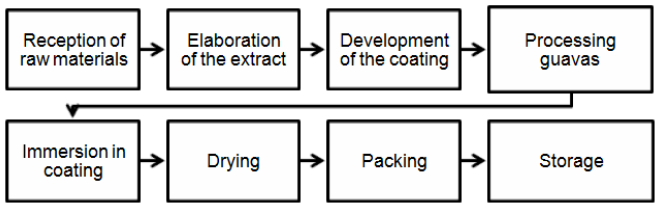


Figure 1. Flowchart of processing operations

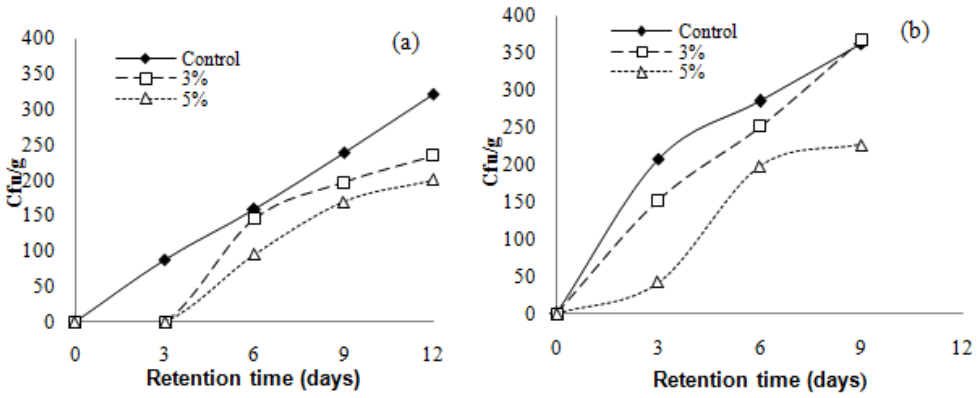
Where two formulations were developed: one with 3% propolis extract raw and the other with 5% of crude propolis extract. The 'Paluma' guavas were acquired in the public market town of Pombal/PB, where they were selected according to the maturation stage, then were sanitizadas in a solution of sodium hypochlorite to 200ppm for 20 minutes and then were washed with tap water to removed from the residual chlorine, were subsequently processed into slices and subjected to the coatings, being divided into three groups: F1 - Processed Guava slices without coating; F2 - Processed Guava slices with 3% of crude propolis extract; F3 - Goiaba processed into slices with 5% of crude propolis extract. After the application of coatings, the fruits were stored at two temperatures (7 and 30°C) where the microbiological analyzes were performed of *Salmonella* sp., filamentous fungi and yeasts and coliforms at 35 and 45°C according to the methodology described by Silva (2015) every three days, during 12 days.

RESULTS AND DISCUSSION

Throughout the storage period none of the samples analyzed showed contamination by *Salmonella sp*, demonstrating that the methods of sanitation and hygiene during processing, application of coatings and manipulation were effective in addition to the great hygienic and sanitary quality throughout the course of the experiment. In Figure 2 are expressed in the results obtained for filamentous fungi and yeasts during storage of minimally processed guavas. Notes to the guavas without coating, that the development of fungi began on the third day of storage, where they were recorded scores of 87.5 UFC/g and 208.3 UFC/g for the temperature of 7ºC and 30ºC, respectively. The application of coatings containing 3% and 5% propolis extract associated packaging refrigerated (7ºC) slowed the growth of fungi and resulted in a reduction of 28.0% and 38.0% in counts, simultaneously, when compared to the control treatment on the 12th day of storage. In the packaging at 30ºC, the best result was obtained for the coating containing 5% of extract, which decreased by 79.6% and 37.7% the count of fungi in the 3rd and 9th day, respectively. Counts of filamentous fungi and yeasts, Abreu (2018) analysing bananas coated with red propolis found the result ranging from 1.67 to 8,9x10² UFC/g, and these values higher than those found in guavas minimally processed.

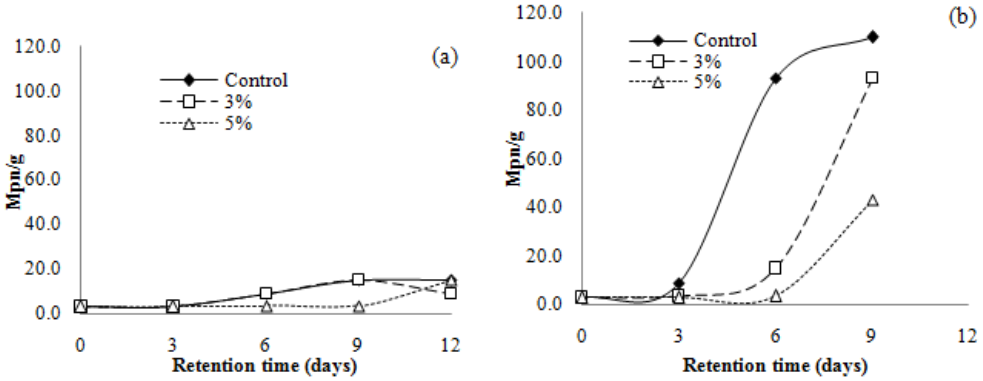
The presence of filamentous fungi and yeasts can be observed with greater frequency in samples that have high acidity, high humidity or are in the process of degradation, which may occur by oxidation of components or for errors in storage and storage temperature (SILVA *et al*, 2010; SILVA, 2013). In Figure 3 shows the results obtained for the Most Probable Number of coliforms at 35°C (NMP/g) during the storage of processed guava slices. Check- in Figure 3 initial counts of Coliforms at 35ºC (3.0 NMP/g), and may consider these low values for all treatments, indicating to the efficiency of the sanitization of fruit and hygienic-sanitary conditions are satisfactory in the preparation of coatings, application and handling of fruit. In guavas processed into slices stored under refrigeration these counts were kept below 20.0 NMP/g during 12 days of storage. For guavas stored at 30ºC, there has been strong growth of these bacteria after the 3rd day in the fruits without coating, reaching 110.0 NMP/g on the 9th day of storage. The application of coatings delayed the increase in counts until the 6th day and on the 9th day counts were recorded 15.5 and 60.9% lower than the control treatment, indicating greater efficiency for the coating with a higher percentage of propolis extract (5%). In Figure 4 shows the results obtained for the Most Probable Number of coliforms at 45°C (NMP/g) during the storage of processed guava slices.

As can be observed in Figure 4 that the development of Coliforms at 45ºC in guavas processed in slices maintained at 7ºC was similar for all treatments and remained almost constant during the storage period, between 3.0 to 9.1 NMP/g. For the fruits kept at 30ºC and without coating (control) there was an increase in the number of coliforms at 45ºC between the 6th and last day of storage, moving from 7.3 to 28.0 NMP/g. In the treatments with 3 and 5 % of propolis extract there was also an increase after the 6th day, resulting in scores of 9.10 and 15.0NMP/g, respectively. All counts are considered low and indicate that the guavas processed into slices were suitable for consumption, since the National Health Surveillance Agency - ANVISA down through the RDC No. 12 of 2001, the presence of up to 5.0 x 102 NMP/g in fresh fruit *in natura*, prepared sanificadas, chilled or frozen, for direct consumption.



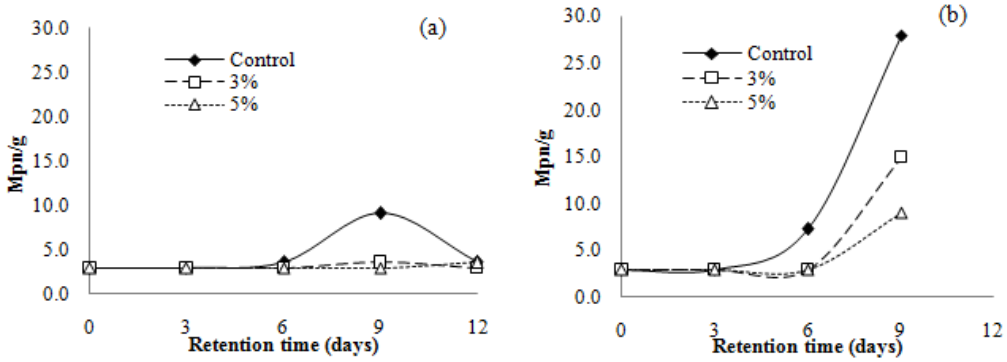
Source: Author itself.

Figure 2. Counting of filamentous fungi and yeasts (UFC/g) in guava processed into slices with and without the application of coatings during storage at 7°C (a) and 30°C (b)



Source: Author itself.

Figure 3. Most Probable Number of coliforms at 35°C (NMP/g) in minimally processed guava with and without the application of coatings during storage at 7°C (a) and 30°C (b)



Source: Author itself.

Figure 4. Most Probable Number of coliforms at 45°C (NMP/g) in guava processed into slices with and without the application of coatings during storage at 7°C (a) and 30°C (b)

Conclusion

According to the results obtained showed that the application of propolis extract had a positive effect for the reduction of filamentous fungi and yeasts, where the coating with the addition of 5% propolis extract was that obtained the best results, showing that the increase the concentration of propolis in the coating has expanded its effect reducing the proliferation of these microorganisms during the storage period.

REFERENCES

ABREU, D. K. P. 2018. Edible coatings based on Red Propolis, the Conservation of banana Prata Anã. 44 F. Work of course completion (Graduation in Food Engineering) - Universidade Federal de Campina Grande, Pombal-PB. 2018.

Brazil, Brazilian Ministry of Health. 2018. Health Surveillance Agency (ANVISA). Resolution - RDC No 12, from 2 January 2001: Technical Regulation on Food Microbiological Standards. Available at: <http://www. anvisa.gov.br/legis/resol/12_01rdc.htm>. Access in: 03 de Mar de.

Chandrahasa, V., Laxmia, A. Delayed post-harvest ripening-associated changes in Manilkara principe L. var. Kalipatti with composite edible coating. Journal of the Science of Food and Agriculture, v. 97, p. 536-542, 2016.

Daugsch, A., Moraes, C. S., Fort, P., Park, Y. K. Brazilian red propolis chemical composition and botanical origin. Evidence-based Complementary and Alternative Medicine**,** v. 5, No. 4, p. 435-441, 2008.

Gilla, K. S., Dhaliwalb, H. S., Mahajanc, B. V. C., Paliyathd, G., Boorae, R. S. Enhancing postharvest shelf life and quality of guava (Psidium guajava L.) cv. Allahabad Safeda by pre-harvest application of hexanal containing aqueous formulation. Postharvest Biology and Technology, v. 112, p. 224-232, 2016.

Misir, J., Brishti, F. H., Hoque, M. Aloe vera gel as a novel Edible Coating for Fresh Fruits: A Review. *American Journal of Food Science and Technology,* v. 2, p. 93-97, 2014.

Rodrigues, M. S. A. biofilm the basis of red propolis extract and its effect in the postharvest conservation of Italian tomato.Dissertation (Master in agroindustrial systems with emphasis on Science and Food Technology) - Graduate Program in Agroindustrial Systems da Universidade Federal de Campina Grande, Pombal, PB. 2015. 82 f.

Silva, M. A. P. D., Santos, P. A. D., Silva, J. W. D., Leon, K. M., Oliveira, A. N. D., Nicholas E. S. variation in quality of raw milk cooled depending on the time of year and the type of milking. Revista do Instituto Adolfo Lutz, Vol. 69, No. 1, p. 112-118, 2010.

Silva, N., Junqueira, V.C.A., Silveira, N.F.A., Taniwaki, M.H., Santos, R.F.S., Gomes, R.A.R. Manual of methods for the microbiological examination of foods and water. 4Th edition. São Paulo: Livraria Varela, 2010.

Silva, P. A., Calixto, M. R., Gorski, I. R. C., Rabelo, V. M., DE Souza, V. A., Oliveira, E. M. Characterization of the quality of milk in natura a dairy of Campos Gerais, Minas Gerais. Revista da Universidade Vale do Rio Verde, Vol. 11, No. 2, p. 293-299, 2013.

Silva, C.M., Rodrigues, M. A. S., Rodrigues, A. A., Deodado, J. V., Martins, S. S., SANTOS, V., Araujo, A. S., physicochemical conditions by temperature and storage time on the application of biofilms the base of red propolis in tomato italian type. Brazilian Society of Food Analyst, 2015.

Soukoulis, C., Yonekura, L., Gan, H., Behboudi-Jobbehdar, S., Parmenter, C., FISK, I. Probiotic edible films as a new strategy for developing functional bakery products: The case of pan bread. Food Hydrocolloids, v. 39, p. 231- 242, 2014a.

Vyssotski, M., Lagutin, K., Catchpole; Simple lipids and S.I. of New Zealand propolis wax. Journal of Apicultural Research (2017), 10.1080/00218839.2017.1384438

****