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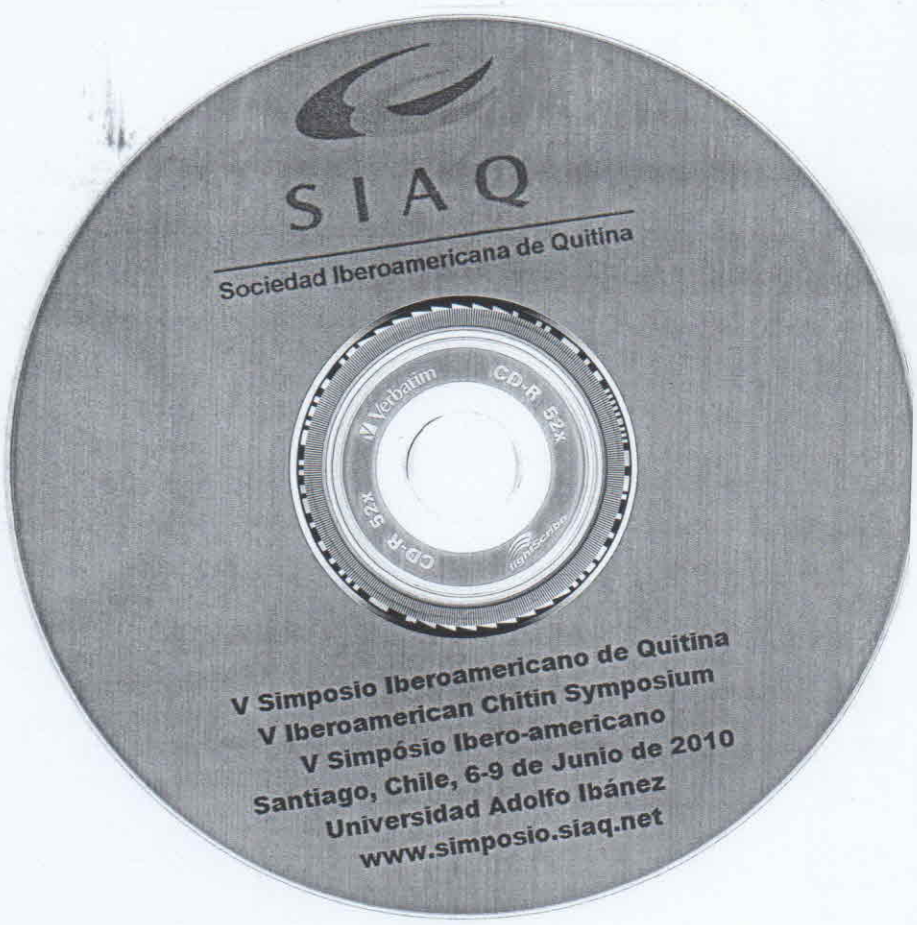

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EVALUATION OF ANTIFUNGAL ACTIVITY OF CHITOSAN COATING ON CUT APPLES BY IMAGE ANALYSIS TECHNIQUE

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Chitosan has been proposed as a potential material for edible coatings with satisfactory preservation properties. This polysaccharide has excellent antimicrobial activity against bacteria, viruses and fungi and has the ability to induce the expression of a variety of genes involved in plant defense responses [1]. The antifungal property of chitosan has been observed for a broad range of concentrations upon several spoilage yeasts [2]. Chitosan coatings have been evaluated, for example, on carrots, on mangos, on strawberries and on apples [3]. When deposited on fruit cut surfaces, Chitosan forms a high transparent film, allowing a statistical and comparative quantification of fungi spreading against time storage. In this study, image analysis technique was carried out in order to follow the fungi area evolution on coated and non-coated processed fruits.

Commercial chitosan of shrimp origin manufactured was used. Solution of 2% wt chitosan in acetic acid (0.5 M) was prepared. Supermarket apples, cv. Gala (*Malus domestica*) were first sliced into two halves and then displayed separately in two groups of 20 samples each. The first group underwent chitosan coating by direct dipped into the gel. Groups of 20 coated and 20 non-coated apple slices were put into a controlled temperature chamber (25°C) where petri dishes containing non-classified cultures of fungi (predominantly *Penicillium* sp. and *Alternaria* sp.) were equidistantly allocated amongst the samples, to allow spontaneous inoculation by ambient contamination.

Qualitative and quantitative analysis were performed using a commercial scanner for image capture. All cut surfaces were individually scanned twice a day. Images were 250% enlarged from the original with 512 by 512-pixels resolution with brightness level ranging from 0 to 255. The typical colonies are characterized by pellet morphology which is highly entangled, dense masses of hyphae. By numerical assessment of the input images (automatically counting) it is observed that the non-protected faces entail higher marked fungal growth and proliferation with time, as can be seen when comparing the evolution data as plotted in Fig. 1. After 10 days of analysis, it was apparent that 90% non-protected samples and 40% of chitosan-coated fruits slices were infected.

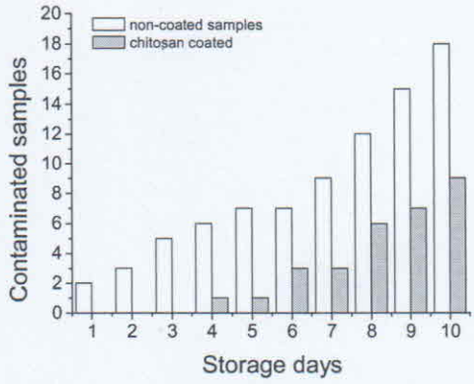

Fig.1. Evolution of the number of infected samples

A simple comparison of the evolution area in a same set of samples over a period reveals the kinetic tendency of the fungal growth. From Figure 2 it is clear that the rate of proliferation is faster for non-protected surfaces than to chitosan-coated surfaces, mainly in the first 1-4 days of exposure to fungus. Such validate the fungistatic action of chitosan coating.

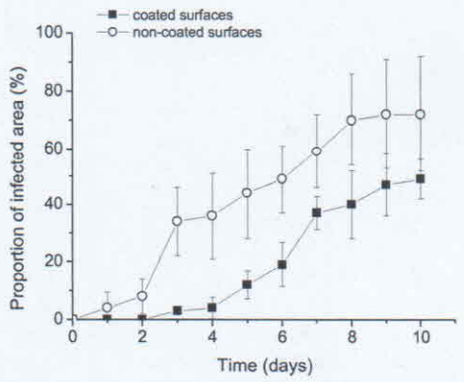

Fig.2. Proportion of infected area for sliced surfaces versus exposure time.

REFERENCES

1. Goy, R.C.; Britto; D. Assis. Polimeros, 19 (2009) 241-247.
2. Devlieghere, F.; Vermeulen, A.; Debevere J. 21 (2004):703-714.
3. Assis, O.B.G. Rev Iberoamericana Tecnologia Poscosecha, 9 (2008) 148-152.