Submerged fermentation of combined induced media for the production of fungal enzymes with fucoidan degradation potential

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Edible films and coatings can provide additional protection for food, while being a fully biodegradable, environmental friendly packaging system. Preliminary works have shown that the presence of a moderate electric field during the preparation of chitosan coating solutions may influence, e.g. their transport properties. If such effect is confirmed, moderate electric fields could be used to tailor edible films and coatings for specific applications.

The aim of this work was to determine the effect of field strength on functional properties of chitosan (obtained from lobster from the Cuban coasts) coatings. Four different field strengths were tested (50, 100, 150, 200 V/cm). The coating-forming solutions were cast into films, which were conditioned at 20 ºC and 25 % relative humidity. For each electric field treatment the water vapor, oxygen and carbon dioxide permeabilities were determined; functional properties of other films were also assessed (color, opacity, solubility in water). The surface microstructure of the films was analyzed using atomic force microscopy (AFM). The results were discussed in terms of “field strength efficiency”; in obtaining a given effect. In general, the most pronounced effect of the field strength was observed for treatments made at 100 V/cm or higher.

A positive correlation has been found between the water vapor, oxygen and carbon dioxide permeability coefficients and field strength. In the absence of the electric field, a decreased permeability to the gases was observed. The AFM results show that the surface of chitosan films is much more uniform when an electric field is applied, which may be related to the differences observed in terms of transport properties.