



Review Article

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An Introduction on Different Affections of Additives on Mechanical Properties of Edible Films

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ABSTRACT

Packaging is a cover which protects its contained good from production to consumption and ensures its hygiene through creating a physical barrier between foodstuffs and environment. Studies revealed that adding of synthetic polar polymers such as polyvinyl alcohol to starch leads to enhance physical and mechanical properties of produce films. Additionally adding Nano crystal cellulose (NCC) and Polyvinyl alcohol (PVA) to starch based films causes to increase created peak by X ray and whatever plasticizer concentration increase more flexibility is possible. Elasticity of edible films increases through adding glycerol and poly ethylene glycol and decreases by adding palmitic acid therefore it can be mentioned that additives can create more desirable properties in edible films.

Key words: edible films, mechanical properties, glycerol, zinc oxide

INTRODUCTION

Packaging is a cover which protects its contained good from production to consumption and ensures its hygiene through creating a physical barrier between foodstuffs and environment, extending perishable foodstuffs, indeed packaging is the first consumer relationship and play the role of creating a desirable mental imagine for customer (1).

Paper, fibrous material, plastic, glass, steel and aluminum are the most conventional packing materials. Commonly produced plastics from oil derivatives are more useable due to their better forming properties and less weight; however they are non-environmental friendly materials (2) and 300-500 years' time required to become decomposed and return to nature cycle. Not only environment concerns but also their complicated recycling process from the viewpoints of economic and technical have caused human to orient to edible packages such as polysaccharide, protein and fat based films. Solubility of cellulosic materials is influenced by adding plasticizers, and its size and molecular weight as well as the type of solvent (3). Since there are lots of environmental concern regarding the growing rate of waste from packaging materials, taking into account of natural compounds as coating is increasing more (4). Today, biodegradable and edible coatings considers as suited alternatives mostly due to being environmental friendly (5). To reach the target of production biodegradable, there are several candidates including polysaccharides, proteins and lipids, however they need some modification in order to create coating properties in them (6). Different modification can propose. Addition of glycerol is one of them in which it acts as plasticizer and increases hydrophobicity of films. One important point must not be forgotten is safety of these packaging (7).

Different studies showed that increase of polar synthetic polymers such as PVA to starch improve physical and mechanical properties of resulted films. PVA can use to overcome crack ability of soft starch (8).

Plasticizer affections on chitosan films

plasticizers including Glycerol, poly propylene glycol, and ethylene glycol and mentioned that poly ethylene glycol and glycerol gives chitosan better properties through enhancing film flexibility and with less reduction in resistance (9).

Investigation of Nano particle affection on mechanical properties of cellar fish

Obtained results revealed that concentration of nano zinc oxide increased from 0 to %5 and resistance to tensile increased significantly from 5MPa to 10MPa (10). In another study on addition of ZnO to Polyurethane (PU) investigated, Results revealed initial increasing of TS (by increasing ZnO amount from 0 to %2) and sequent decreasing (by increasing ZnO amount from 2 to %4). Increase of TS may be due to restrictions of matrix movement when adding of zinc oxide to polyurethane. Moreover when ZnO Nano particles fill with polyurethane chains, interactive forces may occurs (10).

Mechanical properties of methyl cellulose films

Figure 3 shows the amount of elasticity of different methyl cellulose films. This amount is influenced by glycerol, poly ethylene glycol and palmitic acid where films including formers and later contain the most and the least amount of elasticity respectively (11).

CONCLUSION

Regarding easy accessibility of some substances, by addition them to edible film; keeping food qualities along with better physical and mechanical properties make possible.

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