EFFECT OF PLASTICIZER ADDITION IN THE PHYSICOCHEMICAL AND MECHANICAL PROPERTIES OF ALGINATE BIODEGRADABLE FILMS CROSSLINKED WITH BARIUM IONS

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Alginates are polysaccharides extracted from brown seaweeds with a large range of technological applications in the food processing industry due to their well-known ability to form strong gels that are biodegradable and insoluble in water when crosslinked with calcium-ions. This work evaluated the effects of glycerol on the water vapor permeability (WVP), soluble mass (MS), tensile strength (TS), elongation (E) and SEM observation of alginate films crosslinked with barium-ions. Films of alginate solution containing glycerol as plasticizer and a small amount of Ca²⁺ to initiate gelling were produced by casting in an acrylic mold. The crosslinking of these pre-films were further complemented by immersion in solutions containing 1% BaCl₂·H₂O and was varied content of the plasticizer, with values of 3%, 6%, 8% or 10%. The WVP and MS values increased with the increase of the glycerol concentration. TS decreased as the concentration of glycerol while elongation increased significantly from 9.05% to 31.88%. This was due to which glycerol is capable of reducing the intermolecular forces along the polymer chains alginate, increasing the movement of the chains and flexibility of the films. Addition of 10% glycerol in crosslinker solution improved the morphological structure of the film since there were a clean the crystals on the surface of film, the cross section of the film proved to be very homogeneous and compact. The excellent visual appearance and high value of elongation of films crosslinked with barium-ions enhances their use in biodegradable packing, as this has been a limitation in films crosslinked with calcium.