

Abstract

The uses of synthetic packaging materials especially in food industry are concerned mainly about its disposal. The disposal to the environment resulted in the increase in the pollution of the environment. These constraints of disposal of the synthetic polymers in the environment had led to the development of the biodegradable film which could be biologically degraded in the environment. Biodegradable films are a film that acts as a barrier to the external elements, and thus protects the product and extends its shelf-life and finally can undergo a degradation process known as *biodegradation*. The different sources of the biodegradable material are been studied and from that starch was considered to have a potential for this purpose. The starch of water chestnut starch possesses certain properties which makes it very useful in different purposes. The biodegradable film which was made from the starch of water chestnut shows potentiality to use it as a packaging material. Starch was isolated from the locally available water chestnut and characterized for its physical and chemical properties. The films were prepared using starch extracted, agar and palmitic acid mixture and made into biodegradable films by adding a plasticizer (glycerol) with it in different combinations. The thickness was found to be ranging from 0.121 ± 0.002 to 0.258 ± 0.021 mm. The water vapor transmission rate varied from 0.000123 - 0.0032162 g H₂Omm/hr/cm². The tensile strength of the films ranged from 3.683-13.631 MPa with elongations ranging from 6.320-7.4106 mm. The solubility ranges from 31.267 to 41.988%. The films formed were effectively biodegradable, as shown by the growth of soil microorganism on it when done on agar plate assay. The films formed were further coated on raw ripened tomatoes (locally available) to increasing its shelf life at room temperature. The coatings were applied for the increase of minimally processed tomatoes for 15 days. During the study we found that the palmitic acid incorporated coating appeared to be more effective in increasing the shelf life of the tomatoes with respect to the texture, color, titrable acidity, total soluble solids, pH and weight loss and low yeast and mould count. Thus, the formulated biodegradable film incorporating starch can be explored as effective packaging material for different fruits and vegetables without causing environmental pollution issues.