

ABSTRACT

Six numbers of edible films were prepared from tuber starch of *Dioscorea sp.* isolated by alkaline extraction process, casein, and glycerol in different ratios keeping the amount of sodium hydroxide constant. The films were studied for mechanical, barrier, morphological, thermal, and IR spectral properties. The edible film having better properties was used to package green chili and its coating solution was taken to coat garlic pods after minimal processing and the effect of the packaging film/ coating solution was studied for 12 days under refrigerated conditions. The solubility of film ranged from 20.7 to 39.9 %; film thickness on average was 0.0252mm; tensile strength varied from 8.61 MPa to 30.05 MPa; film elongation ranged from 6.22 mm to 29.26 mm; water vapour transmission rate varied from 0.000053 to 0.000154 g H₂Omm/hr/cm²; and film transparency from 3.07 to 3.43%. Color was light in all the films. XRD (X-ray diffraction) data of the films revealed that the B type crystalline structure of *Dioscorea* starch was retained in all the films. The prominent peak at 17° in native starch had lost its intensity in the films and the subdued peak at 22.5° had intensified. The % crystallinity of films were higher than the raw starch, ranging from 32.8-55.4% that indicated formation of smaller crystallites. DSC (Differential scanning calorimetry) thermograms showed that the melting endotherms had broadened compared to that of native starch. FT-IR (Fourier Transform Infrared) spectra revealed that all the characteristic bands of native starch were present in the films. In addition, the band characterizing amide linkage that was seen for casein was also observed in all the films. Based on the mechanical and barrier properties, film S4 having the ratio of starch 3.75 :protein 1 :glycerol 1: sodium hydroxide 1.25 water 93 was found to have better properties than the remaining films and was selected for study of the application properties of the film. Studies showed that the textural quality, colour, microbial load and bioactive capacities deteriorated in both packaged/coated samples and their control but the extent of change was less in packaged/coated samples. The changes in these properties was similar upto third day in both control and packaged/coated samples. Edible film thus can be used to package/coat fresh green chili and garlic.