INFLUENCE OF SPENT BREWER’S YEAST β-GLUCAN ON GELATINIZATION AND RETROGRADATION OF RICE STARCH

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M.Sc. (BIOTECHNOLOGY)

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ABSTRACT

The effects of β-glucan (BG) prepared from spent brewer’s yeast on gelatinization and retrogradation of rice starch (RS) were investigated as functions of mixing ratio and of storage time. The investigation on gelatinization and retrogradation of the RS/BG mixtures included the determination of: i) pasting properties using Rapid Visco-Analysis (RVA), ii) thermal characteristics using differential scanning calorimetry (DSC), iii) syneresis production using the centrifugation methods, iv) viscoelastic properties using the small amplitude oscillatory shear test, and v) textural properties using texture profile analysis.

The results of the RVA indicated that addition of BG increased the peak, breakdown, setback, and final viscosities, but decreased the pasting temperatures of the RS/BG mixtures. The DSC data demonstrated an increase in onset (T_o), peak (T_p), and conclusion (T_c) temperatures, and a decrease in gelatinization enthalpy (ΔH_1) with increasing BG concentration. Storage of the mixed gels at 4°C resulted in a decrease in T_o, T_p, T_c, and melting enthalpy (ΔH_2). The retrogradation ratio (ΔH_2/ΔH_1) and the phase transition temperature range (T_c - T_o) of the mixed gels increased with storage time but this effect was reduced by the addition of BG. BG addition also slowed the syneresis of the mixed gels. Results of dynamic viscoelasticity measurement indicated that the addition of BG promoted RS retrogradation at the beginning and then retarded it during longer storage times. The added BG also retarded the development of gel hardness during refrigerated storage of the RS/BG mixed gels.

KEY WORDS RICE STARCH/ β-GLUCAN/ GELATINIZATION/ RETROGRADATION / BREWER’S YEAST

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