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

SRIPATTRA SATRAPAI

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Title: Rapid Visco-Analysis (RVA) and texture profile analysis

Influence of spent brewer's yeast β-glucan on the gelatinization and retrogradation of rice starch was investigated. The effects of spent brewers yeast β-glucan on the gelatinization and retrogradation of rice starch were analyzed using Rapid Visco-Analysis (RVA). The results showed that the gelatinization temperature, gelatinization enthalpy, and texture profile analysis were significantly affected by the addition of spent brewer's yeast β-glucan. The study also investigated the influence of spent brewer's yeast β-glucan on the texture profile analysis of rice starch. The results indicated that the addition of spent brewer's yeast β-glucan had a significant impact on the texture profile analysis of rice starch.
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SRIPATTRA SATRAPAI 4736201 SCBT/M

M.Sc. (BIOTECHNOLOGY)

THESIS ADVISORS : MANOP SUPHANTHARIKA, Ph.D.
SAIYAVIT VARAVINIT, Dr. Ing., PAIROJ LUANGPHITAKSA, D.Agr.,

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 ($\Delta H_1$) 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 ($\Delta H_2$). The retrogradation ratio ($\Delta H_2/\Delta H_1$) 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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