

INTISARI

Penelitian konjugasi *Soybean flour*-Maltodekstrin (SF-MD) melalui *wet heating* serta aplikasinya dalam menstabilkan *High Internal Phase Emulsion* (HIPEs) berbasis Minyak Zaitun berhasil dilakukan. Evaluasi meliputi aktivitas pengemulsi, stabilitas, derajat glikasi (DG), sifat pembentukan busa, struktur sekunder protein dengan FTIR, kestabilan penyimpanan, perlakuan dalam suhu ekstrim dan perilaku reologi telah dilakukan. Hasil menunjukkan bahwa rasio konjugat 3:1 (SF-MD) menghasilkan DG paling tinggi ($17.82 \pm 2.97 \%$), IAE sebesar $31.68 \pm 1.32 \text{ m}^2\text{g}^{-1}$, menghasilkan droplet yang kecil dan seragam, viskositas lebih tinggi, rentang viskoelastis linier lebih luas, dan elastisitas lebih kuat. Reaksi Maillard terbukti efektif dalam meningkatkan sifat fungsional melalui pembentukan film antarmuka yang kohesif dan fleksibel, sementara metode *wet heating* menawarkan pendekatan yang layak dan *feasible* untuk aplikasi industri. Secara keseluruhan, konjugat SF-MD berpotensi menjadi emulsifier *clean-label* yang berkelanjutan, menggantikan emulsifier sintesis, serta membuka peluang pengembangan formulasi pangan yang lebih sehat dan ramah lingkungan.

Kata kunci: *High internal phase emulsions*; Reaksi Maillard; Konjugasi *Wet-heating*; *Soybean flour*; Maltodekstrin

ABSTRACT

The conjugation of Soybean Flour–Maltodextrin (SF-MD) via wet heating and its application in stabilizing olive oil-based high internal phase emulsions (HIPEs) was successfully conducted. Evaluations included emulsifying activity, stability, degree of glycation (DG), foaming properties, protein secondary structure by FTIR, storage stability, extreme-temperature treatments, and rheological behavior. The results showed that the 3:1 (SF-MD) conjugate ratio produced the highest DG ($17.82 \pm 2.97\%$), EAI of $31.68 \pm 1.32 \text{ m}^2\text{g}^{-1}$, smaller and more uniform droplets, higher viscosity, broader linear viscoelastic regions, and stronger elasticity. The Maillard reaction proved effective in enhancing functional properties through the formation of cohesive and flexible interfacial films, while wet heating offered a feasible and scalable approach for industrial applications. Overall, SF-MD conjugates have great potential as sustainable clean-label emulsifiers to replace synthetic ones, opening opportunities for the development of healthier and environmentally friendly food formulations.

Keywords: High internal phase emulsions; Maillard reaction; Wet-heating conjugation; Soybean flour; Maltodextrin