

**OIL-IN-WATER EMULSION PRODUCTION USING *Azolla microphylla*
PROTEIN AS NATURAL EMULSIFIER: EMULSIFIER
CONCENTRATION EVALUATION**

INTISARI

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Pengemulsi alami semakin banyak dieksplorasi sebagai alternatif berkelanjutan untuk pengemulsi sintetis dan berbahan dasar hewan. Penelitian ini bertujuan untuk mengevaluasi potensi protein *Azolla microphylla* sebagai pengemulsi lokal alami. Protein *Azolla microphylla* diekstraksi dengan metode ekstraksi alkali-UAE dan digunakan untuk membuat emulsi O/W (*oil-in-water*) pada konsentrasi yang bervariasi (0,1%; 0,3%; dan 0,5%). Stabilitas emulsi dievaluasi melalui protein teradsorpsi, viskositas, ukuran partikel, *polydispersity index* (PDI), dan *zeta potential*. Hasil menunjukkan bahwa konsentrasi protein yang tinggi menghasilkan emulsi yang lebih stabil. Kadar protein teradsorpsi tertinggi (56,83%), viskositas tertinggi (6,51 cP), ukuran partikel terkecil (0,39 μm) dengan PDI 0,29, dan *zeta potential* -49,70 mV, teramati pada konsentrasi 0,5%, yang menunjukkan stabilitas emulsi keseluruhan yang lebih baik. Oleh karena itu, protein *Azolla microphylla* menunjukkan potensi yang menjanjikan sebagai pengemulsi alami, terutama pada konsentrasi yang lebih tinggi.

Kata kunci: protein *Azolla microphylla*, ekstraksi berbantuan ultrasonik, pengemulsi, emulsi O/W (*oil-in-water*), stabilitas emulsi

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ABSTRACT

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Naturally-sourced emulsifiers are increasingly explored as sustainable alternatives for synthetic and animal-sourced emulsifier. This research aimed to evaluate *Azolla microphylla* protein potential as a naturally and locally-sourced emulsifier. *Azolla microphylla* protein was extracted with alkali-UAE extraction method and used to prepare oil-in-water emulsion at varying concentration (0,1%; 0,3%; and 0,5%). Emulsion stability evaluated through adsorbed protein, viscosity, particle size, polydispersity index (PDI), and zeta potential. The result showed that high protein concentration creates more stable emulsion. Highest adsorbed protein (56,83%), highest viscosity (6,51 cP), smallest particle size (0,39 μm) with a PDI of 0,29, and a zeta potential of -49,70 mV, were observed at 0,5% indicating better overall emulsion stability. Therefore, *Azolla microphylla* protein demonstrates promising potential as a natural emulsifier, particularly at higher concentration.

Keywords: *Azolla microphylla* protein, ultrasound assisted extraction, emulsifier, oil-in-water emulsion, emulsion stability