

**FORMULASI MARGARIN YANG DIPERKAYA OMEGA-3 DAN
 β -CAROTENE DARI MINYAK SACHA INCHI (*Plukenetia volubilis* L.)
DAN OLEIN SAWIT MERAH (*Elaeis guineensis*) DENGAN
PENAMBAHAN STEARIN SAWIT**

INTISARI

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Penerapan kebijakan nol lemak trans di berbagai negara semakin diperkuat seiring belum tercapainya target Organisasi Kesehatan Dunia (WHO) untuk mengeliminasi asam lemak trans (TFA) hasil produksi industri dari rantai pangan global hingga akhir tahun 2023. Margarin masih menjadi salah satu sumber utama TFA dalam diet, terutama akibat penggunaan minyak terhidrogenasi parsial dan proses pemurnian bersuhu tinggi. Interesterifikasi enzimatis merupakan metode alternatif yang menjanjikan karena mampu memodifikasi struktur triasilgliserol tanpa menghasilkan TFA serta memperbaiki sifat fisikokimia lemak. Penelitian ini bertujuan untuk mengembangkan margarin tinggi omega-3 dan β -carotene berbasis olein sawit merah (RPO) dan minyak sachu inchi (SIO) yang terinteresterifikasi secara enzimatis dengan penambahan stearin sawit (PS), serta menentukan formulasi optimum berdasarkan karakteristik fisik dan kimia. Formulasi margarin disusun dengan perbandingan RPO-SIO terhadap PS sebesar 50:50, 70:30, dan 90:10. Parameter yang dianalisis meliputi kapasitas penahanan minyak, tekstur (kekerasan dan adhesivitas), nilai peroksida, nilai asam, dan kadar air. Hasil penelitian menunjukkan bahwa formulasi 70:30 merupakan formulasi optimum dengan nilai kapasitas penahanan minyak (97,62%), tingkat kekerasan (34,99 N), and adhesivitas (62,32 Nmm) terbaik serta memenuhi standar regulasi (EAS 14:2000 dan SNI) untuk parameter kimia. Margarin optimum didominasi oleh asam palmitat (44,21%) dengan rasio omega-6/omega-3 sebesar 3,5:1. Selain itu, margarin ini memiliki kandungan β -karoten sebesar (420 ppm) dan aktivitas penangkap radikal DPPH sebesar 24,26%. Hasil ini menunjukkan bahwa interesterifikasi enzimatis RPO-SIO dengan penambahan stearin sawit berpotensi menghasilkan margarin dengan kualitas fisik, nutrisi, dan fungsional yang baik.

Kata kunci:

Margarin; Interesterifikasi enzimatis; Olein sawit merah; Stearin sawit; Minyak sachu inchi

FORMULATION OF MARGARINE ENRICHED WITH OMEGA-3 AND β -CAROTENE FROM SACHA INCHI OIL (*Plukenetia volubilis* L.) AND RED PALM OLEIN (*Elaeis guineensis*) WITH THE ADDITION OF PALM STEARIN

ABSTRACT

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In recent years, many countries have strengthened zero trans-fat policies following the World Health Organization's failed mission to eliminate industrially produced trans fatty acids (TFAs) from the global food supply by the end of 2023. Margarine remains a major dietary source of TFAs, primarily due to the use of partially hydrogenated vegetable oils and high temperature processing during oil refining. Interesterification has emerged as a promising alternative, as it modifies the triacylglycerol structure by rearranging fatty acids without generating TFAs, thereby improving the physicochemical properties of fats. This study aimed to develop high omega-3 and β -carotene margarine using enzymatically interesterified red palm olein (RPO) and sacha inchi oil (SIO), blended with palm stearin (PS), and to determine the optimal formulation based on physical and chemical characteristics. Margarine formulations were prepared at RPO-SIO to PS ratios of 50:50, 70:30, and 90:10. The formulations were evaluated for oil holding capacity, texture (hardness and adhesiveness), peroxide value, acid value, and moisture content. Among the tested formulations, the 70:30 blend demonstrated the most favorable overall performance, exhibiting superior Oil Holding Capacity (97,62%), Hardness (34,99 N), and Adhesiveness (62,32 Nmm). Additionally, this formulation complied with EAS 14:2000 and SNI for peroxide value, acid value, and moisture content. Fatty acid analysis revealed that the optimized margarine was dominated by palmitic acid (44.21%) and exhibited a balanced omega-6/omega-3 ratio of 3.5:1. Furthermore, the margarine retained a high β -carotene content (420 ppm) and showed DPPH scavenging activity of 24.26%. These findings indicate that enzymatic interesterification of RPO-SIO combined with palm stearin offers a viable approach for producing margarine with desirable physicochemical, nutritional, and functional properties.

Keywords: Margarine; Enzymatic Interesterification; Red Palm Olein; Palm Stearin; Sacha Inchi Oil