

**THE POTENTIAL OF LIMA BEAN (*Phaseolus lunatus* L.) AND PATIN FISH
(*Pangasius hypophthalmus*) IN REPAIRING SKIN HISTOLOGICAL
STRUCTURE IN MALNUTRITION-INDUCED MALE RATS**

BIOLOGY UNDERGRADUATE THESIS

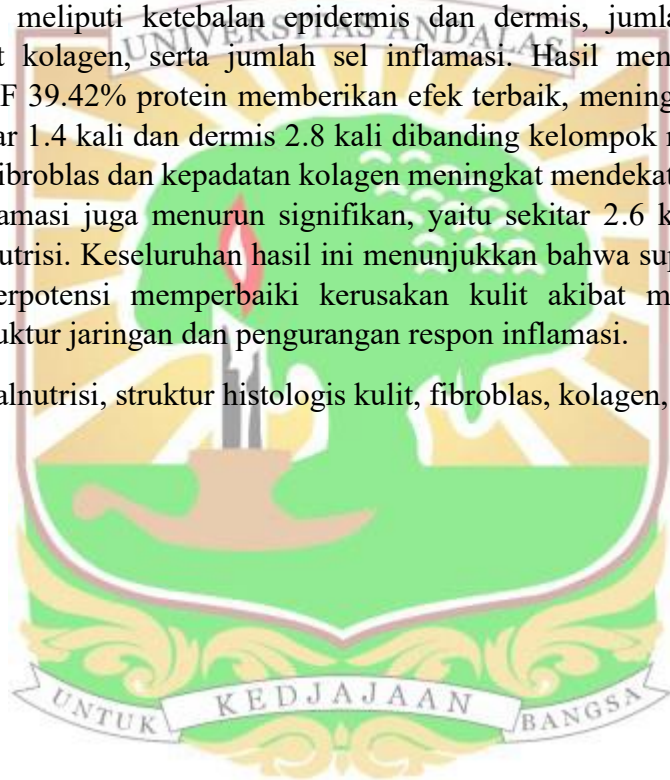


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PADANG
2025

ABSTRAK

Kekurangan asupan protein dapat menyebabkan malnutrisi yang berdampak pada kerusakan struktur kulit. Di Sumatera Barat, prevalensi malnutrisi protein mencapai 23,6% pada tahun 2024, melebihi ambang batas kategori tinggi ($>20\%$). Penelitian ini dilakukan untuk menilai efektivitas kombinasi kacang lima dan tepung ikan patin (LBPF) dalam memperbaiki struktur histologis kulit tikus Wistar jantan yang mengalami malnutrisi. Tikus dibagi dalam lima kelompok: normal (P1), malnutrisi (P2), malnutrisi dengan pakan standar (P3), serta dua kelompok suplementasi LBPF masing-masing LBPF 31.71% protein (P4) dan LBPF 39.42% protein (P5). Parameter yang dianalisis meliputi ketebalan epidermis dan dermis, jumlah sel fibroblas, kepadatan serat kolagen, serta jumlah sel inflamasi. Hasil menunjukkan bahwa pemberian LBPF 39.42% protein memberikan efek terbaik, meningkatkan ketebalan epidermis sekitar 1.4 kali dan dermis 2.8 kali dibanding kelompok malnutrisi. Selain itu, jumlah sel fibroblas dan kepadatan kolagen meningkat mendekati kondisi normal. Jumlah sel inflamasi juga menurun signifikan, yaitu sekitar 2.6 kali dibandingkan kelompok malnutrisi. Keseluruhan hasil ini menunjukkan bahwa suplementasi LBPF dosis tinggi berpotensi memperbaiki kerusakan kulit akibat malnutrisi melalui peningkatan struktur jaringan dan pengurangan respon inflamasi.

Kata kunci: Malnutrisi, struktur histologis kulit, fibroblas, kolagen, sel inflamasi.



ABSTRACT

Inadequate protein intake can lead to malnutrition, which impacts skin structure integrity. In West Sumatra, the prevalence of protein malnutrition reached 23.6% in 2024, exceeding the high-category threshold ($>20\%$). This study aimed to assess the effectiveness of a combination of lima bean and patin fish flour (LBPF) in improving the skin histological structure in malnourished male Wistar rats. Rats were divided into five groups: normal (P1), malnourished (P2), malnourished with standard feed (P3), and two LBPF supplementation groups receiving 31.71% protein (P4) and LBPF 39.42% protein (P5), respectively. Parameters analyzed included epidermal and dermal thickness, fibroblast cells count, collagen fibers density, and inflammatory cells count. Results showed that the administration of 39.42% protein LBPF yielded the best effects, increasing epidermal thickness by approximately 1.4 times and dermal thickness by 2.8 times compared to the malnourished group. Furthermore, the fibroblast cell counts and collagen density increased to near-normal levels. The inflammatory cell counts also significantly decreased, by approximately 2.6 times compared to the malnourished group. Overall, these results indicate that high-dose LBPF supplementation has the potential to repair skin damage caused by malnutrition by enhancing tissue structure and reducing inflammatory responses.

Keywords: Malnourished, skin histologic structure, fibroblasts, collagen, inflammatory cell

