

**UJI KEAMANAN DAN KOMPATIBILITAS MULTI-STRAIN
PROBIOTIK *Lactiplantibacillus plantarum* subsp. *plantarum* (STRAIN Dad-
13 DAN FNCC-0250) DAN *Lacticaseibacillus paracasei* GMRMP-001
SECARA IN VIVO**

ABSTRAK

Multi-strain probiotik merupakan gabungan probiotik dari beberapa strain atau spesies bakteri asam laktat yang berbeda. Dalam penelitian ini *multi-strain* terdiri dari *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250, *Lacticaseibacillus paracasei* GMRMP-001. Penelitian ini bertujuan untuk mengevaluasi keamanan dan kompatibilitas *multi-strain* probiotik dengan dosis tinggi selama 28 hari. Dua puluh empat ekor tikus dibagi menjadi 4 kelompok: kelompok control (P1), kelompok susu skim (P2), kelompok *single-strain* probiotik (P3), kelompok *multi-strain* probiotik (P4). Bobot badan, konsumsi pakan, bobot organ, parameter hematologi, *serum glutamic oxaloacetic transaminase* (SGOT), konsentrasi *serum glutamic pyruvic transaminase* (SGPT), morfologi usus tikus, translokasi bakteri dalam darah, organ (ginjal, limpa, dan hati) dievaluasi. Kompatibilitas mikroba dan populasi dalam digesta dan feses ditentukan dengan metode *total plate count* dan kemungkinan translokasi bakteri pada *multi-strain* probiotik dianalisis dengan metode rep-PCR. Hasil penelitian menunjukkan bahwa probiotik *multi-strain* tidak berdampak buruk pada kesehatan secara keseluruhan, berat organ, status hematologi darah, maupun fungsi enzim SGOT dan SGPT pada tikus. Adanya peningkatan jumlah probiotik *multi-strain* dalam kotoran tikus menunjukkan bakteri berhasil bertahan melewati sistem pencernaan. Bakteri yang ditemukan pada darah dan organ tikus diidentifikasi secara molekuler dan hasil menunjukkan bahwa tidak ada isolat yang identik dengan *Lacticaseibacillus paracasei* GMRMP-001. Oleh karena itu disimpulkan *Lacticaseibacillus paracasei* GMRMP-001 tidak dapat bertranslokasi dan aman untuk dikonsumsi.

Kata Kunci : *Multi-strain* probiotik, Evaluasi keamanan, Kompatibilitas *multi-strain* probiotik

**SAFETY ASSESMENT AND COMPATIBILITY OF *MULTI-STRAIN*
PROBIOTIC *Lactiplantibacillus plantarum* subsp. *plantarum* (STRAIN Dad-
13 AND FNCC-0250) AND *Lacticaseibacillus paracasei* GMRMP-001 IN
VIVO**

ABSTRACT

Multi-strain probiotic is comprised of different strain or species of lactic acid bacteria. In this study the multi-strain is comprised of *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250, *Lacticaseibacillus paracasei* GMRMP-001. Before the application of probiotic, safety and the compatibility of new multi-strain probiotic is necessary to be assessed. In this research, body weight, feed intake, organ weight, hematological parameters, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT) concentrations, intestinal of the rats, translocation of bacteria in blood, organs (kidneys, spleen, and liver) were evaluated. Microbial compatibility and population in digesta, feces are measured by total plate count method and the possibility of bacterial translocation in multi-strain probiotic is analyzed using molecular detection repetitive PCR method. The study findings indicate that the intake of a multi-strain probiotic had no adverse impact on overall health, the weight of organs, blood health indicators, or the functioning of SGOT and SGPT enzymes in rats. Additionally, an increase in the quantity of the multi-strain probiotic in the rats' feces was observed, suggesting that the bacteria successfully endured the conditions within the gastrointestinal system. The presence of bacteria in the blood and organs across all groups was determined through repetitive-polymerase chain reaction (PCR) and 16S rRNA gene sequencing analysis, it showed that none of them belong to *Lacticaseibacillus paracasei* GMRMP-001, it indicates this strain, did not translocate in the organs and blood of rats. Therefore *Lacticaseibacillus paracasei* GMRMP-001 is considered safe.

Keywords: *multi-strain probiotic, compatibility of multi-strain, safety assessment*