

INTISARI

Latar Belakang: Malnutrisi menyebabkan kegagalan pertumbuhan dan penurunan imunitas karena adanya perubahan struktur lapisan mukosa seperti protein Mucin-2 (MUC2). Suplementasi makanan tambahan seperti tepung pisang klutuk (*Musa balbisiana* Colla) terfortifikasi zat besi dan *Lactobacillus plantarum* Dad-13 dapat menjadi salah satu strategi untuk mengatasi malnutrisi.

Tujuan: Penelitian ini bertujuan untuk mengetahui pengaruh tepung pisang klutuk terfortifikasi zat besi dan *Lactobacillus plantarum* Dad-13 terhadap ekspresi MUC2 dan kadar protein MUC2 pada kolon tikus malnutrisi.

Metode: Penelitian ini menggunakan 25 tikus Wistar jantan yang dibagi menjadi 5 kelompok, yaitu kontrol normal (KN), kontrol malnutrisi (KM), malnutrisi + *refeeding* (R), malnutrisi + tepung pisang klutuk terfortifikasi zat besi (TpFe), dan malnutrisi + tepung pisang klutuk terfortifikasi zat besi dan *Lactobacillus plantarum* Dad-13 (TpFeLp). Induksi malnutrisi dilakukan selama 3 minggu dengan pemberian diet rendah protein dan sonde indometasin. Intervensi pemberian suplementasi dilakukan selama 4 minggu. Tikus dieutanasia pada akhir penelitian, jaringan kolon diambil untuk kuantifikasi ekspresi gen MUC2 dengan qPCR dan kadar protein MUC2 dengan ELISA. Analisis statistik dilakukan dengan uji *one way* ANOVA dilanjutkan *post-hoc* Tukey. Nilai signifikansi sebesar $p < 0,05$.

Hasil: Kelompok KM memiliki berat lebih rendah dibandingkan semua kelompok KN ($p < 0,001$). Kelompok TpFe memiliki peningkatan berat badan tertinggi setelah suplementasi pada malnutrisi. Tidak ada perbedaan signifikan terhadap ekspresi MUC2 kolon tikus pada semua kelompok ($p > 0,05$). Kadar protein MUC2 pada jaringan kolon kelompok TpFeLp lebih tinggi dibanding kelompok KM ($p < 0,05$).

Kesimpulan: Suplementasi tepung pisang klutuk terfortifikasi zat besi dan *Lactobacillus plantarum* Dad-13 pada tikus malnutrisi menunjukkan adanya peningkatan ekspresi dan kadar protein MUC2.

Kata Kunci: malnutrisi, Mucin-2, tepung pisang klutuk, fortifikasi zat besi, *Lactobacillus plantarum* Dad-13.

ABSTRACT

Background: Malnutrition causes growth failure and decreased immunity due to changes in the structure of the mucosal layer such as Mucin-2 protein (MUC2). Supplementation of additional foods such as iron-fortified klutuk banana flour (*Musa balbisiana* Colla) and *Lactobacillus plantarum* Dad-13 can be one strategy to overcome malnutrition.

Objective: This study aimed the effect of Iron-fortified klutuk banana flour and *Lactobacillus plantarum* Dad-13 supplementation on the expression of MUC2 and level of MUC2 protein in the colon of malnourished rats.

Methods: This study used 25 male Wistar rats divided into 5 groups, namely normal control (NC), malnutrition control (MC), malnutrition + refeeding (R), malnutrition + iron-fortified klutuk banana flour (IBF), and malnutrition + iron-fortified klutuk banana flour and *Lactobacillus plantarum* Dad-13 (IBLF). Induction of malnutrition was carried out for 3 weeks with the administration of a low-protein diet and indomethacin sonde. The supplementation intervention was carried out for 4 weeks. Rats were euthanized at the end of the study, colonic tissue was taken to quantify MUC2 gene expression with qPCR and MUC2 protein levels with ELISA. Statistical analysis was performed with one way ANOVA test followed by post-hoc Tukey. The significance value is $p < 0.05$.

Result: The MC group had a lower weight than all NC groups ($p < 0.001$). The IBF group had the highest increase in body weight after supplementation in malnutrition. There was no significant difference in MUC2 expression of rat colon in all groups ($p > 0.05$). MUC2 protein level in colon tissue of IBLF group was higher than that of MC group ($p < 0.05$).

Conclusion: Supplementation of iron-fortified klutuk banana flour and *Lactobacillus plantarum* Dad-13 in malnourished rats showed increased expression and levels of MUC2 protein.

Keywords: Malnutrition, Mucin-2, Iron-fortified klutuk banana flour, *Lactobacillus plantarum* Dad-13.