

INTISARI

Latar belakang: Malnutrisi disebabkan oleh adanya kekurangan asupan energi atau protein. Malnutrisi menyebabkan keterlambatan perkembangan, disfungsi imun dan infeksi. Peningkatan FGF21 sebagai respon dari malnutrisi protein menyebabkan resistensi GH sehingga kadar IGF-1 plasma menurun. Di Indonesia, pisang klutuk terdistribusi luas di Jawa dan Sulawesi. Kandungan protein di tepung pisang klutuk cukup tinggi yaitu 8,2%. Tepung pisang klutuk terfortifikasi besi diharapkan dapat dijadikan alternatif memperbaiki malnutrisi.

Tujuan Penelitian: Mengkaji pengaruh pemberian tepung pisang klutuk terfortifikasi besi pada tikus malnutrisi terhadap ekspresi gen FGF21 hepar, kadar FGF21, dan IGF-1 plasma.

Metode: Tikus dibagi menjadi 4 kelompok: Kontrol normal (K), kontrol malnutrisi (MK), malnutrisi + tepung pisang (MP), malnutrisi + biskuit (MB). Selama masa induksi kelompok MK diberi pakan normal dengan 20% kasein (20P), sedangkan kelompok MK, MP, dan MB diberi pakan rendah protein isoenergetik dengan 6% kasein (6P) selama 5 minggu. Selama intervensi, kelompok K, MP, dan MB diberi pakan 20P, sedangkan MK diberi pakan 6P. Kelompok MP diberi suplementasi tepung pisang sebesar 1,2 g/200 g berat badan/hari melalui sonde. Kelompok MP diberi suplementasi biskuit makanan pendamping air susu ibu (MP-ASI) pemerintah sebesar 1,2 g/200 g berat badan/hari melalui sonde. Intervensi dilakukan selama 3 minggu. Sampel darah diambil sebelum dan sesudah intervensi. Ekspresi FGF21 hepar diperiksa dengan qPCR. Kadar FGF21 dan IGF-1 plasma diperiksa dengan ELISA.

Hasil Penelitian: Ekspresi FGF21 di jaringan hepar tikus model malnutrisi yang diberikan tepung pisang klutuk terfortifikasi besi lebih rendah dibandingkan dengan tikus kontrol malnutrisi. Kadar FGF21 plasma tikus model malnutrisi setelah pemberian tepung pisang klutuk terfortifikasi meningkat bermakna, sedangkan kadar IGF-1 plasma menurun.

Kesimpulan: Pemberian tepung pisang klutuk terfortifikasi besi pada tikus model malnutrisi memperbaiki kondisi malnutrisi terlihat dari ekspresi FGF21 hepar yang lebih rendah dibandingkan kontrol malnutrisi dan penurunan kadar FGF21 plasma, tetapi belum dapat memperbaiki kadar IGF-1 plasma.

Kata kunci: malnutrisi, FGF21, *Musa balbisiana* Colla, pisang

ABSTRACT

Background: Malnutrition is caused by lack of energy or protein intake. Malnutrition causes developmental delays, immune dysfunction and infection. Increased FGF21 in response to protein malnutrition causes GH resistance and decrease in plasma IGF-1 levels. In Indonesia, klutuk bananas are widely distributed and the protein content is quite high at 8.2%. Iron-fortified klutuk banana flour (BF) is expected to be an alternative to improve malnutrition.

Objective: To examine the effect of BF in malnourished rats on liver FGF21 gene expression, plasma FGF21, and IGF-1 levels.

Methods: Rats were divided into divided into 4 groups: Normal control (NC), malnutrition control (MC), malnutrition + banana flour (MBF), malnutrition + biscuit (MBC). During malnutrition induction, NC group was fed normal diet containing 20% casein (20P) diet and MC, MBF, MBC groups were fed isoenergetic low protein diet containing 6% casein (6P) for 5 weeks. During intervention, NC, MBF and MBC were fed 20P diet, whereas MC were fed 6P diet. The MBF group was supplemented with BF 1,2g/200gBW/day via gavage. The MBC group was supplemented with Indonesian goverment issued complementary food biscuit 1,2g/200gBW/day via gavage. Intervention phase was conducted for 3 weeks. Blood samples were taken before and after the intervention. Liver FGF21 expression was examined by qPCR. Plasma FGF21 and IGF-1 levels were examined by ELISA.

Results: The expression of FGF21 in the liver tissue of malnutrition rats supplemented with BF was lower compared to malnourished control rats. The levels of FGF21 in malnutrition rat plasma after fortified klutuk banana flour increased significantly, while the plasma IGF-1 level decreased.

Conclusion: BF supplementation on malnourished rats improve malnutrition, elicited by decrease expression of liver fibroblast growth factor 21 (FGF21) and decrease in plasma FGF21 level, but could not improve plasma IGF-1 levels.

Keywords: malnutrition, FGF21, *Musa balbisiana* Colla, banana