

POTENSI TEPUNG EMPULUR BATANG PISANG
(*Musa acuminata* Colla) PADA PEMBUATAN FOOD BAR
ANTI DISLIPIDEMIA BERBAHAN PATI
GANYONG (*Canna edulis* Ker.)

INTISARI

Dislipidemia merupakan kelainan profil lipid darah yang ditandai oleh meningkatnya kolesterol total, LDL, trigliserida, dan menurunnya kolesterol HDL. Alternatif penanganan dislipidemia adalah mengonsumsi produk pangan sehat antidislipidemia yang kaya akan komponen bioaktif seperti serat pangan, pati resisten, dan antioksidan. Salah satu bahan pangan lokal yang potensial dikembangkan sebagai sumber serat pangan, pati resisten, dan antioksidan adalah empulur batang pisang Cavendish Jepara 30 (EBP). Bahan ini berpotensi diolah menjadi tepung yang kaya akan serat pangan, pati resisten, dan antioksidan, serta dapat ditingkatkan manfaatnya dengan cara diolah menjadi *food bar* tinggi serat pangan, pati resisten, dan antioksidan yang mempunyai manfaat kesehatan, seperti antidislipidemia. Untuk membuat *food bar* tersebut dapat dilakukan dengan melakukan formulasi yang tepat dengan pati ganyong yang juga merupakan produk lokal. Tujuan penelitian ini (i) memilih perlakuan yang dapat menghasilkan tepung EBP yang memiliki kadar serat pangan larut, pati resisten dan total fenolik yang tinggi dengan warna yang lebih putih dan karakteristiknya, (ii) mendapatkan formula *food bar* pati ganyong – EBP yang memiliki kadar serat pangan, pati resisten dan antioksidan yang tinggi serta diterima secara sensori dan karakteristiknya, (iii) mengevaluasi potensi tepung EBP dan *food bar* pati ganyong – EBP terhadap penurunan kolesterol dan pertahanan antioksidan plasma darah tikus *Sprague Dawley* dislipidemia dan kemungkinan mekanisme penurunan kolesterol oleh serat pangan/pati resisten

Penelitian ini dibagi menjadi 3 (tiga) tahap, yaitu: (i) Preparasi tepung EBP dengan perlakuan *water blanching* selama 5, 10, 15, 20 menit dan perendaman dalam larutan natrium bisulfit 1% selama 30, 60, 90, dan 120 menit. Selanjutnya dipilih perlakuan terbaik dan ditentukan karakterisasinya. (ii) Pengolahan *food bar* pati ganyong - EBP tinggi serat dan antioksidan dengan proporsi pati ganyong : tepung EBP (100:0, 95:5, 90:10, 85:15, 80:20, dan 75:25). Selanjutnya dipilih formula terbaik berdasarkan uji kesukaan sensoris, kadar serat pangan larut, dan antioksidan, dan ditentukan karakteristiknya. (iii) Uji sifat gizi *in vivo* untuk mengetahui pengaruh tepung EBP dan *food bar* pati ganyong-EBP dalam menurunkan kolesterol dan meningkatkan antioksidan darah tikus hiperkolesterolemia. Sedangkan uji sifat gizi *in vitro* untuk mengetahui kapasitas pengikatan asam empedu.

Hasil penelitian tahap 1 menunjukkan bahwa perlakuan *water blanching* selama 10 menit dapat meningkatkan serat pangan larut sebesar 3,55%, pati resisten sebesar 10,33%, total fenolik sebesar 11,19 mg/100, aktivitas antioksidan sebesar 6,15% RSA DPPH, kapasitas menahan air, kapasitas mengembang,

kapasitas tukar kation. Hasil penelitian tahap II menunjukkan *food bar* yang diolah dengan proporsi pati ganyong : tepung EBP 85:15 (FBE) terpilih sebagai *food bar* terbaik dengan skor kesukaan atribut warna $3,12 \pm 0,08$, aroma $3,00 \pm 0,06$, rasa $3,04 \pm 0,18$, tekstur $3,16 \pm 0,12$, kandungan serat pangan larut $0,83 \pm 0,07$ % d.b, pati resisten $6,54 \pm 0,24$ % d.b, total fenolik $105,75 \pm 0,64$ mg/100g, aktivitas antioksidan $6,97 \pm 0,77$ % RSA DPPH, warna dengan kecerahan (L^*) $52,52 \pm 0,60$ dan daya patah $5,08 \pm 1,95$ N. Hasil penelitian tahap III uji secara *in vivo* menunjukkan intervensi diet tepung EB10 dan FBE dapat menurunkan kadar kolesterol total, LDL, trigliserida, dan meningkatkan kadar kolesterol HDL, serta menurunkan Indeks Atherogenik Plasma, menurunkan kadar MDA, dan meningkatkan kapasitas antioksidan plasma tikus *Sprague Dawley* dislipidemia. Intervensi diet pakan FBE menghasilkan konsentration asam propionat yang paling tinggi yaitu $38,08 \pm 15,31$ %. Sementara diet pakan tepung EB10 menghasilkan kolesterol digesta *caecum* tertinggi, yaitu $83,91 \pm 2,07$ mg/100gr. Hasil uji secara *in vitro* menunjukkan diet tepung EB10 dan FBE dapat meningkatkan kemampuan pengikatan asam empedu. Berdasar kedua uji tersebut dapat disimpulkan bahwa penurunan kolesterol tepung EBP dan FBE diduga melalui mekanisme, yaitu (1) peningkatan ekskresi empedu, (2) penghambatan absorpsi kolesterol, (3) peningkatan asam propionat dalam digesta atau gabungan dari ke tiga kemungkinan tersebut. Dengan demikian tepung EBP dapat diformulasikan menjadi pangan yang memberikan efek kesehatan.

Kata kunci: tepung empulur batang pisang, serat pangan, antioksidan, *food bar*, dislipidemia

**POTENTIAL OF EMPULUR FLOUR BANANA STONE
(*Musa acuminata* Colla) IN MAKING FOOD BAR
ANTI DISLIPIDEMIA FROM PATI
GANYONG (*Canna edulis* Ker.)**

ABSTRACT

Dyslipidemia is an abnormality in blood lipid profile characterized by increased total cholesterol, LDL, triglycerides, and decreased HDL cholesterol. An alternative treatment for dyslipidemia is to consume healthy antidislipidemia snacks that are rich in bioactive components such as dietary fiber, resistant starch, and antioxidants. One of the potential local foodstuffs developed as a source of food fiber, resistant starch, and antioxidants is the Cavendish Jepara banana stem pith 30 (EBP). This material has the potential to be processed into starch that is rich in food fiber, resistant starches and antioxidants, and can be improved by processing it into a high-fiber food bar, resistant starch, and antioxidants that have health benefits, such as antidislipidemia. To make the food bar can be done by doing the right formulation with canna starch which is also a local product. The objectives of this study are (i) choosing treatments that can produce EBP flour which has high levels of soluble food fiber, resistant starch and total phenolic with whiter colors and characteristics, (ii) obtaining canna starch food bar formula - EBP which has fiber content food, resistant starch and antioxidant which is high and sensory and characteristics accepted, (iii) evaluating the potential of EBP flour and canna starch food bar - EBP against cholesterol reduction and antioxidant defense of blood plasma of Sprague Dawley rat dyslipidemia and possible mechanism of cholesterol reduction by food fiber / resistant starch

This study was divided into 3 (three) stages, namely: (i) EBP flour preparation by water blanching for 5, 10, 15, 20 minutes and soaking in 1% sodium bisulfite solution for 30, 60, 90, and 120 minutes. Furthermore, the best treatment is chosen and its characterization determined. (ii) Processing of canna starch food bars - EBP high in fiber and antioxidants with proportion of canna starch: EBP flour (100: 0, 95: 5, 90:10, 85:15, 80:20, and 75:25). Then the best formula is chosen based on the sensory preference test, soluble dietary fiber content, and antioxidants, and its characteristics are determined. (iii) In vivo nutritional properties to determine the effect of EBP flour and canna-EBP starch food bars in lowering cholesterol and increasing the antioxidant blood of hypercholesterolemic rats. While in vitro nutrition properties test to determine the binding capacity of bile acids.

The results of the first phase of the study showed that the treatment of water blanching for 10 minutes could increase the soluble food fiber by 3.55%, resistant starch by 10.33%, total phenolic by 11.19 mg / 100, antioxidant activity by 6.15% RSA DPPH , water holding capacity, expanding capacity, cation exchange capacity. The results of the second phase of the study showed that the food bar processed with the proportion of canna starch: EBP 85:15 (FBE) was selected as the best food bar with a favorite color score of 3.12 ± 0.08 , aroma 3.00

± 0.06 , taste 3.04 ± 0.18 , texture 3.16 ± 0.12 , soluble food fiber content $0.83 \pm 0.07\%$ db, resistant starch $6.54 \pm 0.24\%$ db, total phenolic 105.75 ± 0 , 64 mg / 100g, antioxidant activity $6.97 \pm 0.77\%$ RSA DPPH, color with brightness (L^*) 52.52 ± 0.60 and fracture power 5.08 ± 1.95 N. The results of the Phase III study in vivo showed that dietary intervention of EB10 and FBE flour could reduce total cholesterol, LDL, triglyceride levels, and increase HDL cholesterol levels, as well as reduce the Atherogenic Index of Plasma, reduce MDA levels, and increase the antioxidant capacity of Sprague Dawley rats with dyslipidemia rats. FBE dietary intervention produced the highest concentration of propionic acid, $38.08 \pm 15.31\%$. While the EB10 flour diet produced the highest digesta caecum cholesterol, which was 83.91 ± 2.07 mg / 100gr. In vitro test results show that EB10 and FBE flour diets can improve the binding ability of bile acids. Based on the two tests it can be concluded that the reduction in EBP and FBE flour cholesterol is thought to be through a mechanism, namely (1) an increase in bile excretion, (2) inhibition of cholesterol absorption, (3) an increase in propionic acid in digesta or a combination of the three possibilities. Thus EBP flour can be formulated into food that provides health effects.

Keywords: banana stem pith flour, food fiber, antioxidants, food bar, dyslipidemia