

EKSTRAKSI DAN KARAKTERISASI GELATIN DARI KULIT IKAN TUNA *YELLOWFIN* (*Thunnus albacares*) DAN APLIKASINYA PADA ES KRIM

INTISARI

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Diversifikasi sumber kolagen sebagai alternatif bahan baku ekstraksi gelatin telah dilakukan melalui pemanfaatan kulit ikan tuna *yellowfin* (*Thunnus albacares*). Penelitian ini bertujuan untuk mempelajari pengaruh kondisi *pretreatment* menggunakan variasi konsentrasi asam asetat (0,025; 0,05, dan 0,075 mol/L) dan lama perendaman (12, 18, dan 24 jam) terhadap sifat fisik, kimia, dan fungsional gelatin kulit ikan tuna *yellowfin* (GYF) dan menginvestigasi pengaruh aplikasi GYF sebagai penstabil dan pengemulsi terhadap sifat fisik dan sensoris es krim.

Rendemen ekstraksi GYF yang diperoleh sebesar 7,45-14,41%. Pita absorpsi GYF pada spektrum FTIR terletak di daerah pita absorpsi Amida (Amida A, Amida B, Amida I, Amida II, dan Amida III) yang menunjukkan transformasi dari α -*helix* menjadi *random coil* akibat denaturasi kolagen menjadi gelatin. Konsentrasi asam asetat 0,05 mol/L dan lama perendaman 18 jam merupakan kondisi optimum *pretreatment* kulit ikan tuna *yellowfin*.

GYF diklasifikasikan sebagai tipe A menunjukkan nilai pH 5,78. GYF memiliki kadar protein tinggi (88,493%) dan kadar lemak rendah (0,536%). Viskositas dan kekuatan gel GYF (9,81 cP dan 392,03 g *Bloom*) lebih tinggi daripada gelatin *bovine* (GB) (4,9 cP dan 347,88 g *Bloom*) ($p \leq 0,05$). Komposisi asam amino glisin, prolin, dan hidrosiprolin, masing-masing pada GYF (2,62; 1,96 dan 1,14%) dan GB (2,73; 1,89 dan 1,36%). SDS-PAGE GYF menunjukkan intensitas pita yang tinggi pada komponen α dan β . Kapasitas buih, stabilitas buih, dan indeks stabilitas emulsi GYF meningkat seiring peningkatan konsentrasi GYF (0,3-1,0% b/v). GYF memiliki indeks aktivitas emulsi yang lebih tinggi daripada GB ($p \leq 0,05$). *Water-holding capacity* GYF lebih rendah daripada GB ($p \geq 0,05$), tetapi *oil-holding capacity* GYF lebih tinggi daripada GB ($p \geq 0,05$).

Aplikasi gelatin sebagai penstabil dan pengemulsi pada es krim menunjukkan peningkatan nilai *overrun* dan viskositas *ice cream mix* (GYF > gelatin *bovine* komersial > tanpa gelatin) ($p \leq 0,05$), serta penurunan nilai *hardness* dan *melting rate* (GYF < gelatin *bovine* komersial < tanpa gelatin) ($p \leq 0,05$). Evaluasi sensoris es krim menunjukkan skor tertinggi untuk *sandiness* dan *hardness* diperoleh pada es krim tanpa gelatin ($p \leq 0,05$), sedangkan skor tertinggi untuk *smoothness* dan *creaminess* diperoleh pada es krim GYF ($p \leq 0,05$).

kata kunci: Kulit ikan tuna *yellowfin*, gelatin, *pretreatment*, asam asetat, ekstraksi, es krim

EXTRACTION AND CHARACTERIZATION OF GELATIN FROM YELLOWFIN TUNA FISH SKIN (*Thunnus albacares*) AND ITS APPLICATION IN ICE CREAM

ABSTRACT

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Diversification of collagen sources as an alternative raw material for gelatin extraction had been carried out through the use of yellowfin tuna (*Thunnus albacares*) skin. This study aimed to study the effect of pretreatment conditions using variations in the concentration of acetic acid (0,025; 0,05 and 0,075 mol/L) and soaking time (12, 18, and 24 hours) on the physical, chemical, and functional properties of yellowfin tuna fish skin gelatin (GYF) and to investigate the effect of GYF application as a stabilizer and emulsifier on the physical and sensory properties of ice cream.

The GYF extraction yield was 7,45-14,41%. The absorption band of GYF in FTIR spectra was mainly situated in the amide band region (amide A, amide B, amide I, amide II, and amide III) which showed the transformation of the α -helix to random coil due to denaturation of collagen to gelatin. The concentration of 0,05 mol/L acetic acid and soaking time of 18 hours was the optimum pretreatment conditions for yellowfin tuna skin. GYF classified as type A showed a pH value of 5,78. GYF had high protein content (88,493%) and low fat content (0,536%). The viscosity and gel strength of GYF (9,81 cP and 392,03 g Bloom) were higher than that of bovine gelatin (GB) (4,9 cP and 347,88 g Bloom) ($p \leq 0,05$). The amino acid composition of glycine, proline, and hydroxyproline, respectively in the GYF (2,62; 1,96 and 1,14%) and GB (2,73; 1,89 and 1,36%). SDS-PAGE of GYF showed high band intensity in the α and β components. Foam capacity, foam stability, and emulsion stability index of GYF increased as the concentration of GYF increased (0,3-1,0% w/v). GYF had higher emulsion activity index than GB ($p \leq 0,05$). Water-holding capacity of GYF was lower than GB ($p \geq 0,05$), but the oil-holding capacity of GYF was higher than GB ($p \geq 0,05$).

Application of gelatin as a stabilizer and emulsifier on ice cream showed an increase in overrun and viscosity of ice cream mix (GYF > commercial bovine gelatin > without gelatin) ($p \leq 0,05$), as well as a decrease in the hardness and melting rate (GYF < commercial bovine gelatin < without gelatin) ($p \leq 0,05$). Sensory evaluation of ice cream showed the highest score for sandiness and hardness was obtained on ice cream without gelatin ($p \leq 0,05$), while the highest score for smoothness and creaminess was obtained on GYF ice cream ($p \leq 0,05$).

keywords: Yellowfin tuna fish skin, gelatin, pretreatment, acetic acid, extraction, ice cream