

ABSTRAK

SINTESIS, KARAKTERISASI DAN UJI AKTIVITAS SENYAWA KOMPLEKS Cr(III)- LEUSIN DAN Cu(II)-LEUSIN SEBAGAI ANTIDIABETES

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Suplemen antidiabetes diketahui terdapat di senyawa kromium (III) dan tembaga (II). Suplemen antidiabetes dapat diperoleh dengan mensintesis senyawa kompleks Cr(III), Cu(II) dengan asam amino. Penyakit diabetes melitus ditandai dengan peningkatan kadar glukosa dalam darah akibat gangguan sekresi insulin. Pengobatan berupa obat-obatan berbasis logam seperti kompleks dapat digunakan sebagai antidiabetes. Penelitian ini dilakukan untuk mendapatkan senyawa kompleks $[Cr(leu)_3]$, $[Cu(leu)_2]$ dan untuk menguji pengaruh senyawa kompleks terhadap kadar glukosa darah. Sintesis dilakukan menggunakan refluks dan *freezdryer*, senyawa hasil sintesis di karakterisasi menggunakan spektrofotometer *Uv-Vis* dan spektrofotometer *IR*. Hasil karakterisasi spektrofotometer *Uv-Vis* senyawa kompleks $[Cr(leu)_3]$ yaitu pada panjang gelombang 415 nm dan 566 nm dan senyawa kompleks $[Cu(leu)_2]$ yaitu pada 737 nm. Hasil spektrum spektrofotometer *IR* senyawa kompleks $[Cr(leu)_3]$ menunjukkan adanya gugus Cr-N dan Cr-O pada daerah $468,70\text{ cm}^{-1}$ dan $597,93\text{ cm}^{-1}$ serta pada senyawa kompleks $[Cu(leu)_2]$ terdapat serapan Cr-N dan Cr-O yaitu $432,05\text{ cm}^{-1}$ dan $586,36\text{ cm}^{-1}$. Sintesis senyawa kompleks $[Cr(leu)_3]$ didapatkan padatan hijau keabuan dengan rendemen 72 % dan $[Cu(leu)_2]$ berwarna biru dengan rendemen 99 %. Senyawa hasil sintesis dilanjutkan pengujian aktivitas antidiabetes secara *in-vivo*. Data yang diperoleh diuji *One-Way ANOVA* dan dilanjutkan dengan BNT pada taraf nyata 5%. Pemberian dosis yang menurunkan glukosa darah senyawa kompleks $[Cr(leu)_3]$ yang paling baik pada dosis $200\text{ }\mu\text{g/KgBB}$ sebanyak 61% ($132,0 \pm 27,22$)^a, sedangkan pemberian dosis senyawa kompleks $[Cu(leu)_2]$ yang menurunkan kadar glukosa darah paling baik dosis $100\text{ }\mu\text{g/KgBB}$ sebesar 45% ($107,3 \pm 11,93$)^a. Penurunan kadar gula darah yang terjadi membuktikan bahwa senyawa kompleks dapat menjadi suplemen antidiabetes.

Kata kunci : Antidiabetes, karakterisasi, senyawa kompleks, sintesis.

ABSTRACT

SYNTHESIS, CHARACTERIZATION AND ACTIVITY ASSESSMENT OF Cr(III)-LEUCINE AND Cu(II)-LEUCINE COMPOUNDS AS ANTIDIABETES

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Antidiabetic supplements are known to be found in compounds of chromium (III) and copper (II). Antidiabetic supplements can be obtained by synthesizing complex compounds Cr(III), Cu(II) with amino acids. Diabetes mellitus is characterized by increased levels of glucose in the blood due to impaired insulin secretion. Treatment in the form of metal-based drugs such as complexes can be used as antidiabetic. This research was conducted to obtain complex compounds $[\text{Cr}(\text{leu})_3]$, $[\text{Cu}(\text{leu})_2]$ and to examine the effect of complex compounds on blood glucose levels. The synthesis was carried out using reflux and a freezer, the synthesized compounds were characterized using a UV-Vis spectrophotometer and an IR spectrophotometer. The results of the UV-Vis spectrophotometer characterization of complex compounds $[\text{Cr}(\text{leu})_3]$ are at wavelengths of 415 nm and 566 nm and complex compounds $[\text{Cu}(\text{leu})_2]$ are at 737 nm. The results of the IR spectrophotometer for the complex compound $[\text{Cr}(\text{leu})_3]$ showed the presence of Cr-N and Cr-O groups in the 468.70 cm^{-1} and 597.93 cm^{-1} regions and in the complex compound $[\text{Cu}(\text{leu})_2]$ there were the uptake of Cr-N and Cr-O were 432.05 cm^{-1} and 586.36 cm^{-1} . The synthesis of the complex compound $[\text{Cr}(\text{leu})_3]$ was found to be a gray-green solid with a yield of 72% and a blue $[\text{Cu}(\text{leu})_2]$ with a yield of 99%. The synthesized compound was continued with in vivo antidiabetic activity testing. The data obtained were tested by One-Way ANOVA and continued with BNT at a 5% significance level. Administration of a dose that lowers blood glucose of the complex compound $[\text{Cr}(\text{leu})_3]$ was the best at a dose of 200 g/KgBW as much as 61% (132.0 ± 27.22)a, while the administration of a dose of complex compound $[\text{Cu}(\text{leu})_2]$ which reduces blood glucose levels the best at a dose of 100 g/KgBW by 45% (107.3 ± 11.93)a. The decrease in blood sugar levels that occurs proves that the complex compound can be an antidiabetic supplement.

Keywords: Antidiabetic, characterization, complex compounds, synthesis.