

## ABSTRAK

**Latar Belakang:** *Cinnamaldehyde* berpotensi sebagai antidiabetes, namun memiliki kelarutan dan stabilitas rendah. Sistem penghantaran nanoemulsi dapat meningkatkan bioavailabilitas dan efektivitasnya melalui ukuran partikel yang sangat kecil. Oleh karena itu, formulasi dan uji aktivitas antidiabetes sediaan nanoemulsi *Cinnamaldehyde* perlu dilakukan untuk mengetahui karakteristik dan efektivitasnya.

**Tujuan:** Mengetahui perbedaan karakteristik fisik, adanya aktivitas antioksidan, formula optimal, dan aktivitas antidiabetes pada sediaan nanoemulsi *Cinnamaldehyde*.

**Metode:** Penelitian dengan formulasi dan pengujian karakteristik fisik, aktivitas antioksidan, serta aktivitas antidiabetes secara *in vivo* sediaan nanoemulsi *Cinnamaldehyde*. Penelitian menggunakan *pre-test and post-test control group design* dengan sampel 4 kelompok tikus jantan galur Wistar.

**Hasil:** Sediaan nanoemulsi *Cinnamaldehyde* dengan kombinasi tween 80 dan PEG 400 sebesar 3:1 merupakan formula optimal dengan karakteristik bau khas, warna kuning jernih, tipe O/W, pH  $6,86 \pm 0,07$ ; viskositas  $1335 \pm 7,57$  cP, persen transmattan  $99,08 \pm 0,23\%$ , ukuran partikel 96,83 nm, zeta potensial -1,348 mV, stabil secara fisik dan selama *cycling test*, memiliki persen inhibisi DPPH  $85,93 \pm 1,57\%$ , dan mampu menurunkan kadar GDP pada tikus hiperglikemia sebesar 42,52%.

**Kesimpulan:** Variasi kombinasi tween 80 dan PEG 400 menghasilkan perbedaan karakteristik fisik dan aktivitas antioksidan pada sediaan nanoemulsi *Cinnamaldehyde*, dimana F2 sebagai formula optimal mampu menurunkan kadar GDP lebih besar dibandingkan kontrol normal dan negatif, namun lebih kecil dibandingkan kontrol positif.

**Kata kunci:** *Nanoemulsi, Cinnamaldehyde, Antidiabetes, In vivo*

## ABSTRACT

**Background:** Cinnamaldehyde has antidiabetic potential, but has low solubility and stability. Nanoemulsion drug delivery can improve its bioavailability and therapeutic efficacy due to its small droplet size. Therefore, formulation and evaluation of Cinnamaldehyde nanoemulsion were conducted to determine its characteristics and antidiabetic effectiveness.

**Aim:** To determine the differences in physical characteristics, antioxidant activity, optimal formulation, and antidiabetic activity of Cinnamaldehyde nanoemulsion.

**Methods:** This study involved formulation and evaluation of Cinnamaldehyde nanoemulsion's physical characteristics, antioxidant activity, and antidiabetic activity. A pre-test and post-test control group design was used with four groups of male Wistar rats.

**Results:** Cinnamaldehyde nanoemulsion with tween 80 and PEG 400 (3:1) was identified as the optimal formula, exhibiting characteristics of distinctive odor, clear yellow color, O/W type, pH  $6,86 \pm 0,07$ ; viscosity  $1335 \pm 7,57$  cP, percent transmittance  $99,08 \pm 0,23\%$ ; particle size 96,83 nm; zeta potential  $-1,348$  mV; good physical stability and during the cycling test, DPPH inhibition percentage  $85,93 \pm 1,57\%$ , and the ability to reduce FBG levels by 42.52%.

**Conclusion:** Variations in combination of tween 80 and PEG 400 resulted in differences physical characteristics and antioxidant activity, where F2 as the optimal formula, was able to reduce FBG levels more than the normal and negative controls, but less than the positive control.

**Key Words:** *Nanoemulsion, Cinnamaldehyde, Antidiabetes, In vivo*