

# Sintesis Senyawa Turunan Camphor Quinoline Hidrazida-hidrazon melalui Reaksi Pfitzinger dengan Katalis Nanopartikel La<sub>2</sub>O<sub>3</sub> serta Uji Aktivitas Antibakteri dan Antioksidan = Synthesis Derivatives of Camphor Quinoline Hydrazide-hydrazone via Pfitzinger Reaction with La<sub>2</sub>O<sub>3</sub> Nanoparticles Catalyst and its Antibacterial and Antioxidant Activities

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## Abstrak

Pada penelitian ini, senyawa dengan kerangka quinoline dan camphor akan digabungkan melalui linker hidrazida-hidrazon. Senyawa asam quinoline-4-karboksilat menjadi struktur awal sebelum direaksikan dengan camphor. Senyawa ini disintesis melalui reaksi Pfitzinger dengan bantuan katalis nanopartikel La<sub>2</sub>O<sub>3</sub>. Penggunaan katalis La<sub>2</sub>O<sub>3</sub> pada reaksi menunjukkan yield yang relatif baik. Katalis La<sub>2</sub>O<sub>3</sub> disintesis melalui metode sol gel menggunakan polietilena glikol (PEG) sebagai capping agent sehingga diperoleh katalis berukuran 40–50 nm. Senyawa asam quinoline-4-karboksilat kemudian melalui tahapan esterifikasi dengan etanol, reaksi dengan hidrazin hidrat, dan reaksi dengan camphor sehingga terbentuk senyawa turunan camphor hidrazida-hidrazon. Selanjutnya, aktivitas antioksidan dari produk target diuji dengan metode DPPH, sedangkan aktivitas antibakteri diuji dengan metode difusi cakram terhadap bakteri *Eschericia coli* (bakteri gram negatif) dan *Staphylococcus Aureus* (bakteri gram positif).

.....In this study, compounds with a quinoline and camphor framework will be combined through a hydrazide-hydrazone linker. Quinoline-4-carboxylic acid compounds become the key structure before being reacted with camphor. This compound was synthesized through the Pfitzinger reaction with a La<sub>2</sub>O<sub>3</sub> nanoparticle catalyst. The use of La<sub>2</sub>O<sub>3</sub> catalyst in the reaction showed a relatively good yield. La<sub>2</sub>O<sub>3</sub> catalyst was synthesized through the sol gel method using polyethylene glycol (PEG) as a capping agent to obtain a catalyst with a size of 40–50 nm. The quinoline-4-carboxylic acid compound then went through the stages of esterification with ethanol, reaction with hydrazine hydrate, and reaction with camphor to form a derivative compound of camphor hydrazide-hydrazone. Furthermore, the antioxidant activity of the target product was tested by the DPPH method, while the antibacterial activity was tested by the agar disc diffusion method against *Eschericia coli* (gram-negative bacteria) and *Staphylococcus Aureus* (gram-positive bacteria).