

## Sintesis senyawa turunan piranopirazol dengan nanokatalis ZnO dari ekstrak buah sapindus rarak Dc = Synthesis of pyranopyrazole derivatives with ZnO nanocatalyst from sapindus rarak Dc

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### Abstrak

#### <b>ABSTRAK</b><br>

Senyawa turunan piranopirazol telah berhasil disintesis melalui reaksi multikomponen dengan mereaksikan etil asetoasetat, hidrazin hidrat, malononitril, dan aldehida aromatik yang divariasikan benzaldehida senyawa 1, sinamaldehida senyawa 2 dan vanilin senyawa 3, melalui reaksi kondensasi Knoevenagel dan adisi Michael. Ketiga produk yang terbentuk tersebut dianalisis menggunakan instrumentasi FTIR, UV-Vis, dan GC-MS. Pada reaksi tersebut digunakan nanokatalis ZnO dari ekstrak buah Sapindus rarak Dc yang berhasil disintesis dengan metode in situ dan dikonfirmasi dengan instrumentasi FTIR, XRD, SEM-EDS, dan PSA. Berdasarkan hasil optimasi reaksi diperoleh kondisi optimum reaksi pada 1,5 jam reaksi, suhu ruang, dan 7,5 berat katalis. Persen yield yang diperoleh pada kondisi optimum tersebut terhadap produk satu sebesar 74,29, terhadap produk dua sebesar 40,93, dan terhadap produk tiga sebesar 46,74.

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#### <b>ABSTRACT</b><br>

Pyranopyrazole derivatives were successfully synthesized through multicomponent reaction by reacting ethyl acetoacetate, hydrazine hydrate, malononitrile and varying the aryl aldehydes used benzaldehyde compound 1, cinnamaldehyde compound 2 and vanillin compound 3, through Knoevenagel condensation and Michael addition reactions. Characterization of the four of products were performed by using FTIR, UV Vis, and GC MS instrumentation. Beside that, ZnO nanocatalyst from Sapindus rarak Dc also used in the reactions, which was synthesized by in situ method and characterized by FTIR, XRD, SEM EDS, and PSA instrumentation. The optimum conditions of the reaction are 1,5 hour at reaction time, at room temperature, and 7,5 wt of catalyst. The yield percentage obtained at optimum conditions for compound 1 74,29, for compound 2 40.93, and for compound 3 46.74.