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Synthesis and antimicrobial activity evaluation of coumarin-3-carboxylic acids obtained via Knoevenagel Condensation using chitosan as a recyclable catalyst

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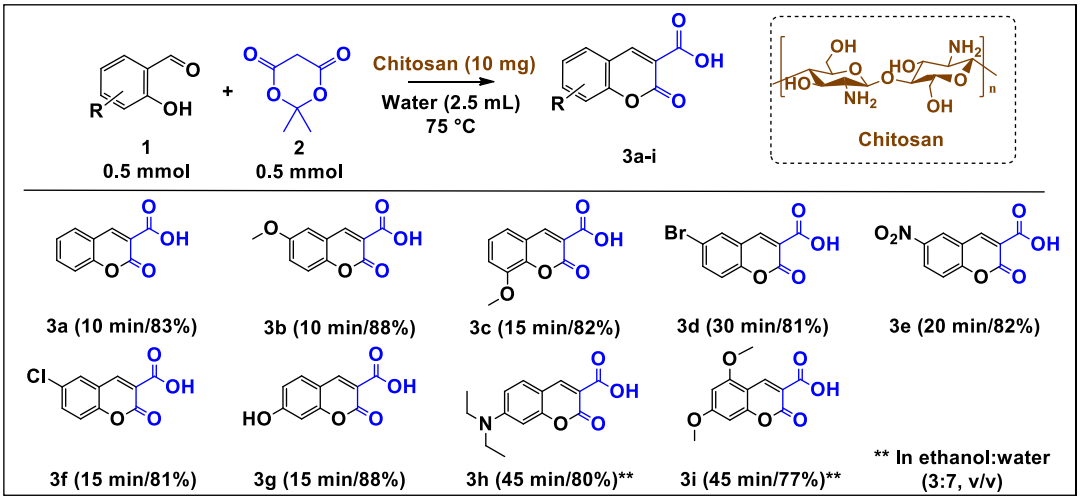
ABSTRACT

Commercial chitosan was used as a catalyst for the efficient synthesis of coumarinic-3-carboxylic acids in water at 75°C via Knoevenagel condensation. The reaction between substituted salicylaldehydes (**1**) and Meldrum's acid (**2**) under mild conditions yielded high yields (77-88%) of coumarin-3-carboxylic acids (**3a-i**) in short reaction times (10-45 minutes) without the need for extensive purification (Scheme 1). This method associated the benefits of homogeneous catalysis with the recovery and reuse of the catalyst up to four times, maintaining its catalytic activity and structural integrity [1].



Scheme 1. Application of substituted salicylaldehydes to obtain various coumarin-3-carboxylic acids using commercial chitosan as recyclable catalyst.

In antimicrobial evaluations against 12 strains of fungi and bacteria, coumarin-3-carboxylic acids **3c-e**, **3h** and **3i** showed significant inhibitory effects (1024-256 µg/mL). Notably, product **3d** exhibited the lowest minimum inhibitory concentration (MIC) against fungal and bacterial strains (256 µg/mL), suggesting its potential as a bactericidal and fungicidal agent [2].

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