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Extraction of Cinnamaldehyde from Cinnamon Bark and its Aldol Condensation Reaction

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Abstract: Cinnamaldehyde, a major component of cinnamon bark oil, possesses significant industrial applications in the food, pharmaceutical, and cosmetic industries due to its distinctive aroma and biological properties. This study explores the extraction of cinnamaldehyde from cinnamon bark using steam distillation, followed by its aldol condensation reaction to synthesize α , β -unsaturated carbonyl compounds. The extraction process involves heating crushed cinnamon bark in water, generating steam that carries volatile oil components, which are then condensed and collected. The separated oil phase is further purified using solvent extraction and drying techniques to obtain pure cinnamaldehyde. The effectiveness of steam distillation in isolating cinnamaldehyde is evaluated based on yield and purity. Following extraction, cinnamaldehyde undergoes aldol condensation in the presence of a base catalyst, typically sodium hydroxide or potassium hydroxide, resulting in the formation of higher molecular weight carbonyl compounds. This reaction is crucial in organic synthesis, as it leads to the formation of complex molecular structures used in various industrial applications, including fragrance synthesis and pharmaceutical intermediates. The study provides insights into natural product isolation and their subsequent chemical modifications, demonstrating an integrated approach to extraction and organic synthesis. Additionally, it emphasizes the efficiency and sustainability of steam distillation in extracting valuable organic compounds from natural sources. The aldol condensation reaction further highlights the chemical reactivity of cinnamaldehyde, paving the way for its utilization in industrial and laboratory settings ..

Keywords: Cinnamaldehyde, Cinnamon bark, Steam distillation, Essential oil extraction, Aldol condensation

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