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A Study on the Production of High-Quality Carbamazepine-Saccharin Co-Crystals: The Role of Seeding Conditions

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Source EGYPTIAN JOURNAL OF CHEMISTRY
Volume: 68 Issue: 8 Page: 161-168
DOI: 10.21608/EJCHEM.2024.325215.10560

Published AUG 2025

Indexed 2025-06-26

Document Type Article

Abstract Seeding involves introducing a pre- formed Carbamazepine-Saccharin (CBZ-SAC) co-crystal into a solution, influenced by seeding temperature, seed size and seed loading. The primary objective of this research is to explore the effects of seeding temperature, seed size and seed loading on the production of CBZ-SAC co-crystals. The seeding experiment was done by adding seed crystal at targeted seeding temperature during the second cooling phase. The experiment was repeated with different seeding temperatures of 20 degrees C, 25 degrees C, 30 degrees C, 35 degrees C and 40 degrees C; seed size of <90, 106-125, 125-160 and 160-180 µm; and seed loading of 31.85, 63.70, 95.55 and 127.4 mg. The study reveals that higher seeding temperature and larger crystal size decrease crystal nucleation rate, while higher seed loading increases it. The optimal seeding temperature between 25 degrees C to 30 degrees C, with the ideal seed size being 125-160 µm and seed loading is 63.7 mg. In conclusion, the research highlights the critical role of seeding temperature, seed size, and seed loading in the production of CBZ-SAC co-crystals. Additional research focusing on commercialization could involve ADME analysis or solubility test of the co-crystal produced for deeper understanding on the economic advantages associated with CBZ-SAC co-crystal.

Keywords **Author Keywords:** Seeding; Carbamazepine-Saccharin; Seeding Temperature; Seed Loading; Seed Size; Co-Crystal

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Categories/Classification Research Areas: Chemistry
Citation Topics: [2 Chemistry](#) > [2.176 Drug Delivery Chemistry](#) > [2.176.878 Cocrystals](#)
Sustainable Development Goals: [03 Good Health and Well-being](#)

Web of Science Categories Chemistry, Multidisciplinary

Language English

Accession Number WOS:001511694200009

Citation Network

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eISSN	2357-0245
IDS Number	3XZ5Z
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