

Original Research Article

Effect of superdisintegrant type and concentration on dissolution behaviour of Ondansetron orodispersible tablets

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Sent for review: 24 March 2026

Revised accepted: 20 June 2026

Abstract

Purpose: To investigate the effect of various superdisintegrants on disintegration time and early-phase dissolution in ondansetron hydrochloride orodispersible tablets (ODTs).

Methods: A total of 12 formulations were prepared by direct compression using a 3x4 full factorial design. Crospovidone (CPV), sodium starch glycolate (SSG), and croscarmellose sodium (CCS) were each tested at 2, 4, 6, and 8 % w/w. Primary responses were disintegration time, 5-minute drug release, dissolution similarity (f_2), and Korsmeyer–Peppas exponent (n).

Results: All blends had acceptable flow properties. At 8 % w/w, CPV released 77.2 % within 5 min compared to SSG ($p < 0.01$), $f_2 = 45.3$ between CPV and SSG indicated dissimilar profiles, and $f_2 = 90.8$ between SSG and CCS confirmed equivalent swelling-polymer behaviour. Korsmeyer–Peppas modelling gave $n = 0.33$ for CPV (Fickian diffusion) and $n = 0.45, 0.44$ for SSG and CCS, respectively, consistent with partial gel-layer resistance. Korsmeyer–Peppas rate constant showed $k_{KP} = 40.09 \text{ min}^{-n}$ for CPV compared to 7.13 min^{-n} and 28.50 min^{-n} for SSG and CCS, respectively. Furthermore, CPV produced faster early drug release compared to SSG and CCS at all concentrations.

Conclusion: Crospovidone significantly shows superior early-phase dissolution at all concentrations compared to SSG and CCS

Keywords: Crospovidone, Korsmeyer–Peppas model, Ondansetron hydrochloride, Orodispersible tablets, Superdisintegrants

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INTRODUCTION

Orodispersible tablets (ODTs) represent one of the specialized oral solid dosage forms specifically designed to disintegrate rapidly within the oral cavity without requiring water or chewing. This system improves patient compliance of extreme age groups (paediatrics and geriatrics), and is suitable for patients with dysphagia. Such advantages have attracted

many reputable manufacturers to target such dosage forms. Orodispersible tablets (ODT) have great benefits in emergencies and when rapid therapeutic response is critical. This is attributed to the rapid disintegration and dissolution of the system which is followed by rapid systemic absorption and bioavailability [1]. A rapid onset of drug action is important for the treatment of many medical conditions, particularly vomiting. Ondansetron (Ond) is a widely used antiemetic