Malaysian Journal of Pharmaceutical Sciences
Vol. 22, No. 1, 87–104 (2024)

PREPARATION AND EVALUATION OF METRONIDAZOLE TABLETS PRODUCED WITH DIFFERENT BINDERS USING WET GRANULATION METHOD

ABBA KHALID ABDULLAHI*, ADENIJI KEHINDE OLOWOSULU AND TERYILA SUZANNE ALLAGH
Department of Pharmaceutics and Industrial Pharmacy,
Ahmadu Bello University Zaria, Nigeria

Published online: 27 May 2024
To cite this article: ABDULLAHI, A. K., OLOWOSULU, A. K. & ALLAGH, T. S. (2024) Preparation and evaluation of metronidazole tablets produced with different binders using wet granulation method, *Malaysian Journal of Pharmaceutical Sciences*, 22(1): 87–104, https://doi.org/10.21315/mjps2024.22.1.6
To link to this article: https://doi.org/10.21315/ mjps2024.22.1.6

ABSTRACT

In tablet formulation, binders are essential for ensuring proper powder mix, granulation and overall tablet quality. Variations in binder quality and concentration can impact drug bioavailability, strength and manufacturing processes. The inconsistency in bioavailability and therapeutic response of metronidazole from different manufacturers highlights the importance of binder selection in tablet formulation. This study evaluates the impact of different binding agents on tablet quality. The optimum binder concentration for each of the binders was assessed to obtain suitable concentration that was used to prepare metronidazole tablets. Metronidazole tablets were formulated with four different binder vis, acacia, gelatine, PVP, maize starch at 3% concentration using wet granulation method after which the tablet properties were evaluated. Metronidazole powder exhibited poor flow indices, as indicated by angle of repose: 39.92 ± 1.85, Carr's compressibility index (CI): 20.13 ± 0.28 and Hausner's ratio (Hr): 1.26 ± 0.01, whereas its granules exhibited good flow properties. The crushing strength (CS), friability (FR), disintegration time (DT) (CSFR/DT) ratio for batches showed values in 3% binder concentration, indicating higher strength as compared to other concentrations. There was a significant increase ($P < 0.05$) in the CSFR/DT ratio for gelatine (2.22) in formulation F2 compared to maize starch in Formulation F4. The formulated tablets with the various binders have met with the British Pharmacopeial criteria of 80% drug release from uncoated immediate-release tablets. Amongst the four binders, gelatine was found to be the best in the formulation of robust metronidazole tablets by wet granulation method at an optimised concentration of 3% w/w. Tablets produced with gelatin exhibited greater mechanical strength than those produced with other binders, while also demonstrating a slightly longer DT. Metronidazole tablets

*Corresponding author: khalidabba90@yahoo.com

produced with gelatine have met the British Pharmacopeial requirements including an acceptable in-vitro drug release profile.

***Keywords*:** Metronidazole Tablet, Wet granulation method, Gelatin binder, Tablet formulation, Binder selection, Immediate-release tablets