

OP 07

Formulation and evaluation of an orally disintegrating metformin tablet using natural superdisintegrants

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Introduction: Orally Disintegrating Tablets (ODTs) provide a solution, rapidly dissolving in the mouth to improve bioavailability and compliance. Metformin is an oral hypoglycemic agent and is widely prescribed among patients with Type II Diabetes mellitus. Natural superdisintegrants: jackfruit seed starch (*Artocarpus heterophyllus*) and banana powder (*Musa paradisiaca*) are cost-effective, sustainable alternatives to synthetic superdisintegrants.

Objectives: The objective of the study was to develop and evaluate orally disintegrating metformin tablets using natural superdisintegrants.

Methodology: Metformin ODTs were prepared using the wet granulation method. Three formulations were developed, each containing 5% of a superdisintegrant: alkali-extracted *Artocarpus heterophyllus* seed starch, dehydrated *Musa paradisiaca* powder, and sodium starch glycolate (SSG). Tablet properties were evaluated using pre- and post-compression tests such as hardness, friability, wetting time, water absorption, disintegration, and dissolution. Drug-excipient compatibility was confirmed using Fourier Transform Infrared Spectroscopy (FTIR). Based on the post-compression tests, the best formulation will be selected and subjected to a stability study at 30°C/65% RH. A t-test was used to compare the formulations.

Results: All three formulations met pharmacopeial specifications for both pre- and post-compression properties. FTIR spectroscopy confirmed the absence of any significant drug-excipient interactions in all formulations. The orally disintegrating tablet containing 5% *Musa paradisiaca* powder was the best formulation, exhibiting the lowest wetting time (76.33 ± 7.77 s), disintegration time (78.00 ± 3.6 s), and the highest water absorption ratio ($106.47\% \pm 2.65\%$). Also, this formulation achieved a high drug release rate of 95.8% in five minutes. Statistical analysis revealed a significant difference ($p < 0.05$) between the formulations for wetting time, water absorption ratio, and disintegration time. A three-month stability study showed that the drug content remained within pharmacopeial limits at 95.79%, confirming the formulation's stability.

Conclusion: Dehydrated *Musa paradisiaca* powder is a potential super disintegrant for orally disintegrating metformin tablets, offering a promising and cost-effective alternative to synthetic disintegrants.

Keywords: *Artocarpus heterophyllus* Seed Starch, *Musa paradisiaca* powder, Metformin, Natural Super Disintegrants, Orally Disintegrating Tablets