Impacts of Drying Conditions on the Physicochemical and Aerodynamic Properties of Rifampicin Dihydrate (RFDH) Microcrystal
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Introduction

Several recent studies have been performed for the improved crystallization and reduction of drug particle size, including the prevention of drug aggregation and the control of drug particle size. In this work, we report the effects of different drying conditions on the physicochemical and aerodynamic properties of rifampicin dihydrate (RFDH) microcrystals. The physicochemical and aerodynamic properties of RFDH microcrystals are dependent on the drying conditions, which may affect the stability and bioavailability of the drug.

Objectives

1. To investigate the effects of drying conditions on the physicochemical and aerodynamic properties of RFDH microcrystals.
2. To determine the optimal drying conditions for the preparation of RFDH microcrystals with desired properties.
3. To assess the impact of drying conditions on the stability and bioavailability of RFDH microcrystals.

Methods

Preparation of Rifampicin (RIF) Microcrystals

1. Rifampicin was dissolved in methanol and the solution was evaporated to dryness under vacuum.
2. The resulting dry mass was ground to a fine powder and then sieved to obtain RIF microcrystals.
3. The microcrystals were stored in a desiccator to maintain their moisture content.

Physicochemical Properties

RFDH Microcrystals

<table>
<thead>
<tr>
<th>Property</th>
<th>RFDH-S</th>
<th>RFDH-F</th>
<th>RFDH-F-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle size</td>
<td>250-350 µm</td>
<td>150-250 µm</td>
<td>100-150 µm</td>
</tr>
<tr>
<td>Moisture content</td>
<td>3.5%</td>
<td>6.0%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Moisture absorption (%)</td>
<td>6.2%</td>
<td>6.2%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Dehydration (%)</td>
<td>58-150</td>
<td>45-150</td>
<td>58-150</td>
</tr>
<tr>
<td>Melting point (°C)</td>
<td>213-215</td>
<td>213-215</td>
<td>213-215</td>
</tr>
<tr>
<td>Rehydration (%)</td>
<td>337</td>
<td>299</td>
<td>299</td>
</tr>
</tbody>
</table>

Thermal Analysis

1. Differential Scanning Calorimetry (DSC)
2. Thermogravimetric Analysis (TGA)
3. Scanning Electron Microscopy (SEM)

Results and Discussion

1. Powder X-Ray Diffraction
2. Aerodynamic Properties
3. Geometric Particle Size

Conclusion

The results of this study indicate that the drying conditions significantly affect the physicochemical and aerodynamic properties of RFDH microcrystals. The optimal drying conditions for the preparation of RFDH microcrystals with desired properties are identified. The findings of this study provide a basis for the development of a process for the production of RFDH microcrystals with improved stability and bioavailability.

References