ABSTRACT SUMMARY

A new co-processed filler compound for orally-disintegrating tablets was developed. The compound contains D-Mannitol, Low-substituted Hydroxypropylcellulose and Polyvinyl Alcohol. It showed high compressibility, fast disintegration and good stability.

INTRODUCTION

Orally-disintegrating tablets (ODT) are getting more popular dosage form especially for geriatric patients. In this study, a new filler compound was prepared by co-processing of three pharmaceutical excipients, and its compressibility, disintegration, and stability were evaluated.

EXPERIMENTAL METHODS

The filler compound was prepared using D-Mannitol, Low-substituted Hydroxypropyl Cellulose (Shin-Etsu Chemical Co., Ltd., Japan), and Polyvinyl alcohol (Shin-Etsu Chemical Co., Ltd., Japan) by a spray granulation process using L-HPC suspended in water. Two grades (QD-50 and QD-100), having different particle size, were prepared by changing processing condition.

Compressibility of the compound was evaluated by direct compression of the compound without API using a rotary tableting machine (Virgo®, Kikusui, Japan) and a hardness tester (TBH 30, Erweka, Germany). Disintegration test was carried out according to USP. Deviation of tablet weight, hardness, and disintegration time were also evaluated from periodical sampling from the same tableting equipment operated for 60 minutes.

Stability test was carried out at 40°C 75% RH for sample in open bottle.

RESULTS AND DISCUSSION

Table 1, and Figures 1-2 show the physical properties of the co-processed excipient. The two grades have different particle size. Both grade has a good flowability with the angle of repose less than 40°.

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>QD-50</th>
<th>QD-100</th>
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<tbody>
<tr>
<td>D50* (µm)</td>
<td>57</td>
<td>86</td>
</tr>
<tr>
<td>D90* (µm)</td>
<td>133</td>
<td>182</td>
</tr>
<tr>
<td>Bulk Density (g/mL)</td>
<td>0.45</td>
<td>0.44</td>
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<tr>
<td>Tapped Density (g/mL)</td>
<td>0.61</td>
<td>0.55</td>
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<tr>
<td>Angle of Repose (°)</td>
<td>38</td>
<td>37</td>
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</table>

*Laser diffraction method

Table 1. Physical Properties

Fig. 1 Particle Size Distribution
(Laser diffraction)

Figure 2 SEM View
Figure 3 shows compression force vs tablet hardness and Figure 4 shows tablet hardness vs disintegration time. The excipient achieved hardness of around 120 - 160 N at the compression force of 10 kN. Disintegration time was less than 60 seconds for both grades.

Figure 5 shows deviation of weight, hardness, and disintegration time of tablets during a compression time for 1 hr. It shows a good uniformity.

Figure 6 shows stability data in 40°C 75% RH, for 6 months. Even though the sample was stored under open condition, the shape (thickness) was not changed and other performance was stable.

CONCLUSIONS
The study showed that the present co-processed compound has an excellent capability as the main excipient for ODT tablets from direct compression. Further studies using APIs are currently ongoing.