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Spray Drying of Cubosomes for Oral Vaccine Delivery

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METHOD

The spray dried powder was heated to 90°C for 24h. This
• Reduced electrostatic charges in the powder
• Allowed easy reconstitution to a colloidally stable
  suspension
• Induced weight loss of 8%
The powder was rich in cubosomes after reconstitution (Fig. 2)

RESULTS

Table 1: Size and zeta-potential of cubosomes with and without adjuvant as measured by dynamic light scattering in Milli-Q water. Mass median aerodynamic diameter (MMAD) measured by time-of-flight mass spectroscopy.

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Size (nm)</th>
<th>PDI</th>
<th>Zeta potential (mV)</th>
<th>MMAD (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cubosomes with OVA</td>
<td>256±10</td>
<td>0.42</td>
<td>-31.7±1.4</td>
<td>4.1±0.4</td>
</tr>
<tr>
<td>Cubosomes with OVA and Quil A</td>
<td>233±13</td>
<td>0.24</td>
<td>-38.3±1.7</td>
<td>4.1±0.02</td>
</tr>
</tbody>
</table>

Table 2: OVA content in formulation

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<table>
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<tbody>
<tr>
<td>OVA content in powder</td>
<td>20.3±0.5 µg/mg</td>
</tr>
<tr>
<td>OVA load in particles</td>
<td>5.1±0.1% wt</td>
</tr>
</tbody>
</table>

Particle Characterization

Loading into microcontainers

Microcontainers were fully and homogenously filled with cubosome powder by an embossing method. The microcontainers offer the possibility to protect the formulation during passage through the stomach and provide release of the cubosomes in the intestine.

CONCLUSION

The developed cubosomes show properties suitable to be used for oral vaccine delivery in microcontainers.