This work explores the possibility to prepare, using supercritical fluid technology, particulate hybrid delivery systems that allow improved bioavailability and controlled release of antioxidant bioactive compounds.

CO₂ is fed to a high pressure stirred vessel containing the carriers and the antioxidant compound, quercetin. The operating conditions are adjusted according to previous studies in order to have a melted product under CO₂ atmosphere. After a certain stirring equilibration time, the mixture is depressurized through a nozzle and the particulate solids collected.

Results & Discussion

**SCF Technology**

- **Clean Method**: Alternative to conventional processes, carried out under conditions that have detrimental effects on the active principle and/or carriers materials.
- **Drug Stability and Bioavailability Enhancement**: Formulation of particulate drug delivery systems, such as microparticles and nanoparticles, liposomes and inclusion compounds which can enhance the drug stability and bioavailability and modulate the drug release profile.

**Particles from Gas-Saturated Solutions (PGSS)\(^5\)**

A high pressure stirred vessel, filled with quercetin, TIC-temperature control.

**Systems Prepared**

<table>
<thead>
<tr>
<th>Quercetin</th>
<th>Carrier</th>
<th>Mass Proportion</th>
<th>S/L Ratio</th>
<th>Contact Time (h)</th>
<th>Temp (°C)</th>
<th>Drug Load (%)</th>
<th>Entrapment Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUER:GMS</td>
<td>GMS</td>
<td>1:10</td>
<td>1:0</td>
<td>2</td>
<td>70</td>
<td>0.38</td>
<td>93.5 ± 0.3</td>
</tr>
<tr>
<td>QUER:HP-a-CO2:GMS</td>
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<td>70</td>
<td>0.38</td>
<td>93.5 ± 0.3</td>
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<tr>
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<td>9:0:1.1:0.1</td>
<td>2</td>
<td>70</td>
<td>0.38</td>
<td>93.5 ± 0.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dissolution Study**

- Performance evaluation of the Quercetin hybrid systems prepared using the PGSS technique in Simulated Intestinal Fluid (SIF) (pH 6.8) at 37°C.

**Antioxidant Activity**

The Oxygen Radical Absorbance Capacity (ORAC) assay was used to evaluate the antioxidant capacity of the samples obtained in the dissolution studies towards peroxyl radicals \(\text{ROO}^-\).

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**References**