Investigation of alkyl polyglucoside / fatty alcohol mixed surfactant ability to form lyotropic liquid crystals in formulated systems

Daria Terescenko, Celine Picard, Géraldine Savary, Emmanuelle Merat, Florence Clemenceau, Michel Grisel

To cite this version:
Daria Terescenco, Celine Picard, Géraldine Savary, Emmanuelle Merat, Florence Clemenceau, et al.. Investigation of alkyl polyglucoside / fatty alcohol mixed surfactant ability to form lyotropic liquid crystals in formulated systems. UK Colloids, Jul 2017, Manchester, United Kingdom. hal-02565497

HAL Id: hal-02565497
https://normandie-univ.hal.science/hal-02565497
Submitted on 13 May 2020
Characterization of the behavior of the mixed emulsifier C_{16}C_{18} APG/C_{16}C_{18}OH and its ability to form lyotropic liquid crystals depending on:

**The concentration of the mixed surfactant in solution**

To investigate the APG/FA emulsifying capacities

| Concentration | Stability
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>Stable</td>
</tr>
<tr>
<td>10%</td>
<td>Stable</td>
</tr>
<tr>
<td>5%</td>
<td>Stable</td>
</tr>
<tr>
<td>2.5%</td>
<td>Stable</td>
</tr>
<tr>
<td>1%</td>
<td>Stable</td>
</tr>
<tr>
<td>0.5%</td>
<td>Stable</td>
</tr>
</tbody>
</table>

Stability does not depend on the presence of the liquid crystals, but on its quantity.

**Alkyl polyglucoside Fatty alcohol Mixed emulsifier**

1. System - auto emulsions
   - Alkylpolyglucoside / Fatty alcohol
   - Water phase + preservative
   - Fatty alcohol plays the role of the oil phase

2. **The ratio of the alkyl chains C_{16}/C_{18} for APG and FA**
   - To describe the importance of the alkyl chain length in the molecular organization.
   - Two systems analyzed:
     - Increasing the ratio of C_{16} increases the size of the drops.
     - C_{16}-C_{18} forms finer droplet sizes and more organized network.

3. **The C_{16}-C_{18} APG/FA ratio**
   - The C_{16}-C_{18} APG/C_{18}OH ratio, in order to evidence the properties provided by each raw material.
   - Intensive peak at 0.42nm = L_{II} formation

**Conclusion**

Conditions of lyotropic liquid crystals formation for the APG/FA mixed emulsifier:
- The quantity of liquid crystals is directly linked to emulsifiers concentration in auto-emulsion;
- The APG/FA ratio variation gives access to different types of liquid crystals;
- The alkyl chain length for the mixed emulsifier has a significant impact on the auto-emulsions microscopic and macroscopic properties.

References


UID Excipients SEPPIC, 127 Chemin de la Poudrerie, 81105 Castres Cedex, France

Direction Innovation - UID Excipients SEPPIC, 127 Chemin de la Poudrerie, 81105 Castres Cedex, France