Specializing in:
- R&D
- Innovation Project Management
- Innovative Engineering Solutions
15+ years of experience.

We are the SME with the highest number of SME-targeted projects in the Seventh Framework Programme (FP7)

100+ Engineers
30+ PhDs

170+ projects,
600+ SMEs involved,
25+ European countries represented.
Enhancing the quality attributes of processed honey and avoiding its crystallisation by the application of a non-thermal treatment process

Project funded by the Commission of the European Communities under the Cooperative action of Framework 7

Start date: 01.01.2010
Duration: 42M
Website: http://www.tophoney.eu/FP2-SME-2008-2
Contract number: 243491

Associations/Groupings:
- Asociación Cultural Valle de Historia y Miel (Spain)
- Federaçao Nacional dos Apicultores de Portugal (Portugal)
- National Bee Branch Association (Bulgaria)

Small and Medium-sized Enterprises:
- Fisa Ibérica (Spain)
- Sociedad Cooperativa Apicola de España (Spain)
- T3 Engineering (Netherlands)
- SYNE (Belgium)

Research and Technological Development:
- Aristotelio Panepistimio Thessalonikis (Greece)
- NPL Management Limited (United Kingdom)
- Centre de Recerca I Innovació de Catalunya (Spain) [now Ateknea Solutions]
Pasteurization delay the onset of crystallization...

Honey is heated to 80 degC for 1-2 minutes to melt glucose micro-crystals and submitted to vacuum to remove air bubbles

...but turns honey to a lower quality product

...alters flavour, viscosity and color
increases HMF (HydroxyMethylFurfural) – freshness indicator, 40mg/kg maximum fixed by EU Directive
destroys enzymatic activity
Acoustic waves as non-thermal alternative to honey pasteurization

Acoustical energy is a mechanical energy that induces vibrational motion of the molecules in the media.

Human hearing: 16Hz – 18kHz

High Power Ultrasound: 20kHz – 100kHz

Propagation media: AIR

Propagation media: HONEY
Acoustic waves as non-thermal alternative to honey pasteurization

Mechanical stress lead in the fragmentation and destruction of honey crystals which act as crystallization nuclei (Acoustic Cavitation)
Laboratory results

<table>
<thead>
<tr>
<th>Position time (min)</th>
<th>HMF</th>
<th>Diastase (U/Kg)</th>
<th>Invertase (U/Kg)</th>
<th>Initial crystallization (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9,9</td>
<td>24,3</td>
<td>16,05</td>
<td>84,26</td>
</tr>
<tr>
<td>0</td>
<td>9,7</td>
<td>24,2</td>
<td>16,53</td>
<td>66,43</td>
</tr>
<tr>
<td>9</td>
<td>9,5</td>
<td>23,0</td>
<td>17,80</td>
<td>49,18</td>
</tr>
<tr>
<td>10</td>
<td>9,4</td>
<td>22,5</td>
<td>18,28</td>
<td>48,57</td>
</tr>
<tr>
<td>12</td>
<td>9,6</td>
<td>22,4</td>
<td>20,19</td>
<td>10,05</td>
</tr>
<tr>
<td>16</td>
<td>9,7</td>
<td>22,6</td>
<td>16,85</td>
<td>0,04</td>
</tr>
</tbody>
</table>

No affected

Similar to pasteurization (0.3% approx.)

Untreated honey

Partial treated honey

Complete treated honey

Multiflora, citrus, azahar, mountain, forest, sun flower, broom
Crystal coverage levels similar to pasteurization without effect on HMF, organoleptic properties and enzyme activity.
Technology-based company created on 2014
Spin-off company from Ateknea Solutions

Easily scalable. Reactors modules can be added to allow high-volume manufacturing (Basic unit 100kg/h each module).
Reduced energy and operating costs
Good returns on capital investment
Improved ultrasound treatment uniformity compared with traditional batch reactors
Ultrasonication as non-thermal alternative for honey processing

Estela Pacheco Martínez
(0034) 93 204 99 22 / 678 478 875
estela.pacheco@sonicat-systems.com
http://www.sonicat-systems.com

THANK YOU for your attention!