Propolis standard: Update

Vassya Bankova
IHC Group “Standards for bee products other than honey”
Work group “Propolis”
Tzarevo 2008
What is new@propolis group

• New values for the lower limits of active constituents in Poplar type propolis, correlation with biological activity.

• Correlation between total phenolics and biological activity in Brazilian propolis.

• Mechanical impurities – method, suggested limits

• Water content – method, suggested limits

• Attention – New Propolis Types!
Poplar type propolis

- New *minimal* values based on statistics (20 percentile) for 114 poplar samples from all over the world.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>45%</td>
</tr>
<tr>
<td>Phenolics</td>
<td>21%</td>
</tr>
<tr>
<td>Flavones</td>
<td>4%</td>
</tr>
<tr>
<td>Flavanones</td>
<td>4%</td>
</tr>
</tbody>
</table>

(Old 44%)
(Old 19%)

M. Popova, V. Bankova, S. Bogdanov, et al. 
*Apidologie* (2007) 38, 306
Poplar type propolis

- Statistically significant negative correlation between the concentration of total phenolics and MIC: the higher the concentration, the lower the MIC (over 110 samples).
- Statistically significant positive correlation between the concentration of total phenolics and the antiradical activity against DPPH (Chinese poplar propolis, 16 samples)*
- No significant correlation of antiradical activity with total flavonoid concentration*

* Based on data from Ahn et al., Food Chem. 101 (2007), 1400
Brazilian propolis

- 49 samples from different states, undefined plant origin

- A similar study needed with clearly defined propolis type (plant origin)

Mendes da Silva et al., *Food Chem.* 99 (2006), 431
Mechanical impurities - method

Suggestion: undissolved matter after extraction of waxes according to Woisky & Salatino (chloroform, Soxhlet), followed by Soxhlet extraction with ethanol
Mechanical impurities - values

Based on 20 samples of poplar origin:
Mean value: 4 ± 2
Minimum value 2.2
Maximum value 8.8

Data from Allwex company, Germany: maximum 5%

Suggested value for Specification: maximum 5%
Water content

Suggested unified procedure: gravimetric drying of powdered propolis for 2 h to constant weight in a conventional kiln at 105°C

Suggested value for Specification: maximum 8%
New Propolis Types: Pacific propolis

- Geographic origin: Okinawa, Taiwan, Indonesia
- Main constituents: C-prenylated flavanones (propolins)
- Plant origin: *Macaranga tanarius*
- Proved activities: antioxidant, antimicrobial, induction of apoptosis

Chen et al., *J. Sci. Food&Agric.* 88 (2008), 412
New Propolis Types: Pacific propolis

- HPLC profile of Taiwanese propolis

- Total phenolics content might be used for standatdization, although data is yet insufficient
New Propolis Types: red propolis

- Geographic origin: Cuba, Brazil
- Main constituents: isoflavonoids
- Plant origin: *Dalbergia ecastophyllim*
- Proved activities: antimicrobial, antioxidant, cytotoxic

Trusheva et al., *eCAM* 3 (2006), 249
Alencar et al., *J. Ethnopharmacol*. 113 (2007) 278;
New Propolis Types: *Clusia* propolis

- **Geographic origin:** Cuba, Venezuela, Brazil
- **Main constituents:** prenylated benzophenones
- **Plant origin:** *Clusia* spp.
- **Proved activities:** antimicrobial, antioxidant, cytotoxic

Trusheva et al., *Fitoterapia*, 75 (2004) 683
### Suggested markers for new propolis types

<table>
<thead>
<tr>
<th>Propolis type</th>
<th>Taxonomic markers</th>
<th>Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific propolis</td>
<td>Prenylated flavanones (propolins)</td>
<td>HPLC, TLC</td>
</tr>
<tr>
<td>Red propolis (from <em>Dalbergia ecastophyllim</em>)</td>
<td>Isoflavonoids: medicarpin, vestitol, formononetin</td>
<td>HPLC, TLC</td>
</tr>
<tr>
<td><em>Clusia</em> propolis</td>
<td>Prenylated benzophenones (nemorozone, guttiferone E, xanthochymol)</td>
<td>HPLC, TLC</td>
</tr>
</tbody>
</table>
European propolis of non-poplar origin

- Mediterranean region
- Main constituents: diterpenes
- Plant source: unknown
- Proved activities: antimicrobial, cytotoxic
What comes next?

- To confirm correlation between activity and total phenolics and total flavonoids in Brazilian green propolis using statistic methods.
- To propose parameters for Brazilian and Cuban red propolis: Commercial interest growing!
- To propose parameters for Pacific propolis: emerging commercial interest.
Thank you for your attention!