APIMONDIA 2011
BUENOS AIRES • ARGENTINA
september

World Network of Honey Sci

Propolis Research Status

IHC Group "Standards for bee products other than honey"

Work group "Propolis"

Propolis standardization: some parameters can be accepted as universal

- Wax content
- Water content – max 8%
- Mechanical impurities – max 6%
- Resin (balsam) content

Propolis standardization should be based on the concentration of biologically active chemical compounds

Propolis standardization:

- Biologically active compounds are different in different propolis types
- It is of crucial importance to determine the propolis type according to the plant source
- Propolis chemical profile gives the answer to this question

Propolis types, for which chemical parameters are proposed

Propolis type	Taxonomic markers	Profiling by
Poplar type (*Populus* spp.)	pinostrobin, pinocembrin, galangin, chrysin, kaempferol , benzyl ferulate, phenethyl caffeate	HPLC, TLC
Brazilian green propolis (Alecrim propolis) (from *Baccharis dracunculifolia*)	*p*-coumaric acid; 3,5-diprenyl-4-hydroxy-cinnamic acid; 2,2-dimethyl-6-carboxy-ethenyl-2H-benzopyran, 3-(2,2-dimethyl-8-prenyl-2H-1-benzopyran-6-yl)2-propenoic acid	HPLC, TLC

Content of bioactive compounds for Poplar propolis type

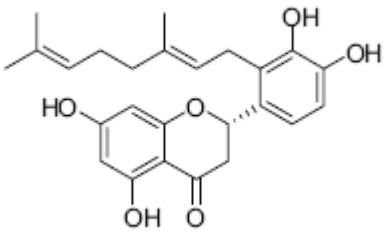
Total Phenolics (Folin-Ciocalteu)	Minimum 21%
Flavones and flavonols ($AlCl_3$)	Minimum 4%
Flavanones and dihydroflavonols (DNP)	Minimum 4%

Content of bioactive compounds for Brazilian green propolis

Total Phenolics (Folin-Ciocalteu)	**Minimum 7%**
Total Flavonoids ($AlCl_3$)	**Minimum 1%**

Pacific propolis

- Geographic origin: Okinawa, Taiwan, Indonesia
- Plant origin: *Macaranga tanarius*
- Chemical markers: C-prenylated flavanones (propolins)



Kumazawa et al., *Naturwissenschaften* 95, 781–786, 2008
Chen et al., *J. Nat. Prod.* 66, 503–506, 2003
Trusheva et al., *Nat. Prod. Commun.* 25, 606-613, 2011

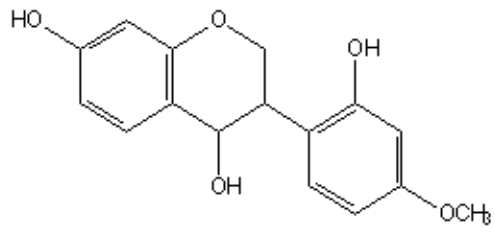
Pacific propolis: recommendatios

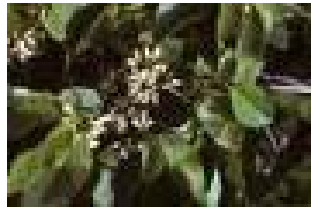
- Chemical profiling: TLC, HPLC
- Biologically active compounds: propolins
- Quantification as total flavanones (DNP), calibration standard: Propolin C:propolin D 4:1 – close to 100% recovery
- Concentration of propolins:45 – 83%

Popova et al., *Phytochem. Anal.* 21, 186–191, 2010.

New Propolis Types: red propolis

- Geographic origin: Cuba, Brazil
- Main constituents/chemical markers: isoflavonoids





- Plant origin: *Dalbergia ecastophyllim*

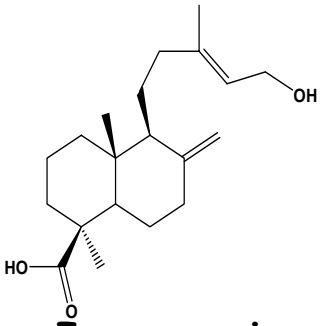
Trusheva et al., *eCAM* 3 (2006), 249

Silva et al., *eCAM* Advance Access published on July 7, 2007; doi:10.1093/ecam/nem0

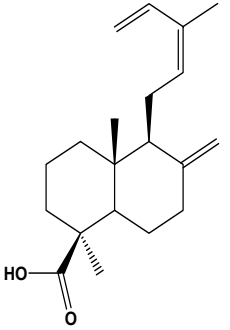
Alencar et al., *J. Ethnopharmacol.* 113 (2007) 278;

New propolis types: Mediterranean propolis

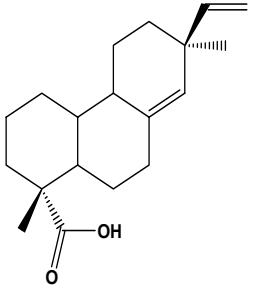
- **Characteristic profile, rich in diterpenic compounds.**
- **Chemical markers**



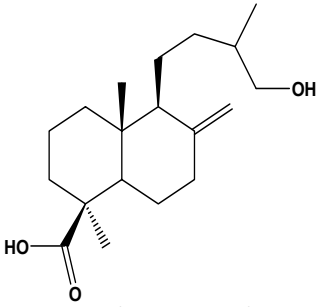
Isocupressic acid



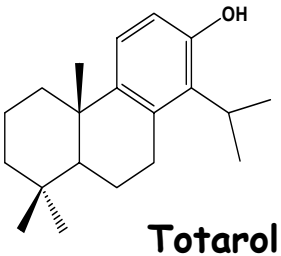
Communic acid



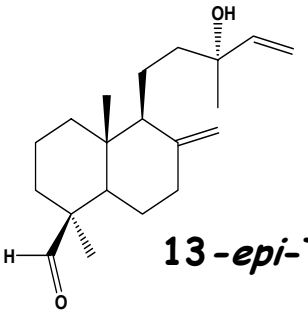
Pimaric acid



Imbricatoloic acid



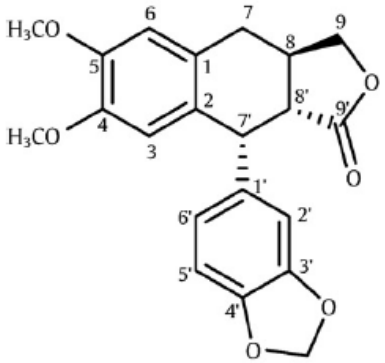
Totarol



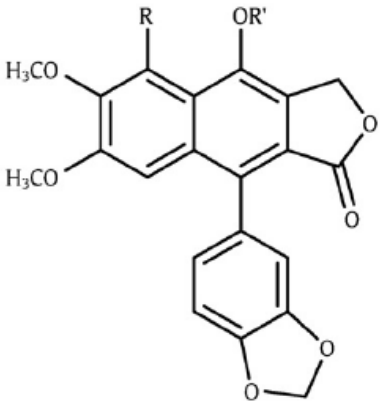
13-*epi*-Torulosal

Popova et al., *J. Agric. Food Chem.* 58, 3167 – 3176, 2010

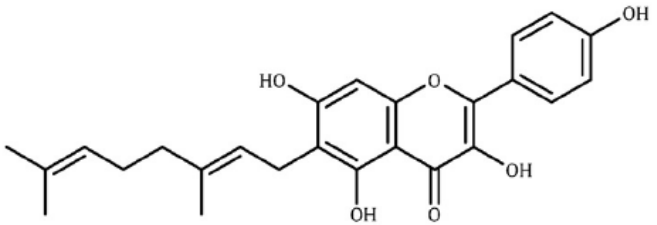
New propolis types: Two propolis types from Kenya



1.



2. R = OCH_3; R' = H
3. R = R' = H
4. R = OH; R' = CH_3



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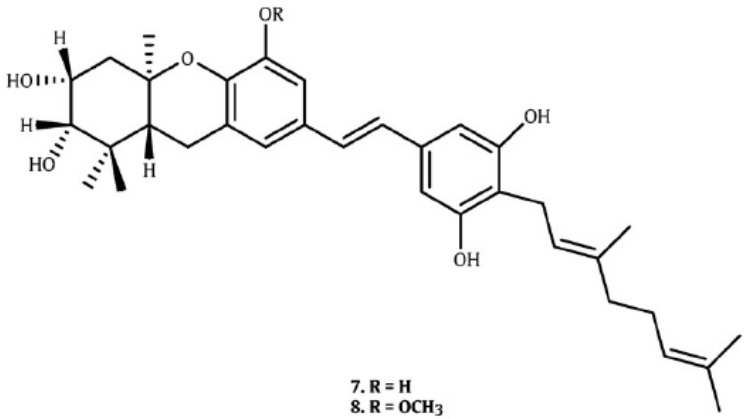
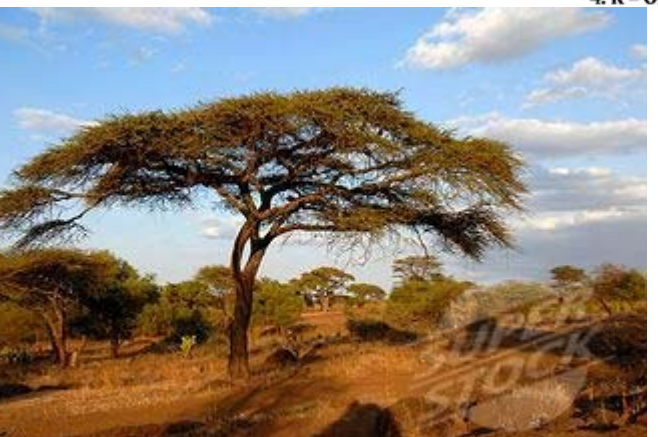


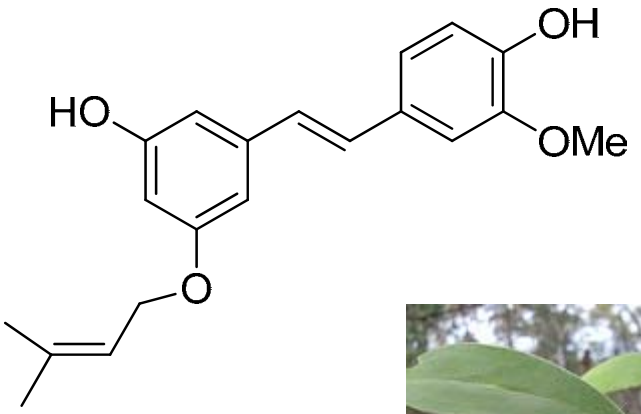
7. R = H
8. R = OCH_3

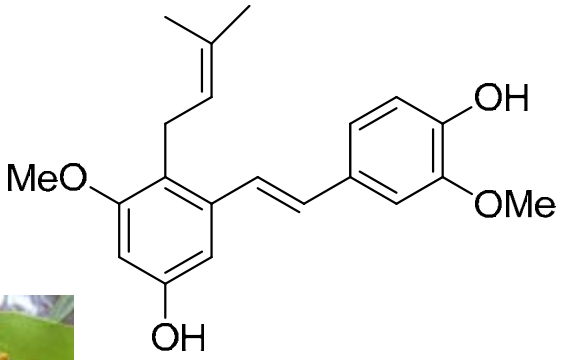
Potent antibacterial



Petrova et al., *Fitoterapia* 81(6), 509–514 (2010)

New propolis types: Australian propolis from *Lepidosperma viscidum*





"Novel Bioactive Prenylated Phenolics from Kangaroo Island Propolis", DUKE C.,

New propolis types: What will be the next?

Thank you for your attention!