



Antimicrobial activity and floral origin of honey from Campeche Mexico against food spoilage bacteria

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Introduction. Functional properties of honey in human health have been proposed by several authors, these properties are associated to antioxidant and antibacterial activity, which also depends on floral origin (1). Yucatan Peninsula is a region with a long tradition in the production of honey (*Apis mellifera*). Despite the variety and recognized quality of Mexican Honeys, little research has been done towards the antibacterial properties (1).

The main objective of this research was to determine the antimicrobial activity and floral origin of honeys from the Yucatan Peninsula against food spoilage bacteria (*Escherichia coli* ATCC 25922, *S. aureus* ATCC 25923, *B. subtilis*, *K. pneumoniae*, *S. typhimurium*, *P. aeruginosa*, *E. fecalis*).

Methods. Four honey samples were obtained from different parts of Campeche, Mexico. Quality parameters as pH, total acidity (TA) and Hydroxymethylfurfural (HMF) were determined according to the Mexican Standard (2). Floral origin was obtained using melissopalynology methods (3). Antibacterial activity was determined as minimum inhibitory concentrations (MIC) (4).

Results. The melissopalynology analysis is showed in table 1, all samples were determined as unifloral honeys, the samples with higher concentrations of pollen presence were from the family of *Bursera Simaruba* (see fig. 1). Quality parameters obtained were within the values range set out in the Mexican Standard.

Table 1. Melissopalynology analysis of honey samples from different localities of Campeche, Mexico.

Locality of origin	Sample code	Honey type	Family most abundant pollen type and percentage of presence
Hecelchakan	H1	Unifloral	<i>Gymnopodium floribundum</i> 53.33%
Escárcega	E1	Unifloral	<i>Bursera Simaruba</i> 62.24%
Felipe Carrillo			
Puerto	CPA3	Unifloral	<i>Bucida buceras</i> 52.23%
Hecelchakan	KAB8	Unifloral	<i>Bursera Simaruba</i> 89.85%

The MIC of honey samples against the different bacterial strains evaluated are shown in fig. 2.

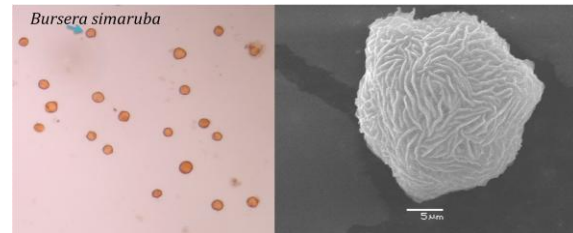


Fig. 1 *Bursera simaruba* a) unifloral honey sample b) pollen scan electron microscopy.

Values of MIC50 were quite similar for gram negative and positive strains. MIC90 values were lower against *K. pneumoniae* and *P. aeruginosa* for gram negative strains, and for *B. subtilis* for gram positive strains. In both cases a concentration of 25% w/v of honey is suitable for microbial growth inhibition in 99% for all the evaluated strains. These results are similar as reported elsewhere (1).

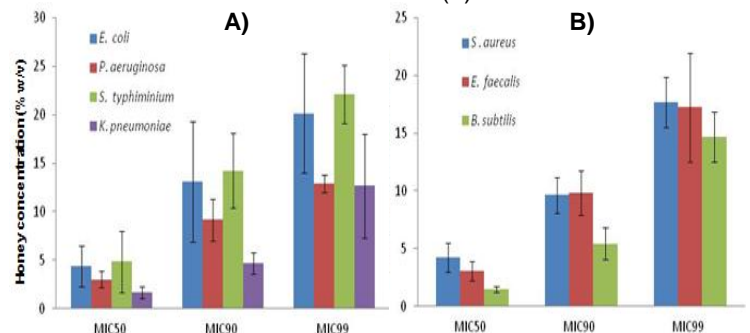


Fig. 2 MIC against different food spoilage bacteria strains, A) Gram negative and B) Gram positive bacteria.

Conclusions. Unifloral Honeys from Campeche with quality parameters according to the Mexican Standard showed antimicrobial activity against different food spoilage bacteria. These results provide information of Mexican honeys to be used as natural antimicrobial additives in food formulations.

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