



**5<sup>th</sup> Portuguese Young  
Chemists Meeting**  
*(5th PYCheM)*  
&  
**1<sup>st</sup> European Young  
Chemists Meeting**  
*(1st EYCheM)*

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ICVS/3B's



Câmara Municipal de Guimarães





## POSTER COMMUNICATIONS



## P70. Propolis phenolic compounds extraction using Response Surface Methodology

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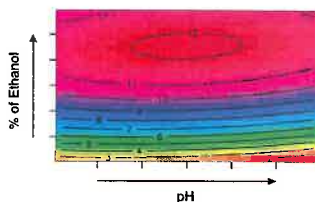
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Propolis is a complex resinous substance prepared by bees (as, *Apis mellifera*) using compounds collected from plants, buds and exudates, which are then mixed with wax, pollen and enzymes of bees' saliva [1,2]. It is used to seal openings and cracks in the hive walls, to isolate animal carcasses inside the beehive, and in the protection against parasites. This product has attained much interest due to its chemical composition and functional properties. Recent publications emphasize its biological and health enhancing properties as, for instance, immunomodulatory, antitumoral, antimicrobial, anti-inflammatory, antioxidant, antiviral and antifungal [3,4].

This study intended to optimize the conditions of extracting phenolic compounds from the Portuguese propolis. For this purpose, Response Surface Methodology [5] was applied to evaluate the influence of two factors in the extracting hydro-ethanolic solution: 1) pH of the HCl solution (used as the aqueous phase); and 2) ethanol percentage. A Box-Wilson central composite design was used with center points and expanded with a group of "star" points in order to estimate a second-degree polynomial model for the response variable considering these two factorial variables [5]. To assess the extraction efficiency in each assay, several parameters were considered as response variables. One of those was the content of total phenolic compounds, which was determined in the hydro-ethanolic extracts using the Folin-Ciocalteu method [6]. Preliminary results, using this response variable, showed that the optimal experimental conditions for the extraction of phenolic compounds from propolis is a hydro-ethanolic solution containing HCl solution with pH=3 and 80% of ethanol. Data processing was performed with R software, a free software environment for statistical computing and graphics.



Fitted response-surface contour plot

### References

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