

## Novel insights for permeant lead structures through *in vitro* skin diffusion assays of *Prunus lusitanica* L., the Portugal Laurel



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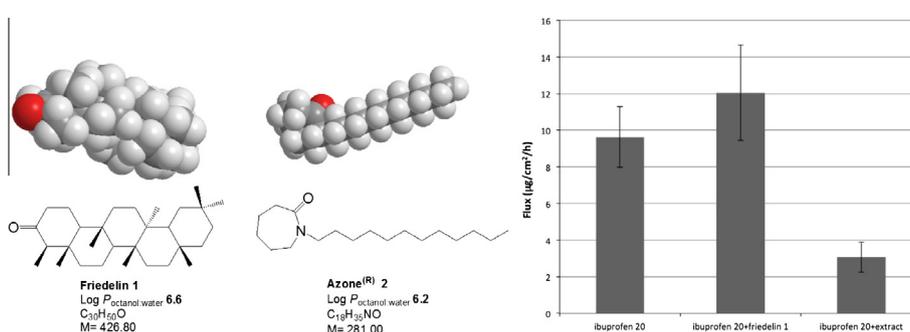
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### HIGHLIGHTS

- The *P. lusitanica* L. extract has a novel effect of retarding permeation of both lipophilic and hydrophilic model molecules.
- Terpenes were identified by GC–MS after extraction by ASE (50.55%) and Soxhlet (89.91%) using the same solvent (PE 40–60 °C).
- The ability of a triterpene to act as a promotor of the permeation of ibuprofen was herein determined for the first time.
- It was concluded that permeation enhancement capacity is linked to the lipophilic properties of friedelin.

### GRAPHICAL ABSTRACT



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### ABSTRACT

As a contribution for the generation of libraries in which a natural product (NP) is used as the guiding structure, this work sought to investigate molecular features of triterpenes as deliver leads to cross the *stratum corneum* at a significant rate. Seeking a bioguided investigation of the dermocosmetic lead-like potential of triterpenes in *Prunus lusitanica* L., various extracts were obtained by two different methods (Soxhlet extractor and Accelerated Solvent Extraction–ASE) and analyzed by GC–MS and NMR. *In vitro* assays were conducted to quantify the friedelin **1** and crude plant extract permeation through a membrane of polydimethylsiloxane (PDMS), as well as their skin penetration enhancement capacity using two model molecules, caffeine **19** and ibuprofen **20**. Friedelin **1** was identified as the major component (16–77%, GC) with isolated yield of 51% w/w (94%, GC) from Soxhlet residue (1.7% p/p) of the dried aerial parts of the plant harvested when in early flowering stage. Friedelin **1** promoted the penetration of the lipophilic molecule **20**, however, it did not influence the permeation of the hydrophilic permeant **20**. On the other hand, the crude extract acted as a retardant of the penetration of both substances. Molecular characteristics for the applicability of *P. lusitanica* L. in the development of dermocosmetics, as well as a new potential use for friedelin **1** in particular, are demonstrated. Probable mechanisms for chemical penetration enhancement using triterpenes as models for transdermal administration are herein discussed.

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