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## Recovery of bioactive polyphenols from Aloe vera (*Aloe barbadensis* Mill.) rind using binary mixtures of propylene glycol and water

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### PURPOSE OF THE ABSTRACT

Aloe vera (*Aloe barbadensis* Mill.) is a succulent plant species cultivated worldwide for its jelly-like parenchyma that is used by cosmetic, pharmaceutical and nutraceutical industries. This gel fillet is found protected by a thick layer (green rind) that constitutes 20-30% of the whole leaf weight [1], which is often discarded as waste. However, this biowaste can be valorised as a source of high added-value compounds [2]. Today, the principles of green chemistry have been introduced into extraction schemes with the aim of making processes more sustainable. Some studies have also shown that polyols in aqueous solution may constitute a very suitable extraction medium for polyphenol recovery [3]. Therefore, this study was carried out to characterize the phenolic profile of Aloe vera rind, evaluate antioxidant properties, and investigate the suitability of propylene glycol-water mixtures for extracting these bioactives.

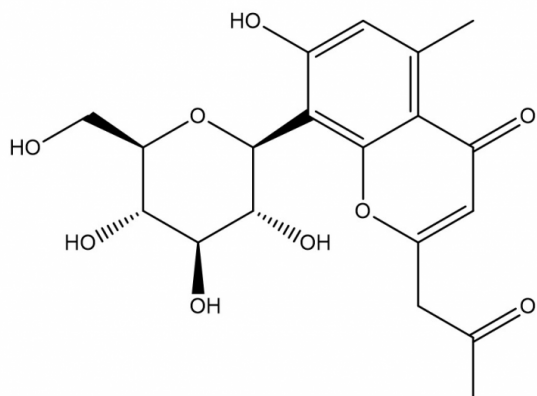
The leaf rind was separated from the fillet gel parenchyma, freeze-dried and reduced to a fine powder. First, a solid-liquid extraction was performed with ethanol/water (80:20, v/v) to obtain a combined extract, from which the phenolic profile was characterized by HPLC-DAD-ESI/MS and the antioxidant activity was evaluated by the in vitro cell-based assays of TBARS (thiobarbituric acid reactive substances) and OxHLIA (oxidative haemolysis inhibition assay) [4]. Afterwards, binary mixtures of propylene glycol (propane-1,2-diol)-water (from 0 to 95 %, w/w) were used in extractions performed at 50 °C for 60 min, whose efficiency was monitored based on the total phenolic and flavonoid contents, measured by colorimetric methods [5].

Different phenolic compounds were identified in the Aloe vera rind extract, including chromones (aloesin A and B), anthrones (aloin A and B), and flavones (luteolin and apigenin glucoside derivatives). Aloesin and aloin (Figures 1 and 2) are recognized for their skin regeneration (wound healing) and laxative effects, respectively, being among the most important physiologically active compounds found in Aloe [6,7]. The combined extract also had interesting antioxidant properties, being particularly effective in protecting erythrocytes from the free radical-induced oxidative damage, with an IC50 value close to that of the positive control, trolox. Regarding the effect of the extraction solvents on the recovery of total phenolics and flavonoids, it was found that intermediate propylene glycol-water mixtures lead to higher amounts than when used alone. Thus, this study showed that Aloe vera rind can be used as an interesting source of bioactive compounds and that propylene glycol in aqueous solution may improve its extraction.

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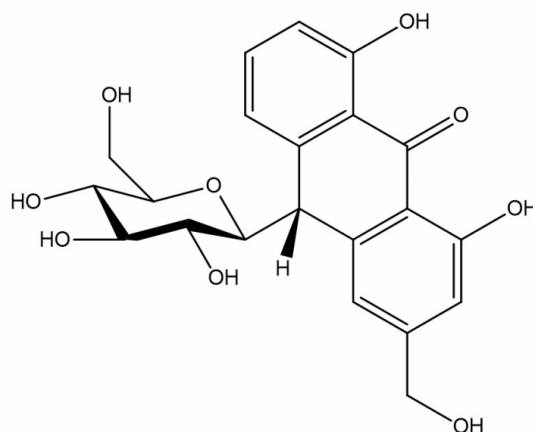
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## FIGURES



**FIGURE 1**

Chemical structure of aloesin or aloeresin B.



**FIGURE 2**

Chemical structure of aloin A or barbaloin.

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## KEYWORDS

Biowaste valorization | Phenolic compounds | Polyol solvents | Bioactive ingredients

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