Subcritical water for extraction and hydrolysis of *Castanea sativa* tannins

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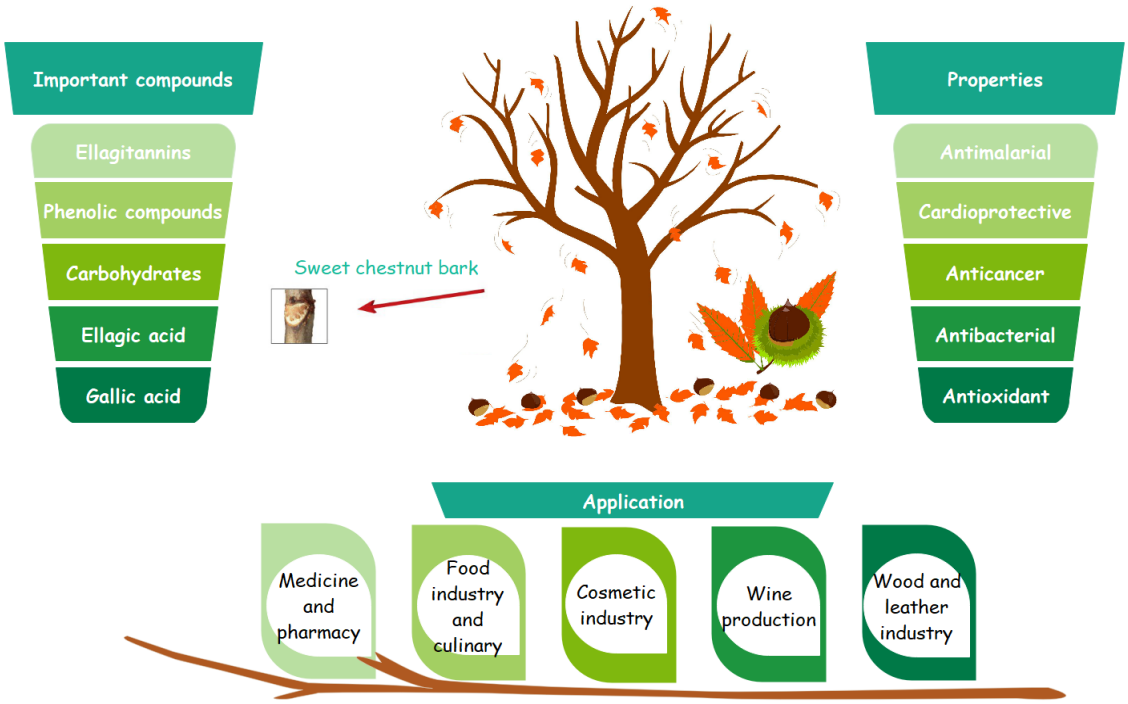

Materials rich in tannins were treated by subcritical water in a batch reactor at different temperatures, reaction times and solvent-solid ratios and optimization of the process in order to obtain the products with high content of ellagic acid was done. In the first step hydrolysis of sweet chestnut (*Castanea sativa)* tannins was studied in order to better understand hydrothermal extraction process of tannins from sweet chestnut bark. The influence of reaction parameters on the product yield was observed. Total tannins, total phenols, total carbobohydrates and antioxidant activity in the products were determined. Ellagitannins such as vescalin, castalin, vescalagin, castalagin and 1-o-galloyl castalagin, as well as ellagic and gallic acid were quantified using HPLC. In addition, acid hydrolysis was performed in order to evaluate the results obtained by hydrothermal hydrolysis. The concentration of of gallic acid and ellagitannins in the product obtained by acid hydrolysis were quite low, while ellagic acid concentration was 8.19 %. By subcritical water hydrolysis the maximal concentration of ellagic acid in the product was obtained at 250 °C in both cases, i.e. hydrothermal hydrolysis of tannins and hydrothermal extraction of the bark, but longer time was needed for the extraction of chestnut bark. Gallic acid and ellagitannins were less stable at these conditions and they were not present in product anymore. Therefore, it was shown that using subcritical water as reaction medium to treat sweet chestnut tannins it is possible to obtain a product with a high concentration of ellagic acid, but without gallic acid. Furthermore, based on results it could be concluded that, compared to conventional techniques, hydrothermal processes as environmentally friendly, clean, non-toxic method showed high process efficiency and method needs shorter reaction time.