



Starbon[®] Case Study – Solid Phase Extraction (SPE) cartridges

There is a rising demand for natural compounds as supplements to a healthy lifestyle, with polyphenols found in fruits, seeds and roots in particular demand. Amongst the polyphenols, flavonoids and coumarins appear to play an important role in human health, possessing beneficial properties for the prevention of human diseases, such as cardiovascular problems, gastric or duodenal ulcers and cancer. They can also be used as active compounds in phytomedicines, nutraceuticals and food.

In this study, thirteen polysaccharide-derived Starbon[®] materials were tested as Solid Phase Extraction (SPE) cartridges for the adsorption and desorption of ten flavonoid/coumarin phenolics (Figure 1). These were selected on the basis of both their widespread presence in a variety of fruits, seeds and vegetables, including biomass waste, and their diverse chemical functionality.

Starbon[®] materials displayed varying desorption efficiencies for the adsorbed polyphenols, dependent on the starting material, carbonisation temperature and nature of the analyte. Ordering of the carbonaceous sorbents based on recovery efficiency of the polyphenols demonstrates a particularly strong correlation with the material's temperature of preparation (Fig. 2).

Higher levels of recovery are obtained when employing Starbon[®] materials carbonised at lower temperatures (see results for S300, A300) with mean recoveries of $80 \pm 4\%$ and $78 \pm 3\%$.

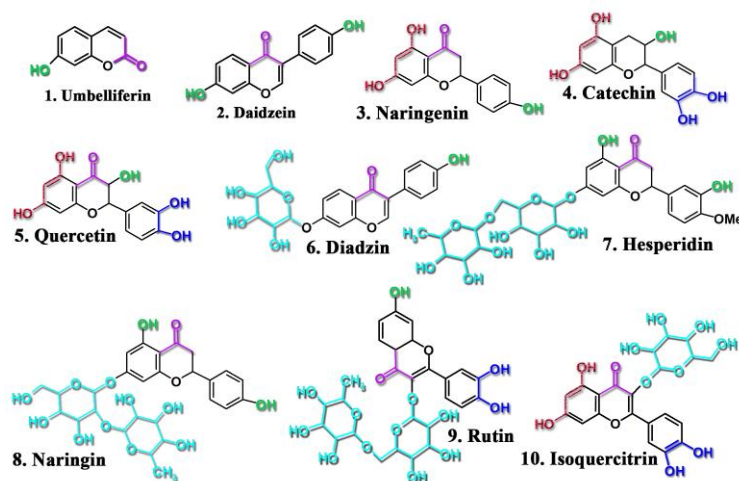


Figure 1. Chemical structures and representative functional groups of the selected polyphenols

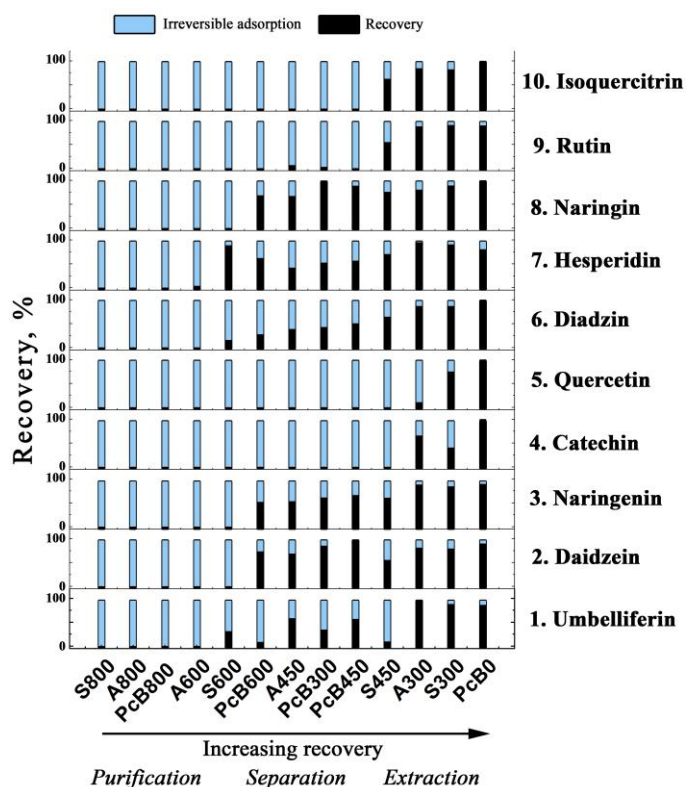


Figure 2. Recovery results of polyphenols ($10 \mu\text{g mL}^{-1}$) obtained using the 13 Starbon[®] SPE (0.1 g cartridges) and 10 mL of methanol as eluent.