SYNTHESIS OF p-COUMAROYLQUINIC ACIDS AND EVALUATION OF FUNCTIONAL MONOMERS FOR a MIP BASED SENSING ELEMENT

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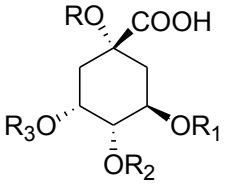
In the human diet coffee is the major source of chlorogenic acids (CGAs), a particular class of phenolic compounds present in the plant kingdom, and they contribute to health benefits such as antioxidant, anti-inflammatory and antispasmodic activity, together with a relative risk reduction of cardiovascular diseases, of type 2 diabetes and of Alzheimer's disease. They are also responsible for the acidity and bitterness of the coffee brew and their final content is greatly dependent on the roasting process. Since the flavor of the final product determines its commercial value, CGAs are an important indicator of quality in coffee.[1] CGAs are esters of quinic acid with different cinnamic acids like caffeoyl, feruloyl and *p*–coumaroyl acids. Among them, *p*-coumaroylquinic acids are less studied, and in order to understand better their role in the quality of coffee, it is necessary to synthesize these compounds in order to use them as standards or target molecules. Together with an analytical study of their presence in the coffee matrix it is also important to develop a reliable, rapid, sensitive and simple method for the quantification of these substances. In the present work, the synthesis of four *p*-coumaroylquinic acids are presented. In order to develop a MIP sensor element to recognize these compounds, a study of the interaction with an anti-chlorogenic acid MIP was carried out. A further selection of functional monomers able to interact non-covalently with *p*-coumaroylquinic acids is then reported. The most favourable monomers have been synthesised and the evaluation of their interaction with CGAs has been determined by spectroscopic techniques, such as UV-Vis and NMR spectroscopies.



R = *p*-coumaroyl acid, R^1=R^2=R^3=H

R^1= *p*-coumaroyl acid, R=R^2=R^3=H

R^2= *p*-coumaroyl acid, R^1=R=R^3=H

R^3= *p*-coumaroyl acid, R^1=R^2=R=H

Figure. 1. *p*-coumaroylquinic acids.

References

[1] Farah, A. (2012) Coffee: Emerging Health Effects and Disease Prevention, First Edition. Edited by Yi-Fang ChuJohn Wiley & Sons, Inc. Chapter 2 22-50