

**Title:** Development of spectroscopic methods for the determination of flavanols in food samples.

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Proanthocyanidins (PACs) are polyphenol compounds present in cranberries (*Vaccinium Macrocarpon*) which received more and more attention in recent years due to their bioactive functions. Specially, "A-type" PACs are associated with prevention of urinary tract infections (UTI) by inhibiting the adhesion of bacteria to the bladder wall. Because of the increasing consumption of cranberries and the development of food supplements with a significant content of "A-type" PACs, a new field of research was exposed.

The qualitative and quantitative analysis of PACs remains very challenging as a consequence of their structural diversity and complexity. Several studies consist of finding a reliable method to determine the concentration of these compounds in the sample.

In this work, first of all, a spectrophotometric method based on the reaction of flavanols with 4-(dimethylamino)cinnamaldehyde (DMAC) was carried out; various parameters to evaluate this method were studied, including DMAC concentration, selectivity, repeatability, limit of detection and quantification. This method provided an overall index of the PAC contents in the samples.

Additionally, two different chromatographic methods were utilized depending on the nature of the study. On the one hand, an optimization method was developed in order to get a good separation of underivatized flavanols; then this method was used to analyze nutraceutical samples. On the other hand, the kinetic of the reaction between some flavanols with DMAC reagent was studied. The aim of this study was to know more about this complex reaction and use the results to optimize the conditions for a quantification of "A-type" PACs.

Finally, nutraceutical samples were analyzed with spectrophotometric method and liquid chromatography method with ultraviolet (UV) and fluorescence (FLD) detection; then the results were compared.

**Keywords:** Flavanol, A-type link, cranberry, 4-(dimethylamino)cinnamaldehyde, spectrophotometry, chromatography, nutraceutical samples