Poster Abstract

Ascorbic acid detection and quantification in apples : application of a UPLC-MSMS method

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Introduction

The objective of this work consisted in reducing the time necessary for the quantitative determination of the ascorbic acid in apples. By reducing the time of analysis, the extracts preserved their properties and did not require any more the repeated injection of standards to correct the possible loss in ascorbic acid. Moreover, the environmental load due to the analyzes was strongly reduced.

Material and methods

The ascorbic acid was extracted from dried and lyophilysed apples by means of a metaphosphoric acid solution. The extracts containing the ascorbic acid were injected in UPLC-MSMS for the quantification (transition used : 177.07 > 140.90). The duration of the chromatographic analysis is reduced from 15 down to 1 minute.

Results

Several hundreds of apple extracts were analyzed for their ascorbic acid content. The determination of the acid content was carried out after calibration by means of standards solutions covering the range from 1 to 100 $mg \cdot L^{-1}$. These standards solutions are prepared daily and injected at the time of each series of analyzes, in order to optimize the response of the mass spectrometer.

The stability of the extracts could be evaluated during a 72 hours storage to 4°C. After this period of storage, a loss of more than 50% in ascorbic acid was measured. The use of a calibration curve realized by means of solutions having been preserved under the same conditions makes it possible to correct for this loss.

Conclusions

The detection and the quantification of the ascorbic acid by UPLC-MSMS have certain advantages compared to the initial method, developed in HPLC-UV (248 nm). The sensitivity and the specificity of the mass spectrometry make it possible to eliminate a series of interferences, also absorbing in UV. The reduction of the time of analysis from 15 down to 1 minute made it possible to guarantee the stability of the conditions of analyzis during different run, without requiring multiple injections of standards. Moreover, the environmental load (0.8 ml of solvent instead of 28 ml) and the costs of analyzis were strongly reduced.