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## CLASSIFICATION OF FRUCTANS FROM AGAVES HARVESTED IN MEXICO USING FOURIER TRANSFORM INFRARED SPECTROSCOPY AND PRINCIPAL COMPONENT ANALYSIS

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Introduction. Fourier transform infrared spectroscopy (FTIR) is a versatile and rapid technique used to determine functional groups in organic samples [1]. In recent years FTIR in combination with chemometrics analysis has been used to classify food samples produced in different geographic zones [2]. It is important to establish geographical limits of productions with the aim of protecting a production zone and ensure a particular standard of quality.

In this work, FTIR and principal component analysis (PCA) were used to classify fructans samples from agave tequilana Weber var. azul plants harvested in four different regions of Mexico (Colima-C, Jalisco-J, Nayarit-N and Michoacan-M).

Methods. Fructans samples were obtained in the pilot plant of the CIATEJ. FTIR spectra (three for each sample) were obtained on a Varian spectrometer FTS 1000 equipped with a micro-attenuated total reflectance (ATR) sampling accessory with clamp. The fructans powder used in each measurement was ~0.5 g. PCA was performed in the SIMCA-P-7.01 program.

Results and discussion. Figure 1 shows а representative spectrum of an agave fructan.



Fig. 1. Infrared spectrum of agave fructan.

In this figure the spectral region between 1200 and 900 cm<sup>-1</sup> is generally dominated by intensive peaks due to C-C, C-O and C-O-H, C-O-C bonds in the agave molecule.

At ~ 1020  $\text{cm}^{-1}$  was found the most intensive band. The peaks approximately at 3250 and 1600 cm<sup>-1</sup> were due to O-H bond from water molecule content in the fructan sample. The region between 2980 and 2850 cm<sup>-1</sup> is associated with C-H mode of CH<sub>2</sub>. Figure 2 shows the score-plot (PC1 and PC2) of fructans samples obtained by using FTIR and PCA. This figure shows an evident separation of the fructan samples from agave plants harvested in different geographical regions of Mexico. This separation could be influenced by polymerization degree of fructans or sugar residues (fructose or glucose) generated during its process of production.



Fig. 2. PCA of the fructans samples.

Conclusions. FTIR in combination with PCA could be used to classify fructans from agaves harvested in different geographical regions.

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## References.

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