Determination of sucralose in fruit jelly by planar chromatography

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Introduction

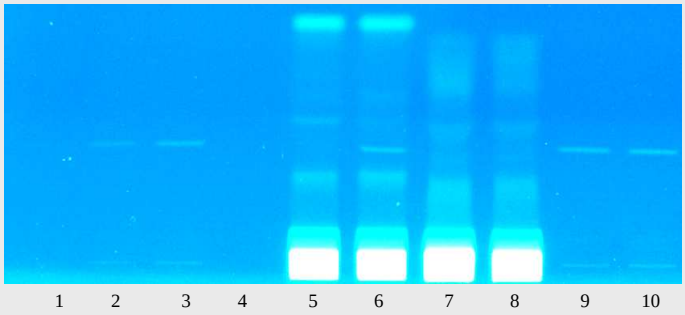
In Europe, since 2005 the sweetener sucralose is permitted for use in different kind of food, like beverages, sweeties, biscuits and cakes. The maximum usable dose in confectionary with no added sugar is 1000 mg/kg. So far it does not exist a method to determinate sucralose in fruit jelly. The chromatographic conditions according to Spangenberg et al. were used slightly modified.

HPTLC method

Application:	12 mm bands by Automatic TLC Sampler ATS 4 (CAMAG)
Stationary phase:	HPTLC plate NH_2 F_{254s}, 20 x 10 cm (Merck, Art. No. 1.13192.0001)
Mobile phase:	Acetonitrile – water 5:1, v/v
Development:	Twin Through Chamber (CAMAG), migration distance 70 mm
Derivatization:	20 min at 190°C on TLC Plate Heater 3 (CAMAG)
Detection:	Fluorescence measurement at UV 366/ >400 nm by TLC Scanner 3 (CAMAG)
Documentation:	Reflectance mode at UV 366 nm with DigiStore 2 (CAMAG)

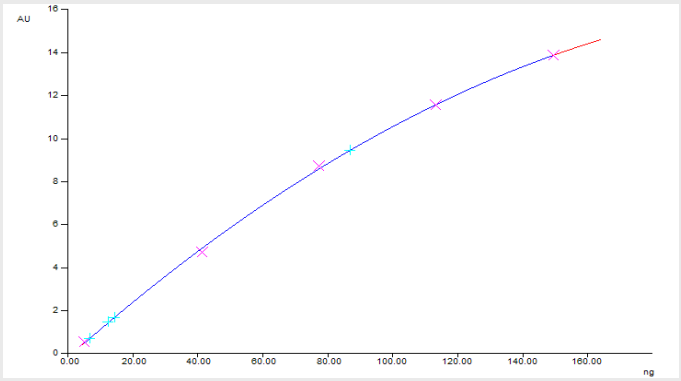
Results and discussion

The sample was freeze-milled with the aid of liquid nitrogen and extracted directly with methanol to avoid lumping of the sample. Due to the high content of matrix an ideal geometry of the start zones had to be chosen. The optimal application pattern was an area of 12 x 6 mm at a maximum application volume of 10 µL.



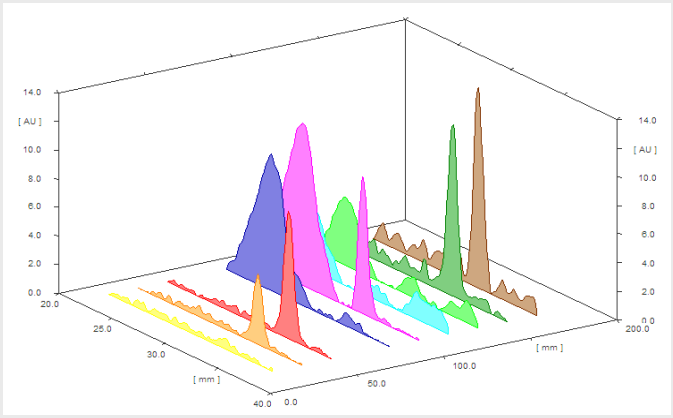
HPTLC plate image under UV 366/>400 nm illumination; track 1-3, 9, 10: sucralose standards (5 – 150 ng/band), track 4: blank track, track 5: fruit jelly extract ('Vitamin Wichtel', Natreen), track 6: standard addition of 9,6 mg/kg sucralose (80 ng/band) to the latter fruit jelly extract; track 7 and 8: fruit jelly extract ('Fruitissimo', Natreen).

The mobile phase was slightly modified to cope with the thickening agent based matrix (poly dextrose, wheat dextrin, gelatine). Acetonitrile – water 5:1 (v/v) was the best choice.



Calibration curve of the sample 'Fruitissimo' containig sucralose via polynomial regression (peak height) in the working range (1:30) of 5 ng to 150 ng. The calibration curve showed a coefficient of correlation of 0.9997.

With this chromatographic system the detection limit of 10 ng/zone sucralose could be reached. The recovery rate was 88 % at 9.6 mg/kg.



Analog curves obtained by fluorescence measurement at UV 366/>400 nm of sucralose standards and different fruit jelly samples; same track assignment as plate image (left).

Conclusion

For analysis of sucralose in fruit jelly freeze-milling and immediate extraction with methanol was the simplest way. Positive findings obtained by fluorescence measurement at 366/>400 nm were in the very low-mg/kg range. The standardization of the optimized method could be ensured by a high degree of automation and the exact documentation of all HPTLC steps.

Reference:
B. Spangenberg, J. Stroka, I. Arranz, E. Anklam, J. Liq. Chromatogr. & Rel. Techn. 26 (2003) 2729-2739.

Thank is due to CAMAG and Merck for support regarding equipment.