APPLICATION NOTE
E184OQJ-002

Determination of Vitamin C Content in Food and Beverages

Abstract

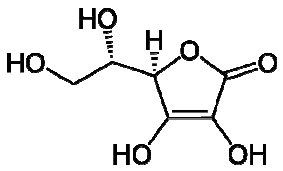
The present application note describes a chromatographic method for determination of Vitamin C content in food and beverages. Exemplary, cabbage, a multivitamin drink, an effervescent multivitamin tablet and freshly squeezed lemon juice have been analyzed.

Keywords

- Food analysis
- Natural product
- Organic acid
- Vitamin C
- L-Ascorbic acid

Compound information

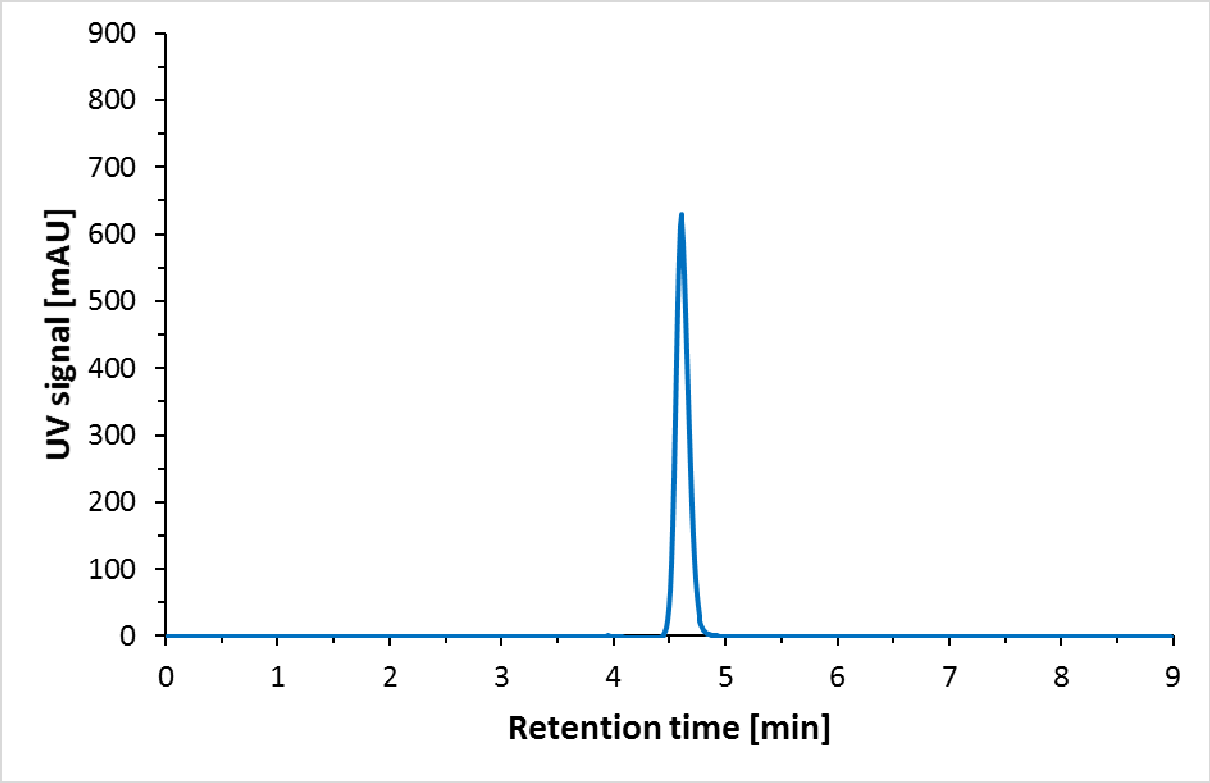
Classification	Compound name
Organic acid	L-Ascorbic acid



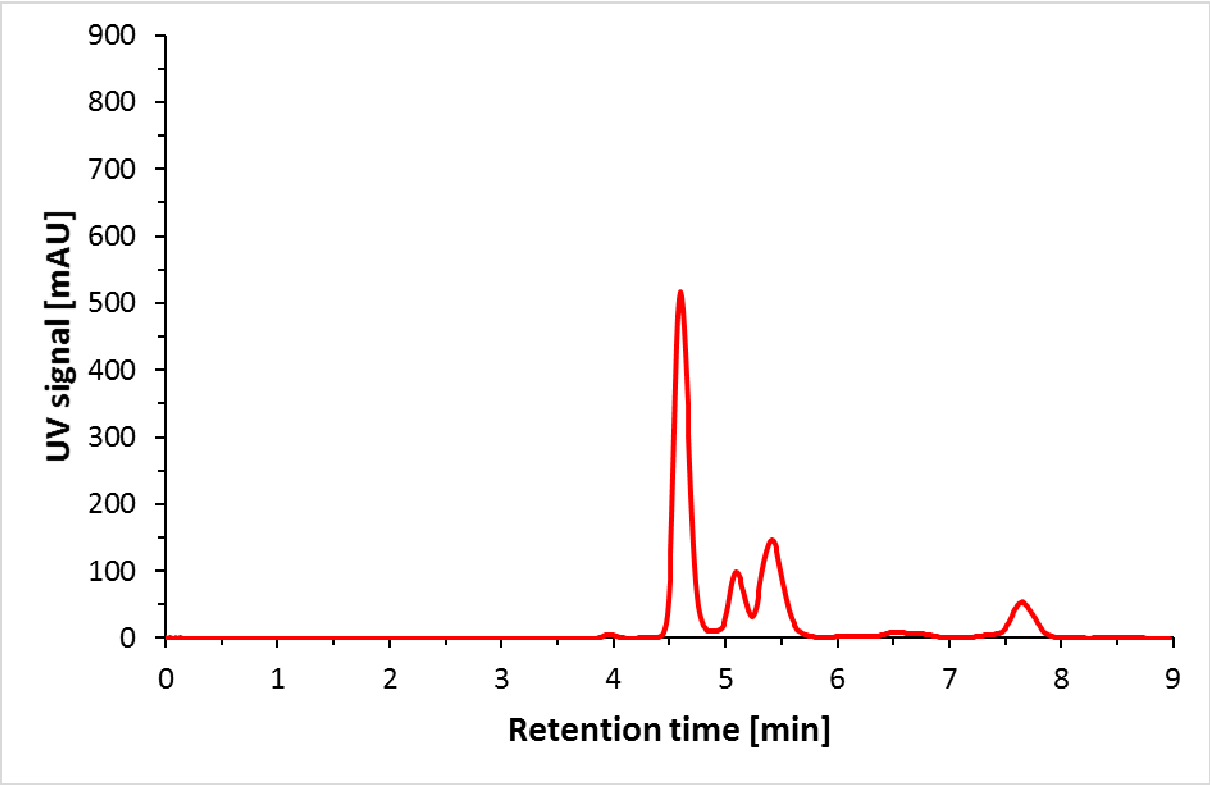
Chromatographic conditions

Column Particle Size, Length × inner diameter Order number	VDSpher OptiAqua PUR 100 C18 5 µm, 250 × 4.6 mm N2546E184OQJ
Separation mode descriptions	analytical, reversed phase
Mobile Phase	H_2O, containing KH_2PO_4/H_3PO_4 buffer, pH = 3 (3.4 g KH_2PO_4 were dissolved in 500 ml H_2O and adjusted with 85% ortho-H_3PO_4 to pH = 3)
Elution conditions	isocratic
Flow rate	0.7 ml/min
Injection	2 µl for standard solutions 7 µl for cabbage sample 10 µl for multivitamin drink 10 µl for effervescent multivitamin tablet 10 µl for lemon juice
Column temperature	37 °C
Pressure	137 bar
HPLC system	HP1090 Detection: DAD, wavelength 254 nm
Sample and sample preparation	For peak calibration, Vitamin C standard solutions were prepared with concentrations of 0.1 mg/ml, 0.25 mg/ml, 0.5 mg/ml, and 1 mg/ml, respectively. The cabbage was cutted, mixed with salt (ratio 50:1) and mashed until water came out of the leaves. The mixture was stored for 7 weeks at 15 °C. 32.35 g of the prepared product were extracted with 50 ml H_2O. The multivitamin drink was filtrated through a 0.45 µm nylon filter. The effervescent multivitamin tablet was dissolved in 250 ml H_2O and filtrated through a 0.45 µm nylon filter. The lemon juice was squeezed from a lemon and filtrated through a 0.45 µm nylon filter.

Chromatograms and results

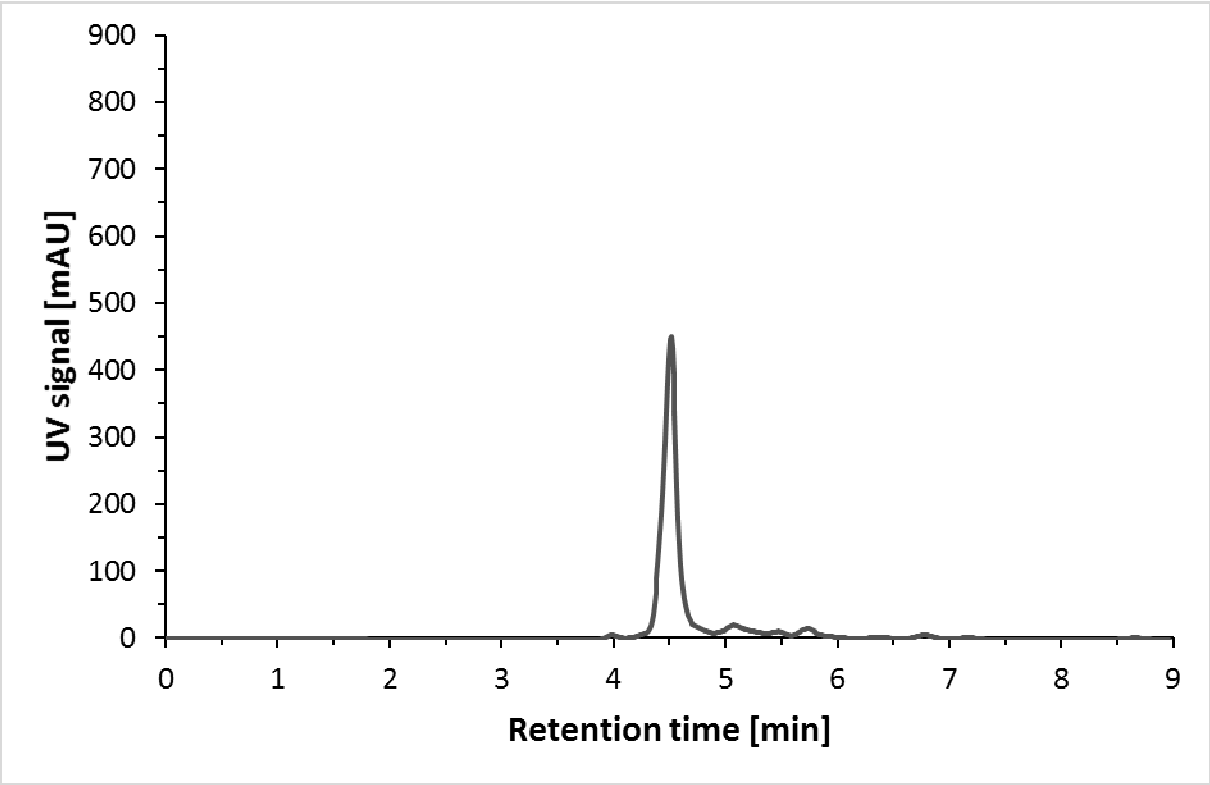


Vitamin C standard solution, 0.5 mg/ml, exemplary for the set of standards; retention time of L-Ascorbic acid = 4.6 min.



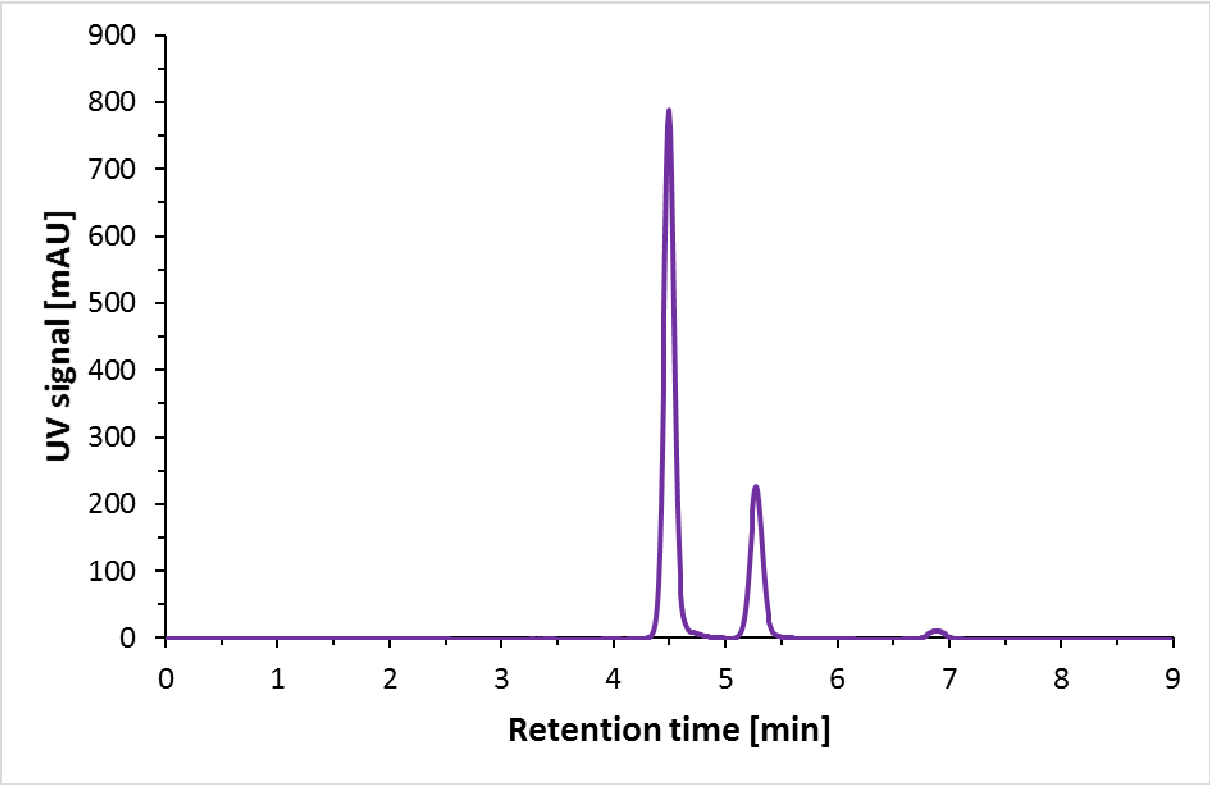
Cabbage sample; retention time of L-Ascorbic acid = 4.6 min.

Applying the calibration function derived from the measurements of the standard solutions results in a Vitamin C concentration of 0.14 mg/ml for the cabbage extract. The cabbage extract was made from 32.35 g cabbage and 50 ml H_2O. The Vitamin C content therefore is 21.6 mg in 100 g cabbage.



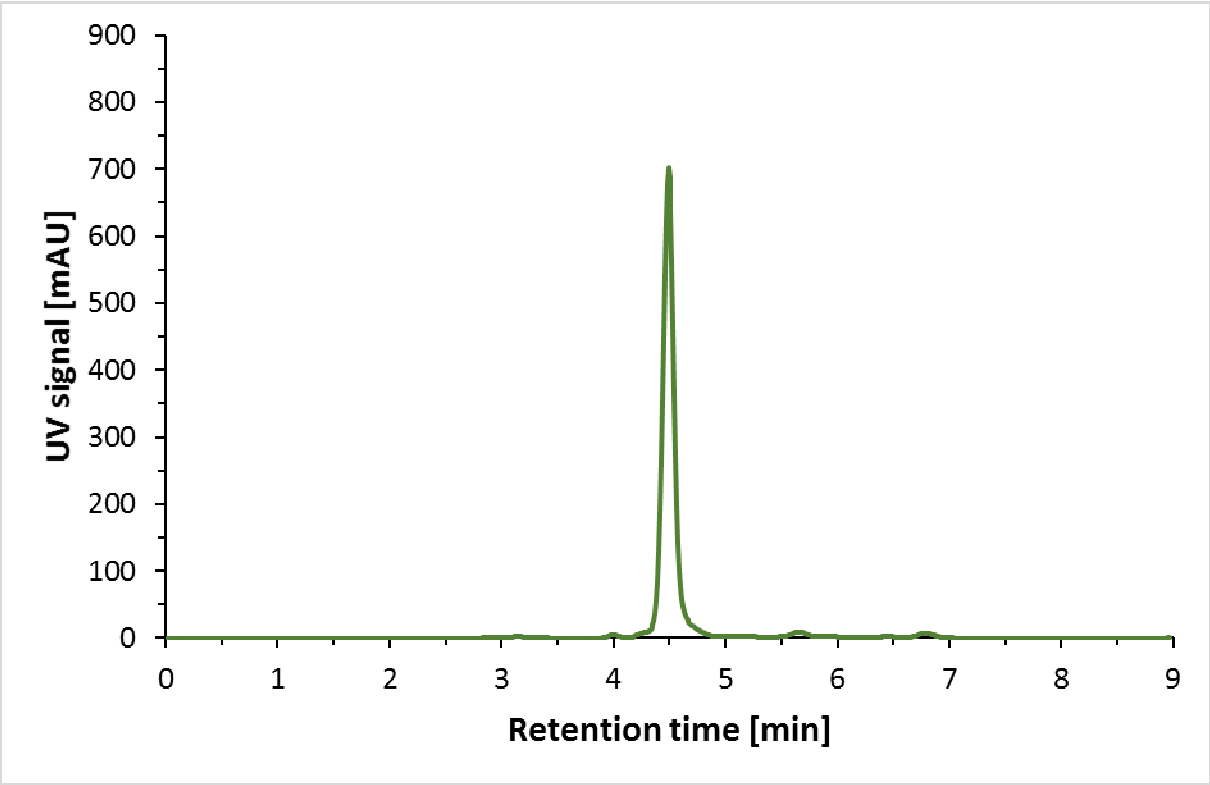
Multivitamin drink; retention time of L-Ascorbic acid = 4.5 min.

Applying the calibration function derived from the measurements of the standard solutions results in a Vitamin C concentration of 0.087 mg/ml for the multivitamin drink. Consequently, the content in 100 ml is 8.7 mg.



Effervescent multivitamin tablet; retention time of L-Ascorbic acid = 4.5 min.

Applying the calibration function derived from the measurements of the standard solutions results in a Vitamin C concentration of 0.11 mg/ml for the tablet. Before the measurement the tablet was dissolved in 250 ml water, the Vitamin C content therefore is 26.4 mg per tablet.



Freshly squeezed lemon juice; retention time of L-Ascorbic acid = 4.5 min.

Applying the calibration function derived from the measurements of the standard solutions results in a Vitamin C concentration of 0.10 mg/ml for the lemon juice. Consequently, the content in 100 ml is 10 mg.

Origin

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References

Year of application: 2016

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