

Stachyose: A Marker of the Presence of Legume Adulterants in Soluble Coffee?

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SUMMARY

Food processors and regulatory bodies are both interested in the detection of fraudulent or accidental adulteration of food. Authenticity of soluble coffee has been and still is a major concern for the coffee manufacturer because of the strong economic interest of adulteration. Typical coffee substitutes that may be added either as (declared) ingredients or (undeclared) adulterants are extracts of chicory, malt, figs, cereals, caramel, starch or maltodextrins. A powerful tool to detect even small amounts of these potential adulterants is **H**igh **P**erformance **A**nion **E**xchange **C**hromatographic (HPAEC) profiling of sugars (free and total upon total sugars hydrolysis of polysaccharides).

Recently, some commercial soluble coffees were seized in France that showed unusual high amounts of proteins (> 20%). Although their HPAEC sugar profile proved that these products were clearly adulterated, we also analysed their HPAEC oligosaccharide profile. This appeared to be unusual since in particular one peak with the same retention time as stachyose was detected, corresponding to about 0.1 to 0.2 g/100 g of this tetrasaccharide typically found in legume plants. In the HPAEC profile of 20 authentic soluble coffees of different manufacturers and covering the most important production conditions, no corresponding peak with the same retention was observed. To identify the unknown peak in one of the suspect soluble coffees, an oligosaccharide fraction was further purified by means of classical RP-HPLC. Using methylation analysis followed by GC-MS analysis of the partly methylated alditol acetates (PMAA), it could be demonstrated that this fraction was composed of about 50% of stachyose.

We conclude that the unusual HPAEC oligosaccharide profile, together with the high protein level and the confirmed presence of stachyose in this sample point to the use of an adulterant on legume basis. Further studies will be carried out to assess the botanical source of the adulterant using PCR techniques and to improve the purification of stachyose from soluble coffee. This could lead to a new screening tool of soluble coffee authenticity and help to decide whether the undeclared addition of legume plant extracts is a more widespread issue.