

Quality Assurance of Fruit-products and Fruit juices

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The analytical control of fruits and fruit juices especially focuses on determination of authenticity, quality and possible residues. The GfL -Gesellschaft für Lebensmittel-Forschung GmbH is working on these analytical fields for many years and consults customers of more than 35 countries on the different continents. For examination of authenticity and quality of fruits, modern analytical procedures for determination of the so called fingerprint are used more intensively beside the classic methods. The most important new developments shall be explained below.

For a few years the knowledge of anthocyan distribution in red fruits was established quite good. Based on this fact it can be summarised today that each type of "red fruit" has a different anthocyan pattern. Juice mixtures or adulterations, resp. undeclared additions of so called colouring ingredients (e.g. red beet) can be detected. One example is shown in fig. 1. Even if the principle of the method looks simple, a correct interpretation of such a chromatogram is not as easy as you may think. Influences are quantitative changes of the

pattern during storage, different varieties of the same type of fruit may have different pattern (e.g. we already know four types of raspberry) and finally a good reproducible HPLC technique is necessary to build up a data base.

Similar problems arise also by using the so called polyphenol-fingerprint technique. Those pattern which are also typical for special fruits can be very complex and further research is necessary. Technology influences are much wider than, for example, of anthocyan. Anyhow, looking to special components

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We can't do everything, but we are strong in:



- advanced analytics for authenticity and quality



- long term experience in interpretation of results



- advanced analytics for residues

- * Pesticides
- * Heavy metals
- * Mycotoxins
- * Contaminants



- consulting in food safety, food quality and food law



- consulting in food technology, quality management and HACCP



- applied research



- Gesellschaft Für Lebensmittel-Forschung mbH

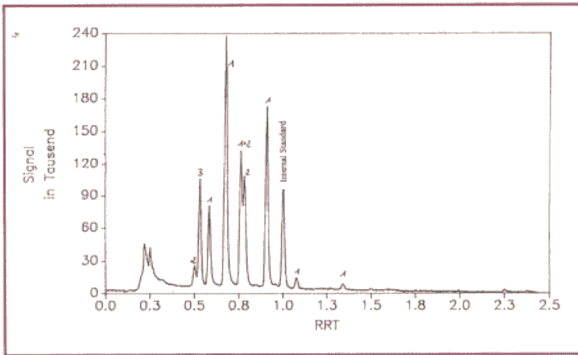


Fig. 1: Determination of Anthocyanins Adulteration of black currant with elderberry and hibiscus

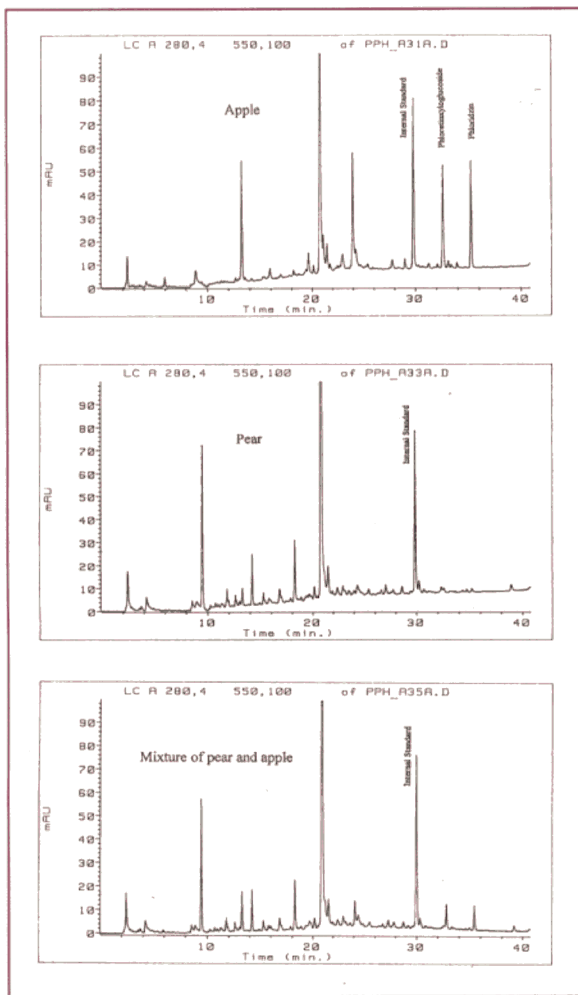


Fig. 2: Polyphenolic fingerprint of apple, pear and an adulterated sample of pear with apple

or ratios, it is a very powerful tool to detect adulterations. An example is shown in figure 2, where the addition of pear – in apple juice, resp. the opposite – is demonstrated. Because both fruits have characteristic peaks, the judgement of an unknown sample can be done down to a 5 % level blend.

One of the most popular fingerprint methods is the detection of flavonoids which are characteristic

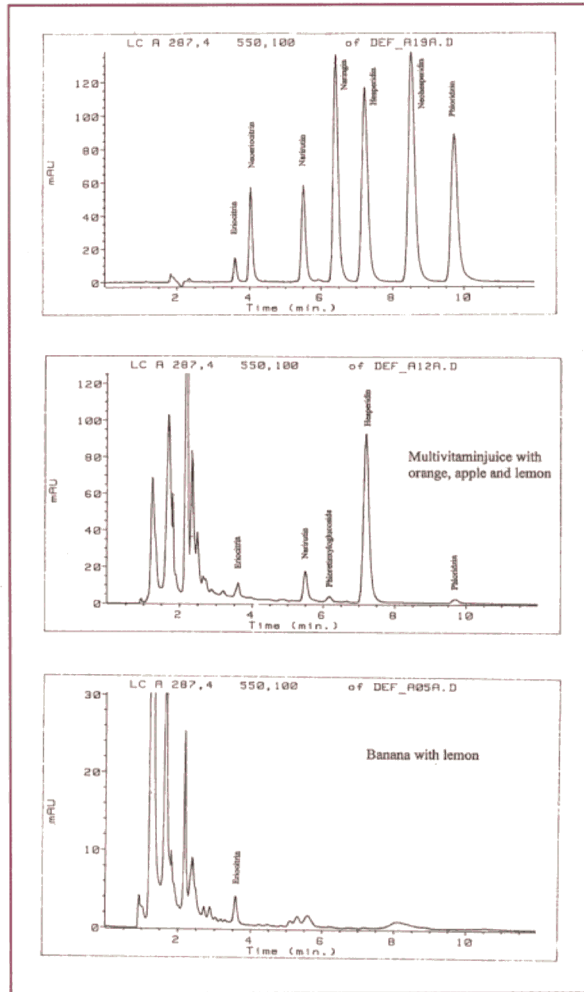


Fig. 3: Determination of different flavonoids

- Standard mixture
- Multivitamin juice containing orange, apple and lemon
- Banana nectar with an addition of lemon

for all kind of citrus juices. During the years, this method was modified several times and most components are identified and can be quantified today. How powerful this technique might be used is demonstrated in figure 3. No other method will indicate the use of lemon juice so precisely instead of citric acid. Furthermore the second example in this figure indicates that also the apple typical component phloridzin is detectable with this procedure.

The use of polymethoxylated flavones as an instrument for judging authenticity among citrus juices is not wide-spread. The technique is no problem for a good equipped laboratory. Limits are mainly the influence of technology and the wide concentration range of the single compounds. Anyhow, for special questions like lemon in lime juice or the opposite it is a very helpful instrument (see figure 4).