# Centre of Expertise Profile

**GfL - Gesellschaft für Lebensmittel-Forschung mbH, Berlin**

**Mikko Hofsommer** | Landgrafenstrasse 16, 10787 Berlin, Germany

**GfL was established 1984 as an independent service laboratory for the fruit processing industry. Since its establishment, industry recognised that unfair competition is extremely harmful for sustainable business development, hence authenticity analysis has played a major role in the work of GfL. Today, a team of 30 staff analyse around 15,000 samples of juices, beverages, concentrates, purees, and related products from nearly 80 countries a year.**

## What Analyses do GfL Offer:

In total, GfL analyse samples using more than 200 methods from a broad range of analytical techniques. These range from wet chemistry to ICP (Inductively Coupled Plasma), GC (Gas Chromatography), IC (Ion Chromatography), LC (Liquid Chromatography), coupled with different detection systems such as MS including IRMS (Isotope Ratio Mass Spectrometry), DAD (Diode Array Detector), PAD (Pulsed Amperometric Detection), and fluorescence. In addition, stable isotope analysis of $^{18}O$, $^{13}C$ and D/H is used, and GfL have developed an **IRMS method** * to detect the addition of both C3 and C4 exogenous sugars. Hence, GfL offer nearly all the recognised techniques for fruit products. However, GfL does not offer DNA based methods because the DNA becomes fragmented in juices which have the low pH and when pasteurised, and hence is difficult to amplify.

* pages 16-17 only

To assess the authenticity of fruit products, the best practice is to obtain a "full" analytical picture. The official methods of the International Fruit and Vegetable Juice Association (IFU) and also the AIJN Code of Practice together with a database on authentic samples play an essential role in GfL's work. The laboratory has ISO 17025 accreditation since 1992.

## What are the Main Findings:

Some types of fraud reoccur on a regular basis, such as the addition of exogenous sugar to juice or juice concentrate, as well as mislabelling products as to their origin. For example, in 2021, **Brazilian authorities** confiscated coconut water, nectars and orange juice, the latter was found to be extended by both water and exogenous sugar. In 2019, **Italian authorities** seized concentrated apple juice that would have been sold as organic when it was not, and was also contaminated with patulin.

*Orange juice confiscated by Brazilian authorities because it was extended with water and exogenous sugar.*

There are many other examples where extension, substitution or adulteration has been detected such as:

- addition of black carrot to pomegranate juice, mixing apple in pear juice, the use of $SO_2$ in organic grape juice, addition of citric acid to lemon juice, substitution of bilberry (*Vaccinium myrtillus*) with blueberries (*Vaccinium corymbosum/ angustifolium*), mixing lemon in lime juice, making concentrate from crab apple (*Malus sylvestris*) instead of *Malus domestica*, rhubarb juice in elderberry, processing of pineapple peel.

Because of client confidentiality, which is the corner stone of our work, most of these results have not been reported publicly. A rare exception was in 1995 when an incident incurred involving 1,400 tons of "artificial" apple juice concentrate made the news, and GfL was interviewed on television.

*Albrecht Korth, Hans-Jürgen Hofsommer, Günther Jauch (left to right) Source: RTL Stern TV 21 Feb. 1996*

## Where next with GfL's Expertise

Anyone involved with food authenticity is aware of the limitations of existing methodology and keeping one step ahead of the fraudsters. This means that GfL is constantly refining its methodology and seeking new applications to address these problems in the time that allows, but it is a never-ending task. Clearly too much detail cannot be released to keep fraudsters in the dark, however, GfL is currently working on IC-HRMS (Ion Chromatography- High Resolution Mass Spectrometry) and looking at specific isotope analysis to distinguish Darjeeling from Assam tea. In addition, the emerging field of proteomics has huge potential in solving many of the pressing problems being investigated.