QUALITY CONTROL OF JUICES WINES AND EDIBLE OILS BY HIGH-RESOLUTION PROTON-NMR - ONE GENERAL APPROACH FOR TARGETED AND NONTARGETED SCREENING

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Introduction and Objectives
Quality control of food products is based on several parameters assessed by multiple analytical and chemical tests. The NMR based screening of food material by high resolution NMR allows quantification of a multitude of compounds and simultaneous application of statistical methods from one single measurement. Due to reference databases, also frauds and problems can be detected, that the system is not trained for. This approach was transferred to other applications like wines and edible oils.

Methodology
Standard operation procedures have been developed from sample preparation to fully automated acquisition, processing NMR spectra at 400 MHz resulting in a report of 31 quantitative values as well as statistical data for juices. Limits of detection and quantification are based on spiking of relevant target compounds into juice matrices in combination with Monte-Carlo based electronic spiking studies in order to address the implications from spectral overlap and inter-sample variability.

Results and Discussion
The non-targeted results up to 24 compounds directly from the juice spectrum and 7 important ratios are provided. A reference compound database assists with assigning unknown signals. The principle technology has been transferred to a NMR based wine screener quantifying 25 compounds and grape variety information up to now.

Conclusions
In our contributions the added value of combining targeted and non-targeted analysis is shown for Juice and Wine. Health relevant aspects of gutter oil into edible oil is a problem on the Chinese market at the moment. The non-targeted verification of oils show the power of this approach.