

**A Needle in the Haystack:**  
**Fraud Detection through Mass-Balancing.**  
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Global supply chains, changing consumer demands and new technology offer exciting opportunities, but also face difficult challenges. This is especially true for high value products with claims regarding how they are produced, their origin and what they contain. Food fraudsters take advantage of legal loopholes to make a profit by selling a lower value product for a higher price. Detecting this fraud can be as difficult as finding 'a needle in the haystack'. However, if we focus more on the haystack, we might make it easier to find the needle.

**Check Integrity: A Non-Analytical Tool that Compares Production with Trade Volumes**

Organic Services developed 'Check Integrity' as a non-analytical integrity tool. The software utilises real-time certification and product transaction data to calculate a mass balance. The required data can be uploaded by any participating entities: farmers, manufacturers, processors, wholesalers, retailers as well as certification bodies. Based on this data, Check Integrity maps the flow of goods and monitors the volumes of certified produce traded along the supply chain. It checks the plausibility of production versus sold quantities, considering the actual acreage with its production potential. Using an intuitive traffic light system, Check Integrity warns the supply chain parties if more produce with a specific product claim is being sold than had been grown. The tool is ready to be used on a large scale, and can be applied to any commodity. It defines the haystack (mass) in which the needle (fraud) can be easily identified. In the organic sector the tool has already been proved to work as "Check Organic".



**Case Study: The Organic Sector**

The organic sector is especially attractive to fraudsters, since organic products sell for higher prices than conventional ones. Organic regulators identified this risk more than 30 years ago, and established organic control and inspection systems both nationally and internationally. What sets these apart from most other quality-related control systems, is their holistic approach i.e. all actors of the supply chain, including inputs, must be certified organic so that the final product can be sold as organic. Sounds super safe, but unfortunately, it is not. The organic control systems are not designed for our globalised, digitalised world. Many scandals have already affected the sector. In most fraud cases, the organic certificates (which guarantee compliance for an entire year and longer, although they represent only a snapshot) were forged. When certification and product transaction data is not shared by all parties, falsified documents travel easily along supply chains. "Check Organic", as one application version of Check Integrity, provides a tested tool to counteract this.

**Fraud Prevention and Detection needs a Multifactorial Approach**

The complexity of food fraud in all its different forms calls for a multifactorial approach, that combines both analytical and non-analytical measures. Analytics investigates the needle. It is much easier, if a mass-balance-tool like Check Integrity defines the haystack beforehand, defining anything that does not belong to the haystack as potentially fraudulent. In the case of suspected fraud, crime investigators have to make sense of all the conflicting evidence. Their work is facilitated if all the relevant product transactions and certification data are available in one platform. In order to make fraud more difficult, national and international authorities must require more transparency of all supply chain parties, to make all the data and hence their haystacks accessible and visible. If you have doubts about your supply chain's integrity you could investigate the advantages of using Check Integrity or Check Organic.