STOP FAKE FOOD

Food Integrity & Product Authenticity Solutions

2 PROBLEM

FOOD CRIME

Food crime is a global $300 billion industry and no one is safe

Food crime is committed in various forms – ingredient substitution, use of illegal substances, non-compliant processing, product adulteration, package mislabelling, brand counterfeiting, document forging or outright fraud.

Food crime can occur on any stage of the food chain

Production → **Processing** → **Distribution** → **Retail**

HOT TOPIC CASES

Adulterated meat

Processed meat products are easy to tamper with

- Horse meat is often used as a cheap and undeclared substitute for beef;
- Traces of pork can be found in Halal, Kosher, vegan and supposedly 'meat-free' products;
- Gourmet products are easily faked by using lower quality or unknown origin meats.

Counterfeit olive oil

Faking of edible oils is a huge global issue

- In the USA around 69% of imported extra virgin olive oil is substandard;
- Olive oil counterfeiting are criminal industrial-scale operations that are 2,5 times more profitable than cocaine;
- Over €5 bln. worth of fake olive oil is circulating in the market.

Fish on formalin

Your fish might not be as healthy as you think

- The toxin formalin causes allergies, genetic mutations and cancer;
- It's illegal but still regularly used in around the world as a fish preservative;
- Samples from South and South-East Asia are regularly found to contain formalin.

THE DAMAGE

Food crime has systemic effects and is damaging in multiple ways

Public sector

Taxes

Illegal activities and unproperly taxed products cause budgetary loses and distorts markets.

Public health

Insufficient food safety control and illegal use of forbidden substances creates public health risks.

Businesses

Revenues

Food and beverage manufacturers around the world lose out on revenue due to product counterfeiting.

Brand image

Low quality counterfeit products have a damaging effect on high-tier food and beverage brands.

Consumers

Expectations

Counterfeit gourmet foods and beverages cheat consumers of their money and expectations.

Dietary choices

Mislabeled products or undeclared ingredients violate religious (ex. halal or kosher) or ethical (ex. vegan) diets.

THE CHALLENGE

Food crime is constantly advancing and our current practices are struggling to keep up

Laboratory research

Reliable, yet unscalable

Conventional laboratory research methods are the best at identifying fake food, yet are fundamentally limited in their applications:

- Time consuming – take several business days to be fulfilled;
- Expensive – often cost more than the tested product;
- Unscalable – have low throughput and cannot be applied on industrial scales.

Supply chain tracking

Tracks packages, not contents

In most cases food supply chain management is more about shipments and package traceability rather than the authenticity of their contents:

- The biggest food faking operations happen on industrial scales and before entering supply chains;
- Documents can be forged, packaging counterfeited and labelling changed;
- Already packaged products can be tainted, substituted or adulterated.

Consumer protection

Too reliant on trust in third parties

Distinguishing well faked products on-the-spot is hard and consumers can be easily fooled into purchasing products they are not expecting:

- Labels and markers can be misleading, insufficient or outright fake;
- Retail-level product control measures are usually selective and irregular;
- Consumers are limited in their actions and need to rely on third parties.

THE SOLUTION

Stop Fake Food is developing innovative solutions for rapid **food authenticity and quality testing** by combining Raman spectrometry with advanced Artificial Intelligence techniques.

Measuring food using Raman spectrometry is **complicated** as most same type products provide very similar results with minor differences.

Stop Fake Food is helping to **make sense of the data** by recognising the complex spectral data patterns that make every product different and unique.

Thus Stop Fake Food is enabling **widespread Raman spectrometry applications** within the food supply chain.

Key service features:

Fast

- Reliable on-the-spot results in a matter of minutes rather than the usual days or weeks for laboratory research

Cost-efficient

- More than 80% cost reduction when compared to conventional methods

Non-invasive

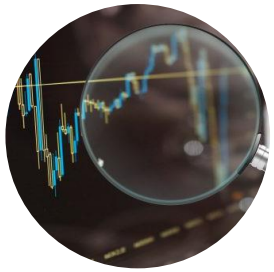
- No product sampling needed and can work through many types of glass, plastic or paper packaging

Scalable

- Global expansion facilitated by distributed infrastructure and an incentive-based business model

HOW IT WORKS

Reliable product analysis with a simple point-and-click procedure



1. Scan product

Scan a questionable food product or beverage with a Raman spectrometer

2. Submit data

Upload scan data into the SFF Platform and provide payment in SFF tokens

3. Data analysis

Data is processed and analysed through the SFF Neural Network in a matter of minutes

4. Receive results

Receive results on product composition, authenticity, safety and quality

SOLUTION

THE TECHNOLOGY

The Stop Fake Food solution is enabled by cross-disciplinary technological integration

Raman Spectrometry

Continued advances in hardware engineering are set to make handheld Raman spectrometers ubiquitous throughout the food industry in the coming 5 years

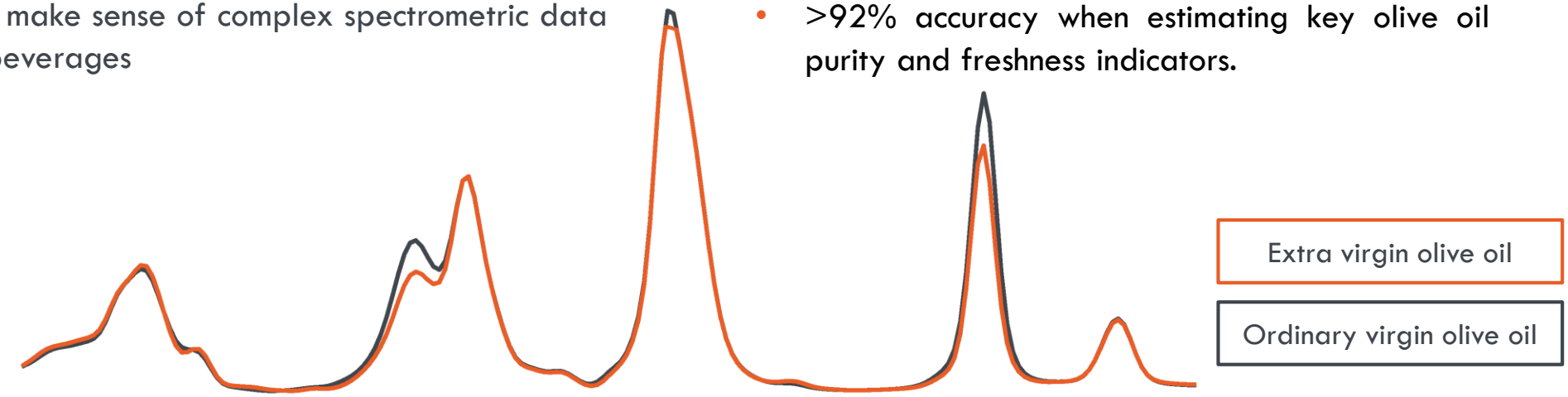
Artificial Intelligence

Applications of machine learning and neural networking methods allow to make sense of complex spectrometric data from foods and beverages

Stop Fake Food is developing unique algorithms for differentiating food products and their quality indicators using various machine learning and advanced statistical analysis methods.

Working technology use-case – **authentic extra virgin olive oil recognition**:

- >90% accuracy in differentiating extra virgin olive oil from ordinary virgin or pomace oils;
- >92% accuracy when estimating key olive oil purity and freshness indicators.



IN COMPARISON

Stop Fake Food enables application of laboratory-tier research on industrial scales

	Various laboratory research methods	Spectrometric methods in a laboratory	The SFF product analysis solution
Duration	1-10 work days	5-10 work days	5-15 min. at any time
Location	Laboratory conditions	Laboratory conditions	Potentially anywhere, on-the-spot
Result reliability	Very high	High	High
Estimate service price	30-1000 USD	50-250 USD	10 USD
Scalability potential	Very low	Low	Very high

CLIENTS & MARKETS

B2G clients

Research laboratories

- Increasing procedural efficiency for accredited governmental food safety and risk assessment laboratories that conduct food analysis on a daily basis

Governmental institutions

- Benefiting customs offices, food safety and consumer rights protection agencies, law enforcement and related institutions with fast on-the-spot testing capabilities

B2B clients

Food and beverage manufacturing

- Protecting from substandard ingredients, increasing on- and off-site product quality controls and protecting brand integrity of high-value food products and beverages

Supply chains and retail

- Increasing food supply chain integrity and fraud prevention with stand-alone implementations or integrations with already existing systems

Target markets

Europe

- High development markets with strict governmental regulations and manufacturers of high-value food products and beverages

Middle East

- Markets with high dependence on food imports and reliance on supply chain integrity

East and South-East Asia

- Rapidly growing markets with expanding middle-class consumer bases

APPLICATION POTENTIAL

Food safety

Dangerous substance identification

Analyzing products for chemical substances that are unfit for human consumption or pose long-term danger to consumer health (e.g. toxins, carcinogens, pesticides, etc.)

Foodborne disease prevention

Identifying various hazardous biological traces (parasites, bacteria, fungi, etc.) that could cause illnesses upon consumption of infected products

Procedural efficiency and scaling

Applying the product analysis solution to significantly scale procedures related to food safety and increase regulatory efficiency

Product authenticity

Fighting product counterfeiting

Method for various interested parties to check on product authenticity in order to fight counterfeiting, reduce financial losses and protect brand integrity

Licencing and quality control

Ensuring that products or their ingredients that are produced by several producers are in line with industry requirements, brand standards or franchise agreements

Complementing existing solutions

Integrating with existing B2B services and supply chain management systems to provide complete and all-rounded business solutions

Consumer expectations

Consumer assurance

Proving that the product is truly what it is presented to be (e.g. extra virgin olive oil instead of pomace oil, or high-end wine instead of a cheap knock-off)

Product labelling accuracy

Verifying product ingredients, determining adulteration, non-specified allergens or other substances that could be unsuitable for some consumers

Religious and ethical diets

Checking product compatibility with consumer religious practices (ex. halal or kosher diets), ethical concerns (ex. vegan) or other specific personal or cultural dietary preferences

MARKET ENTRY & GROWTH

B2G strategy

Preparation	Entry	Growth
Methodology verification and certification • Achieving official methodology recognition and opening it to implementation and public procurement by the governmental sector.	**Creating synergies with institutions** • Implementing compatability with existing Raman spectrometers already used by many governmental institutiosn and laboratories.	**World wide food testing standard** • Open access service platform for reliable testing and analysis of food products and beverages based on their Raman spectral data from.

B2B strategy

Preparation	Entry	Growth
Strategic partnerships and field testing • Working closely with partners from different stages of the food supply chain to define the most competitive business use cases and perform market testing.	**Leveraging on distinctive capabilities** • Offering certified authenticity, quality control and preventative testing services, custom built for specific business needs nd product cases.	**An open implementation approach** • Developing technical means and business incentives for open SFF integration with existing third-party food management systems or consumer-oriented services.

THE COMPANY

The corporate structure of the Stop Fake Food project consists of two companies:

Spectrolab GmbH

Holding company and Intellectual Property Rights holder

Incorporated in Zug (Switzerland) since 2018-09-11

Location address Baarerstrasse 82, 6300 Zug, Switzerland

Spektrolabas Ltd

R&D branch, wholly owned by Spectrolab GmbH

Incorporated in Vilnius (Lithuania) since 2017-08-30

Location address Mokslininku str. 2A, 08412 Vilnius, Lithuania

IPR management

Main object of SFF Intellectual Property – food product spectrometric data analysis methodology using machine learning and neural networks.

Patent application preparations ongoing and planned to be submitted in 2019.

Other key IP assets:

- Library of food product Raman spectres and their associated metadata;
- Specialized spectral data analysis algorithms;
- Tokenized analysis services.

KEY TEAM MEMBERS

Augustas Alesiunas
CEO
Business angel and founder in FoodTech and AgTech industries for 10+ years

Dmitrij Radin
CPO
Expert in technology and product development, startup consultant

Dr. Valdas Rapševičius
Lead AI Architect
Associate Professor at Vilnius University, contributor and team leader at CERN LHC

Justas Gribovskis
CIO
More than 15 years in business development, C-level roles and IT infrastructure projects

Darius Montvila
Chairman of the Board
Senior C-level Executive with 30+ years of high-tech industry experience

Dr. Laurynas Jukna
CSO
PhD in Physical Sciences, Senior Lecturer and scientist at Vilnius University

Dr. Justinas Čeponkus
Lead Spectroscopy Researcher
Associate Professor at Vilnius University, author and co-author of 50+ scientific papers

PARTNERS

NACIONALINIS MAISTO IR VETERINARIJOS RIZIKOS VERTINIMO INSTITUTAS

National Food and Veterinary Risk Assessment Institute

The assigned national risk assessment and research institution, subordinate to the State Food and Veterinary Service of the Republic of Lithuania. Provides scientific and technical assistance in the field of food safety and veterinary, as well performs functions of the national reference laboratory.

National Center for Physical Sciences and Technology

The largest scientific research institution in Lithuania. Conducts fundamental research and technological development in the fields of laser technology, optoelectronics, nuclear physics, organic chemistry, bio and nanotechnologies, electrochemical material science, functional materials, electronics, etc.

Vilnius University Faculty of Mathematics and Informatics

The leading higher education institution in Lithuania. Prepares high competence professionals and conducts fundamental scientific research in the fields of mathematics, computer science and statistics.

swisscom | Blockchain

Swisscom Blockchain AG

A global leader in Blockchain technological solutions, advisory, business development and specialized services. Part of Swisscom – the leading telecommunication service and IT infrastructure group in Switzerland.

STOP FAKE FOOD

Food Integrity & Product Authenticity

- **Non-invasive** & **on-the-spot** product analysis using Raman Spectrometry
- Advanced data processing based on **Artificial Intelligence** technologies
- **Reliable** & **cost-efficient** results in a matter of minutes
- **Versatile** & **scalable** for different stages of the food supply chain

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