INNOVATION
IMPROVEMENT IN PROCESSING
QUALITY CONTROL & FOOD SAFETY
ON 4.0 INDUSTRY
Food Control

“....a mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure that all foods during production, handling, storage, processing, and distribution are safe, wholesome and fit for human consumption; conform to safety and quality requirements; and are honestly and accurately labelled as prescribed by law.”*
For centuries, people worldwide have used sulfites to preserve foods and beverages, to enhance flavor and preserve freshness. Shellfish handlers use sulfites to preserve shrimp. SO₂ & SMBS are most commonly used antioxidants for prevent melanosis, because still is the cheapest and most effective method.

However, eating shrimp that contains sodium sulfite is potentially hazardous, only under an strict control we can ensure that the product is safe for human consumption.
BLACK SPOT & CONTROL IN SHRIMP
How to stop melanosis

MELANOSIS IN SHRIMP

Blackspot or Melanosis in shrimp occurs from system of enzymes that naturally present in shrimp. Melanosis is harmless and not indicate of bacteria spoilage.
• Even though darkening is harmless, it is defect and affects negatively to quality perception. Unappealing discoloration can be rejected purchasing by customer.
• To prevent melanosis there are using of sodium sulfites (SO2) that are effective blocking a transform colorless.
The use of sulfites especially when post harvest procedures, shrimp will be rinsing and soaking in the ice bins therefore while it is freezing, the shrimp will absorb sulfites as well. Due to FDA concerning to limits of using sulfites, it has been controlled by informing a consumer in the label that the product is contained sulfites.
FDA regulation

Content of SO2:

below 80 mg/Kg .... 120 mg/Kg (depending on the sizes)
Properly Labeled over 10 pmm
FARM TO TABLE CONTINUUM
Accessing Global Markets by serving Safe and Best Quality Food to the Consumer

Hazard Analysis Critical Control Point System (HACCP), have resulted in industry taking greater responsibility for and control of food safety risks. Such an integrated approach facilitates improved consumer protection, effectively stimulates agriculture and the food processing industry, and promotes domestic and international food trade.

Access of Global Markets relies on the TRUST OF CONSUMERS in the Food Supply Chain. To achieve this objective an Efficient of Quality Control is mostly required.
FARM TO TABLE CONTINUUM
Accessing Global Markets by serving Safe and Best Quality Food to the Consumer

Smart technology is required to control the quality of product throughout the chain.

During the processing chain food can be contaminated with biological, chemical and physical hazards at any point.
BIOSENSORS TECHNOLOGY AND 4.0 INDUSTRY

FOR FOOD PROCESSING SECTORS
BIOLAN : BIOSENSORS TECHNOLOGY
IN HOUSE TECHNOLOGY

High level of Know How in three technologies which allows to develop disruptive and competitive applications for the Biosensors.

1. **Development** of enzyme biosensors and immuno-sensors for measuring parameters of interest in the field of food safety.

2. **Miniaturization** of biosensor technology to obtain simple, fast, cheap, portable biosensors based on disposable pre-calibrated screen printed electrodes.

3. **Automation** of biosensor technology to obtain continuous monitoring tools.
R&D Projects

30 R&D Projects
22 cooperation
8 individual
A biosensor is a compact analytic device which uses the biological interactions to give quantitative result for different parameters.

The specificity, high sensitivity, rapidity and possibility for continuous monitoring make the Biolan Method an advanced and competitive solution.

SO2 & SMBS on the Shrimp Meat

BIOFISH 300

SO2 & SMBS on the Water Bins

BIOFISH 700
Users & Partners

- GRUPO NUEVA PESCANOVA
- ERRIGAL BAY
- CRUSTA C
- Alpha
- abad overseas private limited
- Bee Gee
- caladero
- Langostinos de Centroamérica
- WESTCOAST GROUP
- LANCE
BIOFISH 700
Analising on the Field

40 Seconds / 2 Samples
Digital Data Recording
Not sensitive
Portable
Chemical free (ONLY water)
Simple and easy to use

This Project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 684026
BIOFISH 700
Analising on the Field

80 g/L  .........................  80 mg/Kg
MTBS in the water (bins)  SO2 in the meat (shrimp)
The Biofish-300 HISTAMINE method was evaluated by the AOAC Research Institute and certified as Performance Tested Method (SM) 051604 for the determination of histamine in raw tuna, raw mackerel, raw sardine, raw anchovy, cooked tuna, canned tuna in oil, canned tuna in water, canned mackerel in tomato sauce, canned pickled sardine (10-200 mg/kg) and canned, salted fish (30-150 mg/kg).

The BIOFISH 300 SULFITE method was evaluated by the AOAC Research Institute and certified as Performance Tested Method (SM) 031802 for the determination of sulphites (measured as SO2) in raw shrimp head on, raw shrimp head off and boiled shrimp.
Biolan has been recognised by the European Commission as one of the most innovative companies in Europe.

SO2SAFE

MARCH 2015

614 proposals, 42 financed

SO2SAFE ACHIEVEMENT: unique proposal financed in BIOTEC topic
Quality and safety standards are among the many factors affecting competitiveness in agrofood trade, and have become increasingly important in the last decade as major dimensions of both trade policy and private marketing strategies.

An agrofood industry wanting to engage international trade will have to deal with opportunities and constraints stemming from those standards. *
The **need for product traceability and the ability to segregate non conforming product** are identified as the two major issues currently impacting upon the development and acceptance of food assurance systems by the market.

Market access is assured through the adoption of both supplier-based and customer-based quality assurance systems. In the international market, food producers must not only meet the private standards set by customers, but negotiate the plethora of regulations established by importing countries.*

*SOURCE: Perspectives on Global Trends in Food Quality and Safety: J.D. Noonan and P.J. Batt*
The trend for Industry 4.0:

• Turn processor company into **predictors** instead of reactors.

• **Optimize cost and time** of the production (quick decision making based the information provided in real time).

• The growing awareness of consumer for ‘sustainability issues’ **demand for traceability of product**.

*SOURCE: Perspectives on Global Trends in Food Quality and Safety: J.D. Noonan and P.J. Batt*
NEW ERA OF SMARTER FOOD SAFETY

“FOOD SAFETY IS EVERYONE’S BUSINESS”
On April 30, 2019, Acting FDA Commissioner Dr. Ned Sharpless and Deputy Commissioner for Food Policy and Response Frank Yiannas announced a new approach to food safety, one that recognizes and builds on the progress made in the past but looks towards what processes and tools will be needed for the future.

The agency is currently developing a Strategic Blueprint that will outline how FDA plans to leverage technology, and other tools, to create a more digital, traceable and safer food system. This work will build on the advances that have been and are being made in FDA’s implementation of the Food Safety Modernization Act (FSMA) while advancing the use of technologies that are currently used in society and business sectors all around us, such as blockchain, sensor technology, the Internet of Things, and artificial intelligence.
Smarter Food Safety is about more than just technology. It’s about leadership and creativity. It’s also about simpler, more effective, and modern approaches and processes.

Smarter Food Safety is people-led, FSMA-based, and technology-enabled. Priority areas that will be the focus of internal workgroups and stakeholders attending a public meeting in the fall of 2019 include:

**Tech-Enabled Traceability and Foodborne Outbreak Response**: Looking at technologies, data streams, and processes that will greatly reduce the time it takes to track and trace the origin of a contaminated food and respond to public health risks.

**Smarter Tools and Approaches for Prevention**: Enhancing the use of new knowledge from traceback, data streams and tools for rapidly analyzing data. The ability to use new data analysis tools and predictive analytics will help FDA and stakeholders better identify and mitigate potential food safety risks and advance the preventive controls framework that FSMA established.

Adapting to New Business Models and Retail Food Safety Modernization: Advancing the safety of both new business models, such as e-commerce and home delivery of foods, and traditional business models, such as retail food establishments.

Food Safety Culture: Promoting and recognizing the role of food safety culture on farms and in facilities. This involves doing more to influence what employees and companies think about food safety and how they demonstrate a commitment to this work. Strengthening food safety cultures also extends to the home and FDA is working to educate consumers on safe food handling practices.

SOURCE: https://www.fda.gov/food/food-industry/new-era-smarter-food-safety
Specifically, the agency has committed to developing a “Blueprint for a New Era of Smarter Food Safety” and will hold a public meeting later this year regarding the same.

FSMA provided FDA with new enforcement authorities designed to achieve higher rates of compliance with prevention- and risk-based food safety standards and to better respond to and contain problems when they do occur.

FDA views the New Era of Smarter Food Safety plan as the next step in its implementation of FSMA, through which it can identify:

- A process to digitally track food through the supply chain in a similar manner to tracking packaged goods;
- New technologies (e.g., distributed ledgers, sensors, the Internet of Things, and artificial intelligence) that can be used to create transparency in the food system; and
- The appropriate standard of care in evolving business models such as e-commerce of food.

Although it remains to be seen which technology or technologies discussed above, if any, FDA will mandate, it is possible that any of the approaches noted could significantly enhance traceability in the food supply chain.

For example, imagine being able to digitally track produce throughout the supply chain. In October 2018, IBM launched a blockchain produce tracker called IBM Food Trust.

It has been reported that the technology allows for growing, processing, and transportation information to be traced and shared across the industry, and that the solution can “reduce the checking time for provenance from days or weeks to seconds.”

As stakeholders well know, compliance is not cheap. The benefits of enhanced food safety aside, FSMA compliance has been an expensive proposition. As it considers weighing in on the smarter food safety doctrine at FDA, one thing that the industry will want to evaluate is what additional costs it will have to bear in order to adopt the technology or technologies FDA is considering.

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Highest Increasing!

Batch #1: Frozen Final Product
Corrective Action

Batch #2: Labeling
Corrective Action
FROZEN TUNA QUALITY TRACEABILITY
Biosensores inteligentes y conectados (4.0)
1. Integrate the information generated in a simple and visual way.

2. Generation of information, which contributes in detection and improvements.

3. Guarantee the traceability of the lots and the information corresponding to each of them.
BIOLAN 4.0
DEVELOPMENT OF TECHNOLOGY

R&D 7000
“WE MEASURE QUALITY”
Biolan is a biotechnology company that works mainly in developing and marketing new biosensors capable of detecting health and agro-food-related molecules.
THANK YOU FOR YOUR ATTENTION

ANTONIO JOSE BUSTAMANTE BUENDIA