CHANGING PERSPECTIVES: FROM WASTE AND WASTEWATER MANAGEMENT TO SIDE-STREAM VALORISATION

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Circular economy in the fish canning industry

The fish canning sector is characterized by the low utilization of the main raw material (for example, 40-60% tuna) and higher water consumption in its processing lines. However, it is one of the food sectors with the highest intensity of recovery of by-products for direct use as fishmeal.
PRODUCTION PROCESS

- Defrost
- Cutting & Gutting
- Cooking In Brine
- Canning
- Sterilization
- Final Product
Byproducts & waste:
- Heads
- Bones
- Skin
- Vistera

Wastewater:
- Sewage load
- High fats and grease content
- High salinity
- High temperature
Main pollution of effluents
CHANGING PERSPECTIVES: FROM WASTE AND WASTEWATER MANAGEMENT TO SIDE-STREAM VALORISATION

1. Improving **Eco-Efficiency** in the processes

2. **Regeneration** of food brines and fish proteins **upcycling**

3. **Intelligent waste & loss monitoring:** Use of **IoT & AI**

RESALTUN project

iFishCan

AZTI
Objective:
Demonstration of an integrated solution (technical, legislative and environmental) for reduction at the origin and the controlled integration of high organic and saline load discharges from the SME’s canning industry in the urban sanitation system.

Levels Project performance

Level 1 - Tuna canning industry
Strategies for the minimization of highly polluted effluents and secondary raw material

Level 2 - Sewerage system
Develop and model a virtual simulation platform integrating industrial pretreatments, collector network and WWTP

Level 3 - Environment
Monitoring the impact of the project actions on the environment
3 Barrier System

1st Barrier

Water saving and prevention of material losses

3 Barriers system

2nd Barrier

Retention and revalorization of solids and fats

3rd Barrier

Intelligent management of partial discharges
1st BARRIER

- Water consumption reduction in productive and auxiliary processes
- Avoid the loss of raw material and products and its disposal in wastewater

Water savings
- Installation of a pass sensor for tuna pieces
- Replacement of more efficient diffusers

Avoid loss of raw material
- Installation of baffles to avoid loss of raw material
- Install trays for the hygienic collection of tuna crumbs
Retention of solids and food fractions in a hygienic way through specific systems and technologies that allow their recovery.

1. Oil Valorisation
2. Recovered brine
3. Protein concentrated Valorisation

Example: Integral recovery of cooking brines
Intelligent internal management of partial discharges, through temporary storage, partial treatment, reuse before being discharged

Example: Recovery of sterilizer cooling water for internal reuse in floors cleaning or other uses
RESALTUN Project: UPCYCLING OF BY-PRODUCTS

Fish protein Upcycling System

Nanofiltration

Exhausted brine

Recovered brine

Brine recovered for reuse

NF Concentrate

NF Permeate

Protein concentration from 6 – 8 g/L to 25-36 g/L for use in savoury or fertilizer industries
RESALTUN Project: UPCYCLING OF FISH BY-PRODUCTS

Fish Oil

Fish meal

Animal Feed

Pharmaceutical industry

Nutraceutical industry

Fertilizers
iFishCan – intelligent waste & loss monitoring test bed for the Fish Canning industry

OBJECTIVE

Improving the performance and sustainability of the fish canning sector through digitalization and Artificial Intelligence
¿What is iFishCan?

IIoT digital cognitive platform for the optimization and prediction of process efficiency (waste, water, energy) in the canned fish industry.

- WEIGHT (Raw material, wastes & products)
- ENERGY Consumption
- WATER Consumption
OUT PUTS

• Analyse and visualize production data
• Trace the use of resources at each point of the production chain at real-time:
  • monitoring for efficient use of raw materials and reducing product waste
  • allowing to implement corrective actions in real time
• Estimate the impact of the implementation of different technological solutions on the efficiency and the associated environmental footprint

Testbed main goals:

10% Reduction of food loss during production

5-10% Reduction of energy consumption

5-20% Reduction of water consumption
Fish Canning Industry and Circular Economy

Raw Material -> Fish Canning Plant -> Product

Water

Wastewater -> WWTP

Fishmeal -> Fertilizer

Crop

Biogas

Product

Waste

Valorización
Thank you very much for your attention