

Food radar system for the detection of foreign objects with low density in foods

Campden BRI Hungary

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Dissemination Level		
PU	Public	
PP	Restricted to other programme participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	

1. Title of the case description

Food radar system for the detection of foreign objects with low density in foods

2. Indicate your role in the Smart Food Supply Chain:

- individual member of the chain:
- chain operator:
- network operator:
- association:
- technical, scientific, or management expert:
- advisor:
- policy maker:
- other:

3. Indicate the region (if applicable): world-wide applicable

4. WP2 Cross-reference table

Please indicate with an X in the relevant box of the matrix for which needs and the steps / functions of the supply chain the described innovative solution is applicable

		Individual steps of the SFSC							Short food supply chain as whole						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Needs of the consumers (citizens)	food safety		X		X										
	food quality		X		X										
	trust														
	ethical aspects														
	accessibility														
Needs of the chain actors	fair price														
	increased negotiating power														
	shared use of available resources														
	product development support														
	access to markets and consumers														
	access to infrastructure														

- 1: Farming**
- 2: Primary production**
- 3: Transport**
- 4: Processing and packaging**
- 5: Storage**
- 6: Logistics**
- 7: Sale**
- 8: Product integrity, authenticity, transparency**
- 9: Marketing concepts**
- 10: Food chain management and networking for enhancing cooperation among chain actors**
- 11: Business modelling**
- 12: Policy environment**
- 13: Legal requirements**
- 14: Labelling**

5. Short description of the innovative solution

- **Describe the specific need or problem being addressed by the case and please explain what is the novelty of this innovative solution**

"With increasing use of plastics in everyday applications and the difficulty of detecting them on-line, many food companies regard plastics as one of the most important causes of foreign body complaints." - Dr. Mike Edwards Microscopy Section Department of Chemistry and Biochemistry, Campden BRI

- **Describe the enabling function(s) and the practical benefit(s)-(e.g. for which types of problems and opportunities is used and can it be used, and how)**

The detection of foreign bodies is one of the main issues of food safety, because they can present a health risk for the consumer. Detection methods have been optimized over the years, but it is still difficult to detect small foreign bodies of low density. In contrast to X-Ray or metal detectors, the new food radar detection method is able to detect even small plastic pieces or fruit stone fragments.

- **Describe the method/procedure/technology/solution implemented. (Please explain, whether the innovative method is a product / service / process / marketing or organisational / management innovation) After completing the description, please indicate, whether this innovation is a technological or non-technological one.**

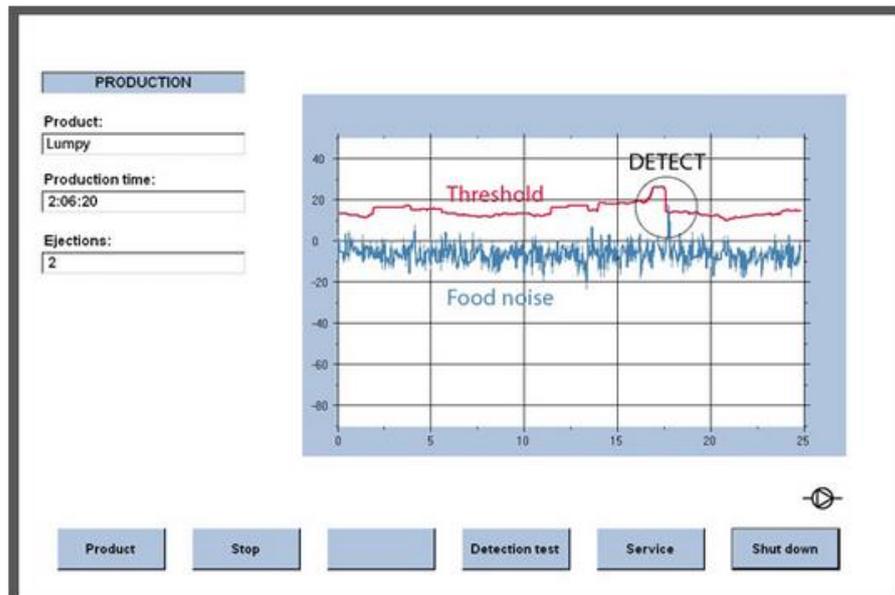
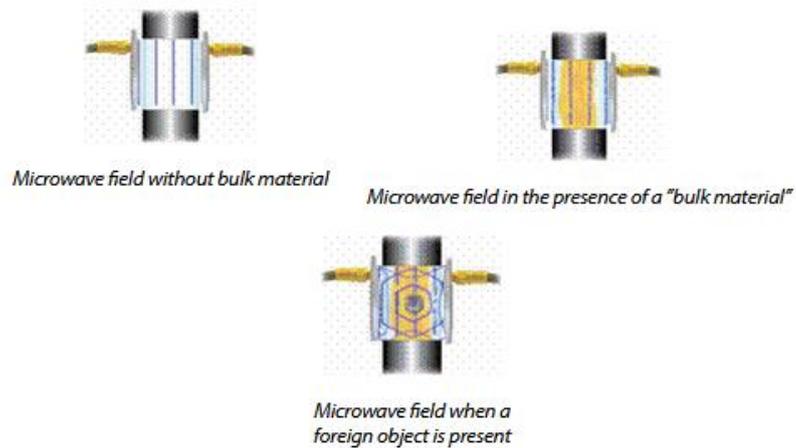
This new food radar system works with microwaves to detect a broad level of contaminants (wood splinters, fruit stones, hard and soft plastic, shells, rubber, seeds, paper).

All system components are hygienically contained. The entire system takes up about one meter of pipe length and is very quick and easy to install. It consists of the following:

1. Operator panel.
2. Rejection unit.
3. Buffer pipe.
4. Sensor unit

All detection technologies assume a certain contrast between the foreign bodies and the surrounding material, the bulk. The contrast, as experienced by the electromagnetic waves, is physically described by the difference in electromagnetic permittivity, or the dielectric "constant" between the two materials. The permittivity, which in its most general form is mathematical/physical very complex, and an important physical property determine transmission, reflection, attenuation and scattering of the

electromagnetic radiation when it impinges on the foreign object. The fact that the dielectric permittivity is frequency and temperature dependant makes it even more complicated. Another important parameter is of course the physical shape of the foreign object. Thus, it can during some instances be easier to detect an object with sharp edges, than a spherical object. Our definition of contrast includes all the above mentioned differences between the bulk and the foreign body from a electromagnetic point of view.



Food Radar software displaying the signal, the threshold and a detect.

technological

non-technological

- **Describe the business, which implemented the innovated solution (size, country, region, location, type of food)**

For the new food radar system Schwartauer Werke in Bad Schwartau (a German producer of jams, fruit preparations, dessert dressings, cereal bars and syrups) worked together with the Swedish company Food Radar Systems AB. The Swedish microwave food radar system was first only applicable in homogeneous products. Together with Schwartauer Werke, they further developed the technique to be able to use it also for chunky products like jams containing fruit pieces

- **Describe the distribution channels of the product(s)**
- **Describe what makes the innovation work.**

The case is a good example for the practice, how the strategic alliance of two companies can develop new solutions for foreign body detection in food industry, as many companies struggle with the detection of those low density foreign bodies. The food radar system improves the food safety rapidly and also reduces the waste of food if such a foreign body is detected in the end product. Additionally, the product recalls and the food waste can be minimized. This also helps with the companies' image, as bad press is always more remembered than good press.

- **Describe the specific prerequisites for the business related to the implementation of the method and/or related to the location, method, procedure, solution**
 - a: List the relevant necessary resources (including the estimated cost) for the specific innovation.
Please list the relevant ones only (list is annexed)**
 - b: List the relevant necessary capabilities for the specific innovation.
Please list the relevant ones only (list is annexed)**

6. Describe the results, achievements and typical failures

The strategic alliance of two companies to improve food safety can be a good example for other companies to follow. • Using a known technology like microwaves to achieve a so far unknown goal in a traditional sector. • The innovation improves food safety, reduces the risk of contamination and comes together with cost reductions due to less food waste and thus is being sustainable.

7. Summarize what makes the case to a good practice for the members of the SFSCs (e.g. lessons learned)

8. Aspects, methods for transfer of methods for other SFSC members

9. Recommendations for members of other SFSCs for further applications

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10. More information is available at (web), if it is relevant

I-CON Interreg Central Europe : Handbook tool, Good practice cases

<http://www.foodradar.com/index.php>

Annex

1. Checklist for necessary resources (tangible and non-tangible):

- materials (access to: raw materials/ ingredients - including volume, land – including size, packaging materials)
- human: labour force: size, knowledge & skills (production, technical, marketing, managerial, ICT, financial, etc.)
- technology: patents, know-how, trademarks, copyrights, trade secrets
- infrastructure, equipment, facilities, - size, minimum volume of production/sales, IT infrastructure
- information, reputation, brand, trust
- financial*

*: estimated cost:

0 - 10 000 Eur
10 001 - 50 000 Eur
50 001 - 100 000 Eur
100 001 - 300 000 Eur
300 001 – 1 000 000 Eur
1 000 000 Eur above –

- other specific necessary resources for the application of the specific innovation

2. Checklist for the necessary capabilities

- **food safety:**
 - basic skills to comply with the EU food safety regulations
 - ability to understand what makes the product safe (the key controls, which ensure the safety of the product – biological, chemical and physical hazards, providing the safety shelf life of perishable products)
 - food safety culture (motivation, responsibility for food safety) and basic skills for the implementation of HACCP

- **food quality:**
 - ability to define the target segments of consumers for SFSCs
 - ability to define the product characteristics which are (tacit) basic requirements for the target segment(s) of consumers;
 - ability to define which product attributes/levels and augmented services represent an added value for the target segments of consumers;
 - food quality culture (motivation, responsibility for food quality);
 - production experiences which help to provide the expected quality reliably, uniformly;
 - ability to provide distinguishable quality which meets the needs of the targeted consumer segment;
 - meeting (local) legal requirements, application of the labelling rules;
 - ability to access the consumer willingness to pay for specific products of SFSCs.

- **trust:**
 - ability to ensure product integrity, authenticity and transparent information for the consumers (including systems, tools);
 - ability to access external trust enhancers (third party certification, internal certification system, participatory guarantee systems);
 - application of the labelling rules and branding (mandatory and voluntary);
 - ability to meet third party certification requirements

- **ethical aspects**
 - ability to understand consumer needs for ethical behaviour related to the specific product(s) of the SFSCs;
 - culture for ethical food production and supply;
 - ability to implement necessary measures to ensure ethical food production and supply;
 - ability to access the consumer willingness to pay for products meeting ethical aspects

- **accessibility to consumers:**
 - ability to organize logistics efficiently and to exploit innovative solutions and distribution channels;
 - efficient, innovative sales methods;

- ability to develop and implement new business models for ensuring access of consumers to products and augmented services;
- **fair price:**
 - collecting marketing information;
 - ability to enhance and maintain cooperation among chain actors including the combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management;
 - ability to define, develop or maintain unique quality of products and augmented services;
 - ability to develop and implement new business models;
 - ability to access the consumer willingness to pay for fair price
- **increased negotiation power:**
 - collecting marketing information;
 - ability to enhance and maintain cooperation among chain actors including the combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management, cooperation culture;
 - ability to define, develop or maintain unique quality of products and augmented services;
 - ability to develop and implement new business models;
- **shared use of available resources:**
 - ability to enhance and maintain cooperation among chain actors including the shared and combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management, cooperation culture;
 - the level of value chain management culture;
 - ability to access the consumer willingness to pay for food with reduced environmental impacts

- **input for R+D:**
 - ability to monitor, research, evaluate, and understand the needs and wants of customers and consumers;
 - ability to develop new products, processes, packaging, preservation techniques, systems and access to new markets, including in other categories;
 - access to innovative technologies; distribution and marketing solutions and methods. management systems;
 - access to local input for R+D covered by other aspects

- **access to markets: and market success**
 - effective promotion, customer service, efficient and innovative sales methods;
 - ability to understand consumer's needs;
 - ability to organise logistics efficiently and to exploit innovative solutions and distribution channels,
 - unique value propositions;
 - ability to develop and implement new business models for ensuring access of consumers to products and augmented services, develop the market accessibility for the suppliers.
 - stock control;
 - ability to access to required raw materials within a restricted geographical area

- **access to infrastructure:**
 - ability to use existing own infrastructure in a focused way to serve consumer needs or to combine it with complementary infrastructures of other SFSC actors, cooperation culture;

- **management:**
 - to implement management systems for vision, planning, implementing), coordinating, controlling, monitoring, continuously;
 - improving; ability to motivate, authorize staff;

- **production, processing:**
 - management system, production experience, specific controlling, monitoring, continuously;
 - willingness to consider and ability to evaluate the adoption of TECI and NTI in the current production processes;
 - any additional specific resources necessary for the application of the specific innovation.