

Automated cutting of meat and meat products to prevent accidents at work and improve productivity and hygiene

Summary

The following prototypes were developed and tested:

- Automation of the meat cutting process at existing band saws for all types of meat industries, but in slaughterhouses and cutting plants in particular. The aim is to optimise the process involved in cutting semi-frozen and deep-frozen meat by designing an automatic band saw with a hygienic design to make the process safer and more efficient for both the operator and the product
- Automation of the cutting of cured meat products, primarily for the ham production industry. The aim is to optimise the process involved in cutting cured meat by implementing a micro-cutting disc on a conveyor belt directly to the slicer, in order to optimise the processing from both a productive and safety perspective for the operator, and in terms of product quality.

Objectives

This project involves the objectives listed below:

1. Automated cutting of fresh and frozen meat and meat products.
2. High capacity and maximum output when cutting meat and meat products.
3. Improved safety for people working in these cutting areas.
4. An appropriate hygienic design for the cutting system to prevent cross-contamination and improve food safety.

Description of the actions carried out in the project

WP1. Design, construction, implementation and validation of an automated band saw system for cutting fresh and frozen meat.

Task 1. Design and construction of a prototype

Task 2. Installation of the equipment in the plant

Task 3. Efficiency study of the automated system

WP2. Design, construction, implementation and validation of an automated micro-cutting system through the middle of the cured ham on a direct slicing conveyor belt.

Task 4. Design and construction of a prototype

Task 5. Installation of the equipment in the plant

Task 6. Study of the efficiency of the automated system

WP3. Analysis of results, reports and dissemination.

Task 7. Analysis of results

Task 8. Dissemination of results

Final results and practical recommendations

After completing the prototypes proposed in this project for automating cutting systems for fresh meat and cured ham with an automatic saw and/or a blowing/suction system for use with the manual saw, and a micro-cutting disc for use with guillotine cutting to improve the safety of operators and the associated occupational hazards, the conclusion regarding production output due to automation and the effect on hygiene and microbiological quality of the product proposed for treatment is that:

The automation of the cutting of fresh meat with a band saw increases the number of pieces of meat processed in the same time as the manual saw and therefore increases production, while the equipment increases protection for the operator. However, the accumulation of product transfers the microbiological counts on the surface of the pieces of lamb to the surfaces of the automatic saw in a shorter time, and to the suction table. This means that the initial counts on the surface of the cut piece increase, and this could therefore affect the product's microbiological quality, shortening its shelf life. As regards safety, no food-borne pathogens were detected. The blowing system, which has a suction mechanism as conceived in the prototype, which is applied after cutting and is operated manually, does not improve the quality of the product. Although the prototypes have a higher production yield and improve the safety of the product, they do not improve the initial count of the product in terms of microbiological quality. It would be useful to complement the design of the equipment with improvements facilitating compliance with hygiene and disinfection protocols, as well as intermediate cleaning. Although the design of the cutting system for cured ham with a micro-cutting disc appears to enable appropriate cleaning and disinfection, and no excessive microbial contamination accumulates on its surfaces during processing, the rotating micro-cutting disc system on the block of cured ham may transfer some of the surface contamination from the ham to the slicer, affecting its microbiological quality. The results of the first studies carried out seem to suggest that this is the case. Further studies of the implementation of the prototype in a production plant are necessary.

Conclusions

The project has validated two innovative automated cutting systems, which offer the meat companies involved in this project and all meat companies in general greater precision when cutting fresh and frozen meat and processed meat products, appropriate hygiene to prevent cross-contamination and improve food safety, and a significant improvement in the safety of the people working in these cutting areas.

Leader of the Operational Group

ORGANISATION: FRIGORÍFICS COSTA BRAVA, SA

CONTACT E-MAIL: process.engineer3@fcostabrava.com

Coordinator of the Operational Group

ORGANISATION: INNOVACC

CONTACT E-MAIL: innovacc@olot.cat

Other members of the Operational Group (grant recipients)

ORGANISATION: ESTEBAN ESPUÑA, SA

Other members of the Operational Group (not recipients of the grant)

ORGANISATION: IRTA

CONTACT E-MAIL: teresa.aymerich@irta.cat**Subject area(s) of application**

- Agricultural equipment and machinery
- Food quality/processing and nutrition

Geographical area(s) of application

PROVINCE(S): GIRONA

REGION(S): LA GARROTXA, LA SELVA

Dissemination of the project: publications, seminars, multimedia, etc. (State links)

INNOVACC annual magazine 2021, where there is an article on the project.

https://www.innovacc.cat/wp-content/uploads/2021/06/disseny-revista-innovacc-2021_ok.pdf**Project website**<https://www.innovacc.cat/2021/08/09/automatitzacio-de-tall-de-carn-o-derivats-carnis-per-eliminar-riscs-daccidents-laborals-i-millorar-productivitat-i-higiene-3/>**More information on the project**

PROJECT DATES	TOTAL BUDGET
Starting date: July 2019	Total budget: €190,800.00
End date: September 2021	DARP funding: €77,976.00
Current status: Executed	EU funding: €58,824.00
	Own funding: €54,000.00

With funding from:

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014-2020.

Order ARP/133/2017 of 21 June, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ARP/1282/2018, of 8 June, announcing the call for the grant.



Generalitat de Catalunya
**Departament d'Acció Climàtica,
 Alimentació i Agenda Rural**



**Fons Europeu Agrícola
 de Desenvolupament Rural:**
 Europa inverteix en les zones rurals