Innovative solutions to reduce the use of nitrifiers in cooked meat preparations without affecting food safety and organoleptic quality

Summary

The project consists of a big data analysis of variables in the preparation of a wide range of cooked meat products. It will also analyse processing formulations, times and temperatures and cooking technologies and their effects on the residual nitrite and nitrate content and on the sensory properties of the product. In addition to the testing of physical and chemical alternatives on actual products, the aim will be to obtain the key parameters to be controlled.
Accordingly, the project will be developed in two ways:
a) bibliographic analysis to distinguish between the effects of nitrifiers studied in model solutions and those studied in actual products.
b) pilot tests with physical (radio frequency, high pressure) and chemical (extracts and other additives) alternatives to obtain information applicable to the parameters to be controlled.

Objectives

The main objective of the project is to answer the following questions:
- What can be done to prevent the loss of so much functional nitrite during the process? When and how is it added? What parameters help preserve its functionality?
- What adjuvants (chemical and technological) enhance the functionality of residual nitrite?

Description of initiatives outlined in the project

Companies need to assure the quality of their processed products for a long time. They know that only a part of the added nitrites remain after cooking and it is necessary for them to maintain their activity throughout the marketing period to assure the quality of the products. The actions to be taken are:
1. Meta-analysis of the kinetics of nitrites in cooked meats.
2. Testing of chemical and physical alternatives in meat inoculated with *Clostridium sporogenes* (a surrogate of C. botulinum accepted in testing).
3. Assessment of the organoleptic effects that have quality and sales repercussions. Assessment of the effect of the raw material and of the production process on the residual nitrite and nitrate content and on the sensory characteristics of the product.

Expected results and practical recommendations

The expected results are as follows:
- Synthesis of the knowledge of the kinetics and functionality of nitrifying salts based on the bibliography, in accordance with the treatment and formula parameters.
- Critical points of the current preparations to maintain the residual nitrite concentrations in sufficient quantities to assure the quality of the product in long marketing processes.
- Critical points for organoleptic quality in the cases above and the possibility of establishing conditions that meet both objectives.
- Matrix of equivalent treatments (in accordance with the product and concentrations of non-meat, processed additives and ingredients) to meet the safety objective.
- Forms and concentrations of the plant extracts that may be useful depending on the target products (actual matrices and not model systems).

• Radio frequency heating parameters that lead to good synergy with the nitrifiers for both food safety and organoleptic quality.
• High isostatic pressure parameters that add safety to sliced meats by reducing nitrifiers and/or salt.
• Organoleptic aspects of new products that can have a greater effect on consumer acceptance.

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Subject area(s) of application

Food quality/processing and nutrition
Supply chain, marketing and consumption

Geographical area(s) of application

Province(s)	*Region(s)*
Girona	Gironès Garrotxa Selva

Dissemination of the project *(publications, conferences, multimedia...)*

News article in the INNOVACC newsletter of November 2017 explaining the submission of the subsidy application: http://www.innovacc.cat/2017/11/28/projectes-presentats-en-la-linia-de-grups-operatius-2017-del- darp/

News article in the INNOVACC newsletter of July 2018 notifying of the awarding of the subsidy for execution of the project: http://www.innovacc.cat/2018/07/23/ajuts-obtinguts-per-a-6-projectes-pilots-de- grups-operatius-del-darp-2017/

Publication of information on the project on the INNOVACC website: www.innovacc.cat/2018/07/23/el-projecte-solucions-innovadores-per-a-reduir-lus-de-nitrificants-en-elaborats-carnis-cuits-mantenint-la-seguretat- alimentaria-i-la-qualitat-organoleptica-a-obtingut-un-aju/

Project website

www.innovacc.cat/2018/07/23/el-projecte-solucions-innovadores-per-a-reduir-lus-de-nitrificants-en-elaborats-carnis-cuits-mantenint-la-seguretat-alimentaria-i-la-qualitat-organoleptica-a-obtingut-un-aju/

More information on the project

Project dates

Starting date (month-year): June 2018

Completion date (month-year):

Current status: *Underway*

Budget approved

Total budget:	**€125,002.77**
DARP funding:	*€51,086.04*
EU funding:	*€38,538.59*
Own funding:	*€35,378.14*

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Order ARP/133/2017, of 21 June, approving the regulatory bases of grants for cooperation for innovation through the promotion of the creation of European Association for Innovation task forces in terms of agricultural productivity and sustainability and the execution of innovative pilot projects by these groups.
Resolution ARP/1868/2017, of 20 July, calling for applications for grants for the year 2017.

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