

VALORCARN PROJECT (A. Kondjoyan et P.S. Mirade)

Reducing waste of animal proteins in Southern and in Northern countries by multi-criteria optimization of meat processes

alain.kondjoyan@clermont.inra.fr and pierre-sylvain.mirade @clermont.inra.fr

Context and objective of the project: Meat is the best source of protein for human nutrition but its production is very energy-consuming while animal production can impact negatively on environment. There is also an increasing demand of meat in developing countries, which will not be satisfied due to the increase of the world population. Reduction of the waste of animal proteins can help in answering this problem. The Valorcarn project aims at optimizing the processes used in the meat production systems to limit the waste of animal proteins.

Approach: Meat degradation and waste are mainly due to uncontrolled microbial development and/or in-product biochemical reactions. The different processes used to avoid meat degradation (surface decontamination, drying, product formulation, storage RH and T, packaging ...) have to be adjusted and combined / according to the specificities of the meat systems existing in the different countries (animal production, slaughtering, deboning, cutting, storage conditions...) and to the consumer eating habits. The project Valorcarn aims at developing multi-criteria approaches to optimize processes and to reduce wastes in different meat production systems. Modelling of the key steps of these systems will be accompanied by data mining, to find the pertinent parameters, and data sets, during model writing and testing. Two meat products are used to validate our approach: the "Biltong" which is a dried meat product specific to some Southern African countries, and a pre-cooked meat product, specifically heat treated, to limit degradation under Northern countries conditions.

Planned project progression

- Quantification of the waste along the meat chain to determine the key stages to be studied
- Modelling of the effect of processes and of storage conditions on the degradation of the heat treated product and of the Biltong
- Use and test of existing data mining tools, and development of new ones
- Development of a data base for the prediction of the microbial degradation
- Quantitative assessment of the impact of different scenarios to limit the waste of the Southern and of the Northern meat products
- Extension of the approach to the degradation due to biochemical degradation reactions

Partners and expertises

- (1) INRA-QuaPA: process models, reactions models to predict the transformation and preservation of meat products
- (2) CIRAD-QualiSud: knowledge, data, and specific models for processes of Southern meat products and of their social-economic environments
- (3) INRA-IATE with (4) CIRAD-TETIS: textual and data mining, knowledge integration in databases
- (4) IRSTEA: databases and models for the cold chain
- (5) ANSES: predictive microbiology and microbiological food safety.

First Year Results

- Two surveys on the wastes along the meat chain for the Northern and the Biltong products
- Adaptation to the project of existing data mining tools developed by INRA-IATE
- Structure of the database on the parameters needed to predict the microbial degradation of the two chosen types of meat products.
- Transfer models and data on the variation of the water activity and of the water diffusivity at the surface of heat-treated products
- Funding of a thesis jointly by INRA and CIRAD on the optimization of the Biltong process