Decision support system for durum wheat products quality

DSS durum wheat

Identification

Key words
Artificial intelligence, decision support, expert knowhow, durum wheat chain, quality

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Completed by
INRA - IATE

How does it work?

Primary objective
This tool is a knowledge management system designed to help prediction for the durum wheat processing chain.

Working principle
This hybrid information system allows to model a food chain as a set of consecutive unit operations (by example, in the durum wheat chain, extrusion, drying, cooking, …) transforming raw material into a food product. Each unit operation is modelled by a set of process parameters and product characteristics (by example, in the pasta chain, for the cooking in water unit operation, controlled parameters are temperature, % salt, cooking duration, type of water; product characteristics are e.g. vitamin contents, for niacin, thiamin, etc.). The software permits to load experimental quantitative and/or qualitative data for each unit operation in terms of controlled parameters and food characteristics. Those data are used thanks to learning functionalities (based on decision trees) to determine the controlled parameters which have the main influence on food characteristics for a given unit operation. Those decision trees can be also used to simulate the impact of a given set of controlled parameter values on food characteristics. It allows evaluating both faults and qualities of food products. (1)

Images

Additional effects
The system does not require an a priori model. It could be used for risk and benefit analysis.

Important process parameters
Process parameters, which may influence the product characteristics such as temperature, % salt, cooking duration, type of water..., must be entered. The learning functionalities will automatically determine the actual influence of the process parameters on the product characteristics with respect to the experimental data entered in the database.
Important product parameters

What can it be used for?

Products  
This technology is generic; it can be used for any kind of food product chain. It requires inputting the data for each specific food chain.

Operations  
Quality managing

Solutions for short comings  
Demand for safe, healthy and tasty foods

What can it NOT be used for?

Products  
none

Operations  
none

Other limitations  
This method requires experimental data and/or formalized expert knowledge to be used. For a given unit operation (by example, pasta cooking in water), controlled parameter values, impact on the studied characteristic(s) (value before and after the unit operation) must be entered.

Risks or hazards  
not known

Implementation

Maturity  
registered at the Agency for the Protection of Programs. The software is not commercialised. It is a research prototype.

Modularity /Implementation  
This system is to be installed alongside the whole durum wheat processing chain. It could also be adapted to other food chains.

Consumer aspects  
Consumers will certainly accept food products with improved safety, health and taste

Legal aspects  
registered at the Agency for the Protection of Programs (07.12.2007, n° IDDN.FR.001.490041.000.R.P.2007.000.30605).

Environmental aspects  
No information currently available

Facilities that might be interesting for you

Further Information

Institutes  
INRA - IATE, INRA - MISTEA, UMII - LIRMM

Companies  
(no current commercial product)

References  