TECHEESE: X-ray tomographical imaging of cheese

EU FWP6 funded (SME) project.
Partners a.o.: Cooperation of sheep cheese manufacturers (IT, SP, RO), University Albacete (SP), InnospeXion.

Objective:
The distribution of voids and holes in cheese may have a large influence on the quality of the cheese. For certain cheese types, a void development may result in failure to sell the cheese. This concerns e.g. cheeses based on sheep milk and others, as well as other cheeses with a long maturity requirement. The problem is, that the voids may develop near the surface, causing fungi to enter the cheese cavity. This makes the cheese to develop as a blue cheese which impedes that it can be sold. Such void development may occur at any stage during the long maturation process, thereby causing significant waste and loss for the manufacturers.

The ability to scan the cheese at regular intervals may facilitate that the cheese can be sold when a hole is developing critically near the surface.

The objective is therefore to develop, test and install an X-ray system which can determine when the cheese is ready for the market.

Solution:
Development, design, testing and installation of a prototype high sensitivity and high resolution tomographical scanning system suitable for the inspection of cheese.

Achievements:
A (prototype) commercial **tomographical X-ray system for cheese inspection** with the following specifications:
- Automatic in- and out-feeding of cheese and automatic scanning and decision-taking of critical hole development in cheese
- High contrast, high resolution imaging with tailored X-ray scanning detector;
- Operating at maximum 70 kV, at very high flux and with large output stability
- Lead-free radiation cabinet with integrated conveyor section
- Software package for general assessment of cheese, automatic operation
- System control and safety system complying to European and US regulations
- Cycle time 1-4 cheeses/min
- Hygienic design suitable for cheese producers
- Automatic/semi-automatic decision taking and sorting

Figures:
1. The TECHEESE prototype system is a tailored CT system for automatic assessment of the development stage of cheese that undergo long storage, in order to detect critical voids developed near to the cheese surfaces.
2. The system detects, quantifies and interpretes the voids based on their criticality. Voids nnear the surface leads to risk of internal fungi attack, which renders the cheese worthless.