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Amadou Ndiaye, Franck Taillander, Nadine Leconte, Fabienne Lambrouin, Alicja Sobantka, Christophe Fernandez, Geneviève Gésan-Guiziou

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Knowledge book on milk microfiltration : an INRA project to identify key actions in research on proteins fractionation

A. Ndiaye^{1,2}, F. Taillander^{1,2}, N. Leconte^{3,4}, F. Garnier-Lambrouin^{3,4}, A. Sobańtka^{3,4}, C. Fernandez^{1,2}, G. Gésan-Guiziou^{3,4}

¹ INRA, USC1368 I2M, Bordeaux, France

² University of Bordeaux, UMR5295 I2M, Bordeaux, France

³ INRA, UMR1253 STLO, Rennes, France

⁴ Agrocampus Ouest, UMR1253 STLO Rennes, France

The expertise of both industry and research institutes has created an important collection of knowledge on food processes, which is the result of scientific and technological research and experimental know-how. However, despite a great number of results published in the form of “peer” reviewed papers and patents, it has been failed to formalize, organize and complete the acquired knowledge. The need for a sustained capitalization is crucial in view of: i) preventing the loss of knowledge due to the departure of employees over the years; ii) avoiding the dispersal of existing experimental data; iii) and finally, allowing optimal exploitation of data and knowledge.

The objective of this work is to address these challenges by developing an electronic knowledge book (kBook) of one specific food process, the microfiltration of skimmed milk. Microfiltration of skimmed milk is widely used in the dairy industry to separate casein micelles from soluble protein aiming at producing a retentate used in cheese making and a permeate containing whey proteins with valuable nutritional and functional properties. Due to the increasingly use of this operation at industrial scale, there is a need to collect and correlate the existing knowledge in a structured way and to gain a better insight of the overall process.

The knowledge was first elicited through semi-structured interviews with a group of experts on dairy filtration. Concomitantly, data and knowledge from patents and literature was collated. In a next step, a kBook was established, whose pages were formatted in concept maps (cmap) and technical sheets that are connected by hypertext links. A cmap is a semantic graph where nodes represent concepts that are connected by arcs expressing the relationships between them. A formatted cmap answers a specific question about one central concept. The hyperlinks between cmaps, technical sheets and cmaps and technical sheets form a network of knowledge which can be browsed by the user to find relevant answers to its questions.

Several knowledge areas have been identified so far including milk pretreatment, microbiological stabilization, microfiltration and analytical methods for the characterization of fractions. A global representation of the overall process from raw milk to fractions of proteins, based on the individual cmaps has been built. The practical structuration of the knowledge and the original version of the kBook will be disclosed at the congress. The development and use of this new approach for the representation of a food processe will be discussed.

Highlight 1: An electronic knowledge book (kBook) on milk microfiltration has been established

Highlight 2: A kBook facilitates the diffusion, re-use, review, reassessment and update of new findings

Highlight 3: A kBook minimizes the user disorientation while supporting its acquisition of knowledge