

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

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

▶ To cite this version:

Nadine Leconte, Christophe Fernandez, Amadou Ndiaye, Fabienne Lambrouin, F. Taillander, et al.. Knowledge book on milk microfiltration: an INRA project to identify key actions in research on proteins fractionation. Congrès MemPro VI Intégration des Membranes dans les procédés, Jun 2017, Saint Malo, France. , 2017. hal-01539468

HAL Id: hal-01539468 https://hal.science/hal-01539468

Submitted on 14 Jun2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License



KNOWLEDGE BOOK ON MILK MICROFILTRATION

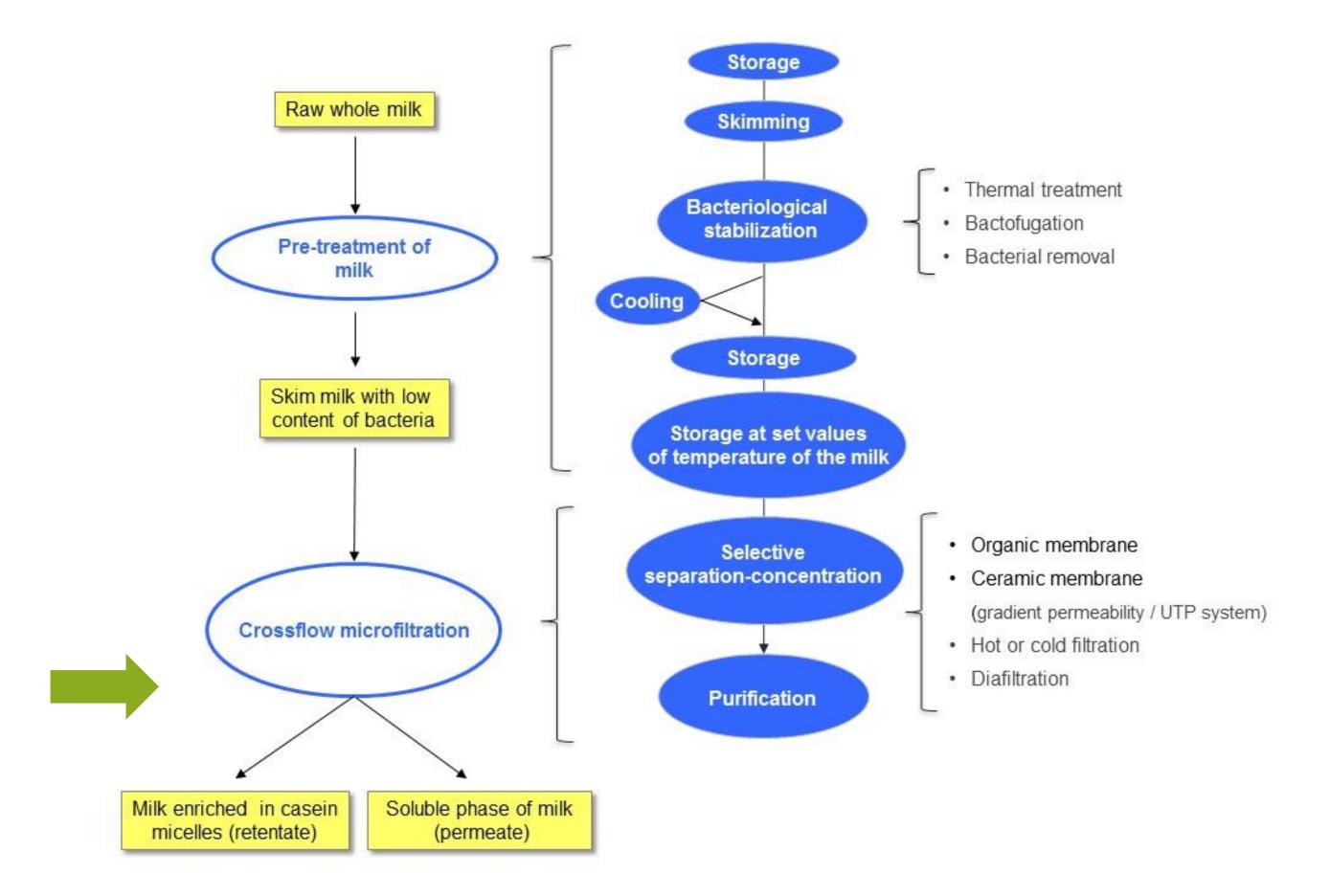
An INRA project to identify key actions in research on proteins fractionation

N. Leconte¹, C. Fernandez^{2,3}, F. Garnier-Lambrouin¹, F. Taillander^{2,3}, A. Ndiaye^{2,3}, G. Gésan-Guiziou¹ ¹ UMR1253 STLO, INRA, Agrocampus Ouest Rennes ² USC1368 I2M, INRA, Bordeaux ³ University of Bordeaux, UMR5295 I2M, Bordeaux

Context

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:

- preventing the loss of knowledge due to the departure of employees; i)
- avoiding the dispersal of existing experimental data; ii)
- allowing optimal exploitation of data and knowledge. iii)



Objective : To capitalize the data related to one specific food process (milk) microfiltration) by developing an electronic knowledge book (kBook) [Raboutet et al., 2008].

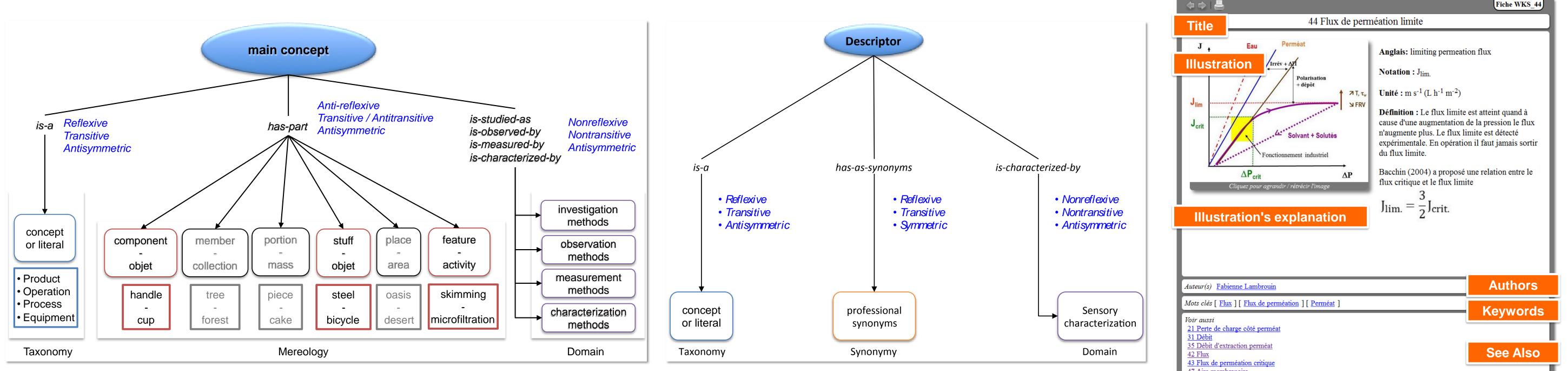
Microfiltration of skimmed milk is widely used in the dairy industry to separate casein micelles from whey protein aiming at producing a retentate used in cheese making and a permeate containing whey proteins with valuable nutritional and functional properties.

Skimmed milk microfiltration process

Method

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 were collated.

Then, a kBook was established, whose pages were formatted in canonical concept maps (cmap) [Jmallet al., 2011] and technical sheets [Raboutet et al., 2008] 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.



Canonical concept maps used to represent product, operation, process and equipment

Cmap answers an ontological question about a specific main concept. The hyperlinks between cmaps, technical sheets and

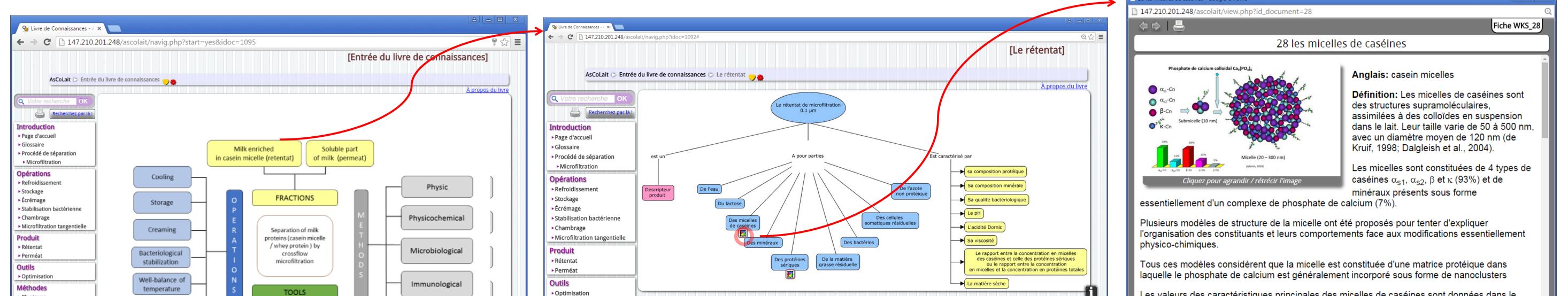
between cmaps and technical sheets form a network of knowledge which can be browsed to find answer to a question.

47 Aire membranaire Références bibliographiques · Bacchin, P., Aimar, P., Field, R. (2006). "Critical and sustainable fluxes: Theory, experiments Reference of Membrane Science 281(1-2): 42-69 (수 다) 📇 Créée le 22/05/2014 et modifiée le 13/06/2014

Technical sheet's format

Results

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.



Physiques Physico-Chimiques Microbiologiques Crossflow microfiltration	Métrological Physiques		tableau 1.		
Immunologique Suivi métrologique	► Physico-Chimiques		Auteur(s) Nadine Leconte		
Optimiza	ation of the production by both the bot		Mots clés [<u>Caséine</u>] [<u>Rétentat</u>]		
	Suivi métrologique		Voir aussi 24 Processus général de production o 25 Caractéristiques du lait de vache 26 Les protéines sériques	l'un lait concentré en micelles de caséines	
Navigating the electronic knowledge book of milk microfiltration via hyperlinks' cmaps			resolution field-emission scannin o de Kruif, C. (1998). "Supra-aggreg 81(11): 3019-3028	 Dalgleish, D., Spagnuolo, P., Douglas Goff, H. (2004). "A possible structure of the casein micelle based on high-resolution field-emission scanning electron microscopy", International Dairy Journal 14(12): 1025-1031 de Kruif, C. (1998). "Supra-aggregates of Casein Micelles as a Prelude to Coagulation", Journal of Dairy Science 	
Conclusion		Perspectives		Créée le 21/05/2014 et modifiée le 21/09/2015	

development of a kBook, through its knowledge The elicitation process, allows the detection of knowledge lacking and by the way is a good guide for new research actions. The kBook is an original and effective tool for transfer of knowledge that is used, here, for initiation to the crossflow microfiltration of skim milk dedicated to a large public.

Perspectives

. Simulation tools will be integrated to the kBook for the optimization of crossflow microfiltration taking into account various operating conditions and conception alternatives . Disorientation and cognitive load of the kBook's users will be evaluated on a significant population.

boccard



To be continued through the **Optimal** Project



SODIAAL





MemPro6 – Intégration des membranes dans les procédés - Saint-Malo, 7 – 9 juin 2017