

Impact of skimming and microfiltration processes on equol concentration in milk

DAEMS F.^a, NINANE V.^a, ROMNEE J.-M.^a, LOGNAY G.^b & FROIDMONT E.^c

^a CRA-W – Agricultural Valorisation Department, 24 Chaussée de Namur, 5030 Gembloux, Belgium.

^b ULg-Gembloux ABT – Analytical Chemistry Department, Passage des Déportés 2, 5030 Gembloux, Belgium.

^c CRA-W – Département Productions et Filières, 8 Rue de Liroux, 5030 Gembloux, Belgium.

* Corresponding authors: Tel. : ++ 32 (0) 81 62 03 70 - Fax : ++ 32 (0) 81 62 03 88 - f.daems@cra.wallonie.be - http://cra.wallonie.be.

Phyto Health

cra-w

<http://www.cra.wallonie.be/fr/les-projets/phytohealth>

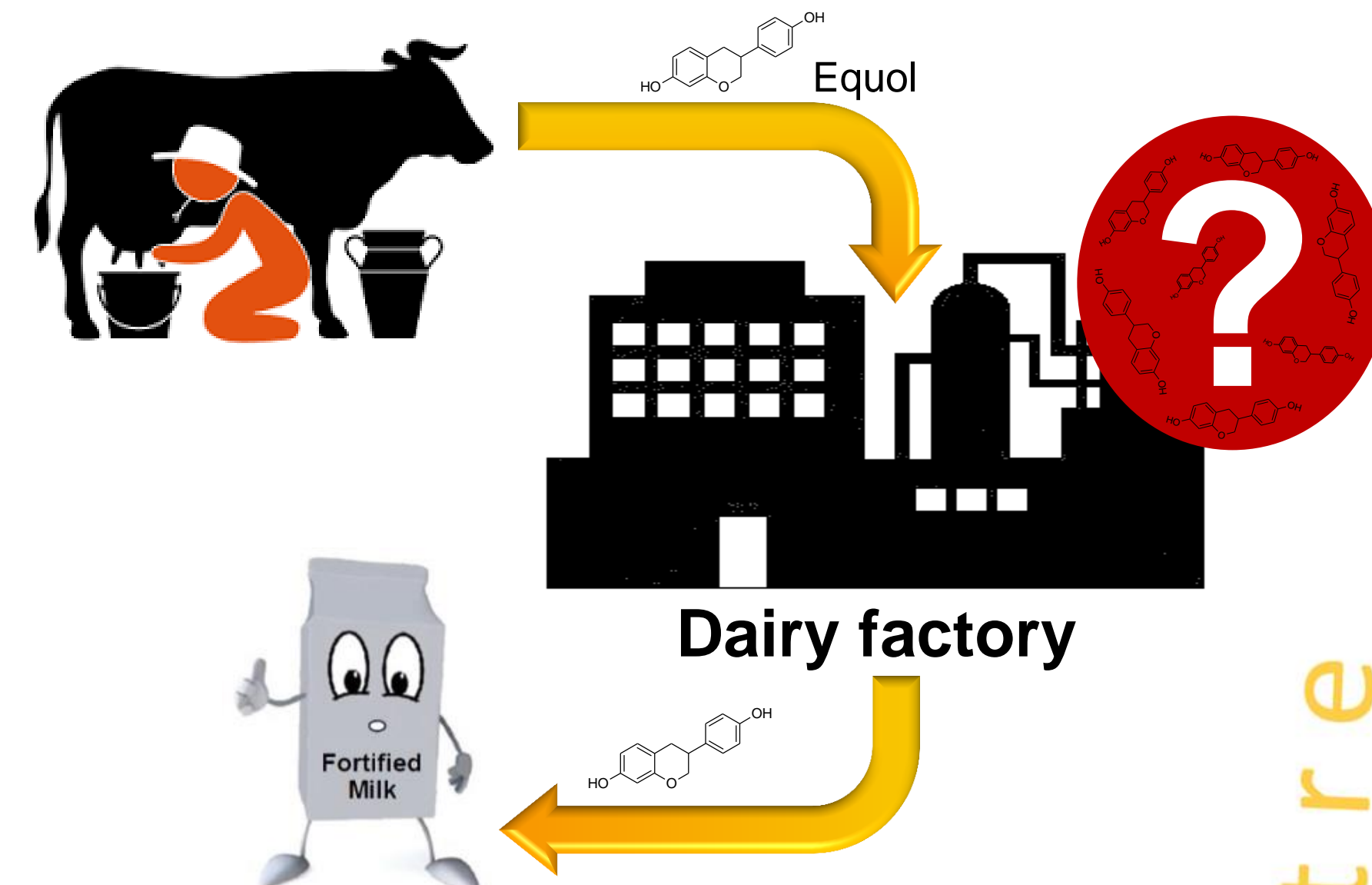
Introduction

Context

Equol is a microbial metabolite of isoflavones that could be used as therapeutic agent against several diseases and cancers. Cow's milk could be a potential source of equol in the human diet. However, more studies are needed about the changes in equol concentration during technological processing of milk and dairy products.

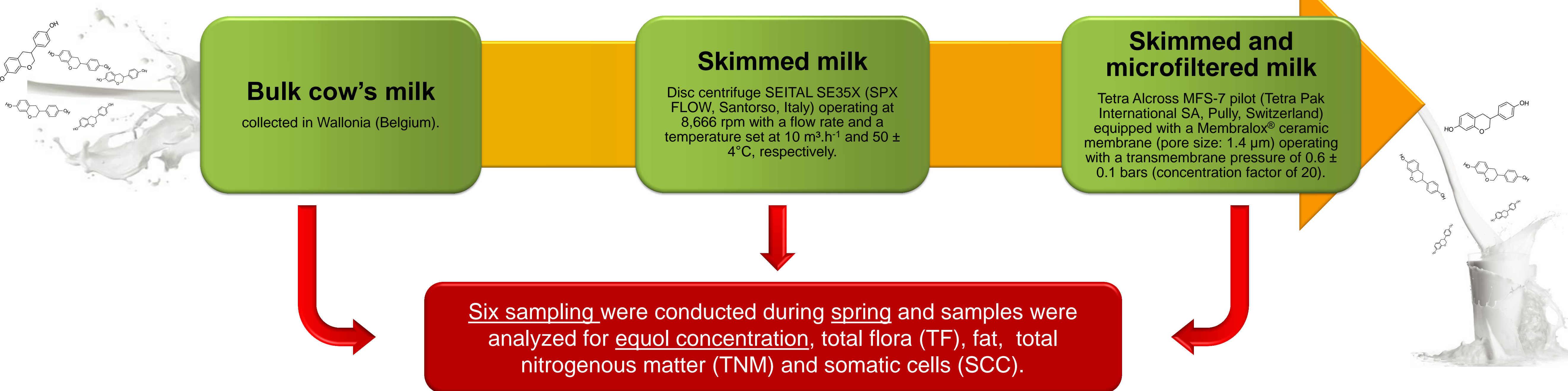
Objective

This first exploratory study sought to assess the impact of industrial skimming and microfiltration processes on equol concentration in conventional cow's milk.



Materials and methods

Milk processing (local cheese factory)



Results and discussion

Sampling	Raw				Skimmed				Micro-filtered			
	fat ^a	TNM ^b	SCC ^c	TF ^d	fat	TNM	SCC	TF	fat	TNM	SCC	TF
26 April	4.11	32.9	265000	21000	0.22	33.7	85000	4900	0.14	33.5	<1000	<1
03 May	3.93	32.9	222000	14000	0.22	33.3	52000	760	0.14	33.2	<1000	5
17 May	3.93	32.8	193000	7900	0.19	33.6	53000	2500	0.08	32.9	<1000	12
24 May	4.04	33.5	235000	3700	0.19	33.9	80000	3100	0.07	33.6	<1000	3
31 May	3.96	34.0	191000	2900	0.20	34.4	58000	940	0.07	33.8	<1000	3
13 June	3.72	32.9	241000	190000	0.18	33.3	98000	76000	0.07	33.2	<1000	8800

^a expressed as %, ^b expressed as g.L⁻¹, ^c expressed as cells.mL⁻¹ and ^d expressed as cfu.mL⁻¹.

Equol was present in all samples and varied from one sampling period to another.

Equol concentration ranged between 3,2 and 10,3 µg.L⁻¹.

These concentrations were within the same range than those previously observed in UK, but lower than those observed in France and Finland.

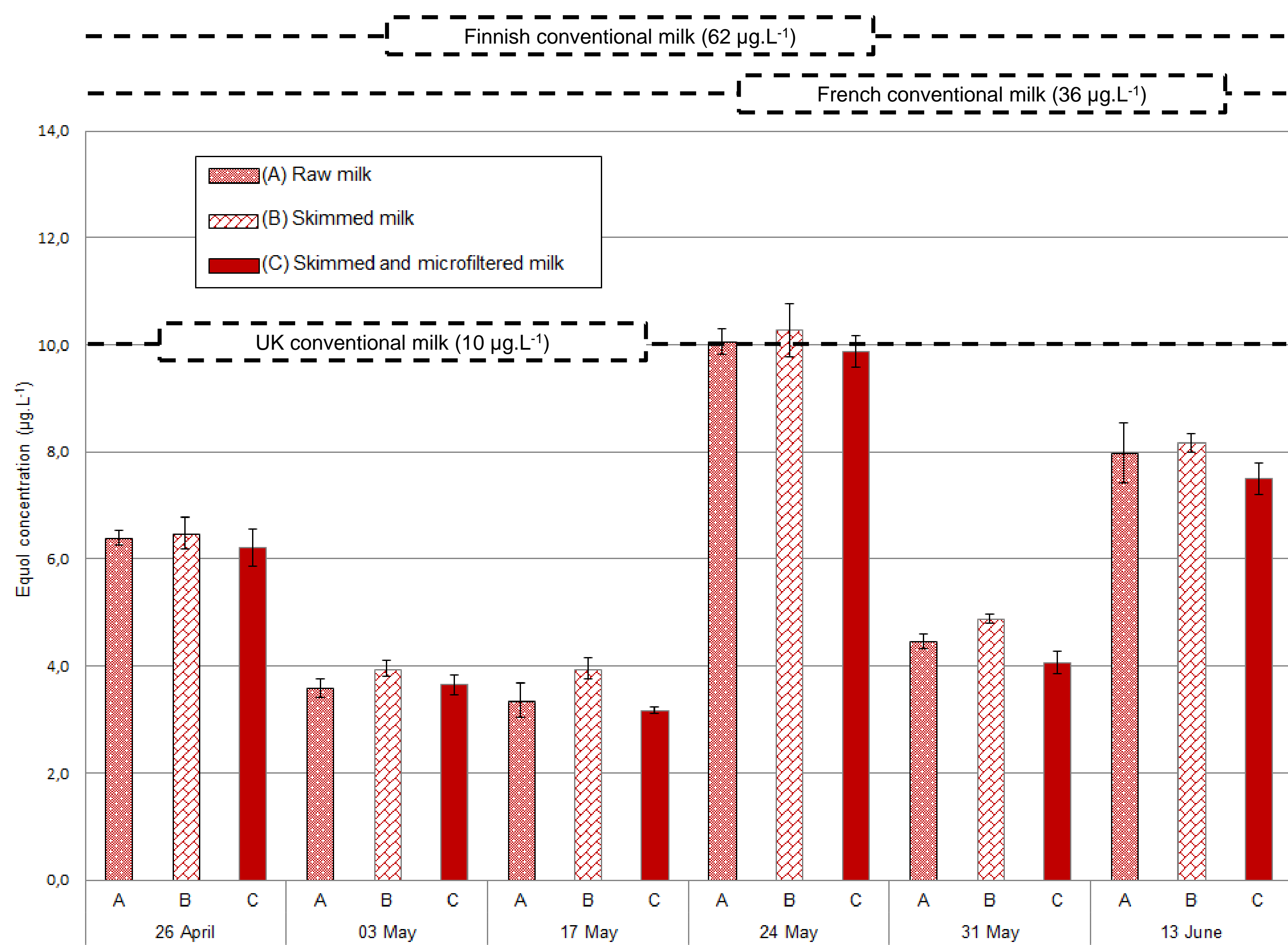
Skimming process increased the equol concentration (*p*-value: 0,0313)*.

Equol concentration increased for 5 % on average.

Microfiltration process decreased the equol concentration (*p*-value: 0,0313)*.

9 % (on average) of equol was retained between skimmed and micro-filtered samples.

* Statistical analysis: Wilcoxon's signed rank test was performed on the differences of data, having raw milk as reference, irrespective of the collection date.



Equol concentration of raw milk before and after skimming and microfiltration processes. Each sample was analyzed in triplicate (n=3). The standard deviation is represented by error bars. * - - - - * Kalač P., 2011. *Food Chemistry*, 125, 307-317.

Conclusions and perspectives

This study showed:

- The systematic presence of equol in milk. (→ Cow's milk could be a potential source of equol in the human diet)
- The variation of equol concentration over time. (→ Production of a new quality differentiated milk will have to take this into account)
- No loss of equol during skimming process. (→ Equol has little or no affinity with the milk lipid fraction)
- A small proportion of equol was retained during microfiltration process. (→ This might be because of interactions with bigger molecules that are retained, like proteins, for example)

This scoping study paves the way for more extensive studies on the impact of technological processing of milk on equol concentration and the interaction between this compound and other components of the milk. (GrassMilk project → <http://www.cra.wallonie.be/fr/les-projets/grassmilk>)

Acknowledgments

This research was made possible with the financial support of the *Public Service of Wallonia* (Moerman funds). The authors also wish to thank Christophe Jasselette for his involvement in the samples analysis, as well as *Herve-société* and the members of *LaitHerbe* project for their participation in the samples collection.



Wallonie

Wallonia Agricultural Research Centre