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Biochemical composition and mineral profile of dairy curds obtained by a plant extract of *Calotropis procera* in comparison with chymosin

Rayanatou Issa Ado [a,b,c], Mahamadou ElHadji Gounga [c], Gilles Garric[a,b], Marielle Harel-Oger[a,b], Arlette Leduc[a,b], Chantal Cauty [a,b], Jean François Grongnet[b], Frédéric Gaucheron[a,b*]

[a]UMR 1253 Science et Technologie du Lait et de l'Œuf, Inra-Agrocampus Rennes, 65 rue de St-Brieuc, 35042 Rennes Cedex, France

[b]Agrocampus Ouest, 65 rue de St-Brieuc, 35042, Rennes Cedex, France

[c]Faculté d'Agronomie et des Sciences de l'Environnement, Université Dandicko Dankoulodo de Maradi, BP 465 ADS Maradi, Niger

rayan2000atou@yahoo.fr ; frederic.gaucheron@inra.fr

Introduction

Cheese is used to preserve the essential constituents of milk (protein, fat, vitamin and minerals).[1]

In West Africa, a traditional cheese named "wagashi" is manufactured using an extract of *Calotropis procera* leaves, a small latex tree [illegible] subtropical areas of Africa and Asia.

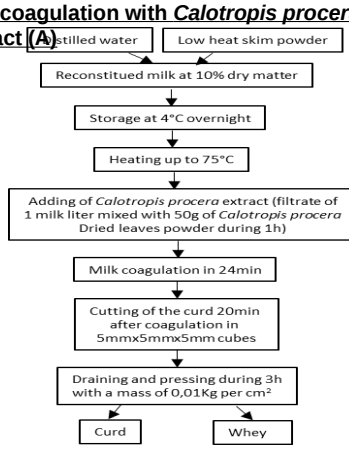
Objectives

The aim of this work was to investigate the biochemical composition and mineral profile of curds manufactured using an extract of dried leaves of *Calotropis procera* as coagulant.

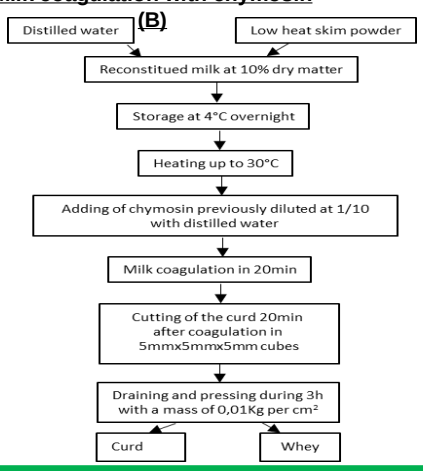
The results obtained have been compared to those of control curds coagulated using

Materials and methods

Milk coagulation with *Calotropis procera* extract (A)



Milk coagulation with chymosin (B)

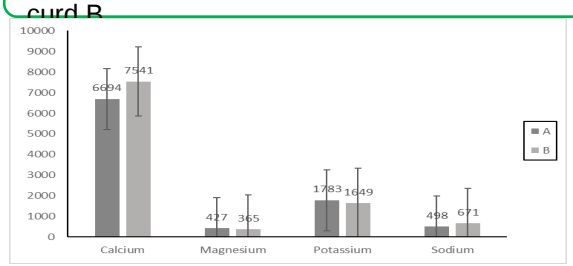


Results and discussion

Table 1: Biochemical composition of processed milks, *Calotropis procera* (A) and rennet (B) curds

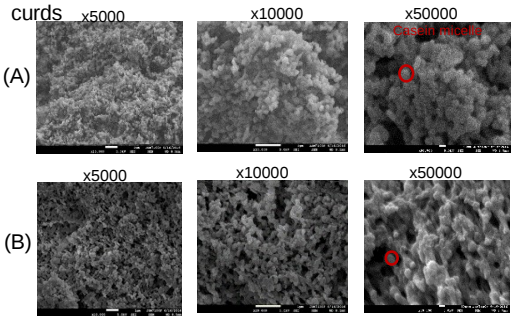
	pH (at 20°C)	Dry matter ($g.Kg^{-1}$)	Ash ($g.Kg^{-1}$)	Total nitrogen ($g.Kg^{-1}$)	NCN ($g.Kg^{-1}$)	NPN ($g.Kg^{-1}$)
A (*Calotropis procera*)						
Milk	6.76±0.02	100.60±2.62	8.10±0.10	32.07±1.28	16.76±0.59	2.39±0.09
Curd	6.52±0.06	310.91±16.14	31.10±0.30	231.91±2.59	9.82±1.19	3.10±0.49
B (Chymosin)						
Milk	6.73±0.04	100.97±0.20	8.15±0.20	33.50±0.89	17.32±1.02	2.16±0.06
Curd	6.69±0.04	305.75±9.31	25.52±1.25	207.84±16.81	7.84±1.70	1.83±0.28

The processed milks have similar composition. The contents in dry matter, ash and protein were more important in curd A than curd B.



The two curds exhibited the same contents in minerals.

Figure 2: Mineral contents of *Calotropis procera* (A) and rennet (B) curds



The protein network appeared well organized in the curd B compared to A.

Casein micelles were observed at high magnification in both curds.

Figure 3: Microstructure of *Calotropis procera* (A) and rennet (B) curds observed on scanning electron microscopy

Conclusion

The curds manufactured with *Calotropis procera* extract exhibited a good content in protein and minerals. This conclusion leads to encourage traditional dairy products consumption for a good protein and mineral supplementation in populations whose diet is poor in these elements.

Fox P. F. & McSweeney P. L. H., (2004), Cheese chemistry, physics and microbiology, Vol1, 1-18.

J. O. Ogundiwin & O. L. Oke, (1983), Factors affecting the process of wara-a Nigerian white cheese, Food Chemistry, 11, 1-13.

Lawal A.K. & Adedeji O.M., (2013), Nutritional and elemental analysis of warankasi (fermented product) sold in Lagos metropolis, International Journal of Biotechnology, 4, 112-116.

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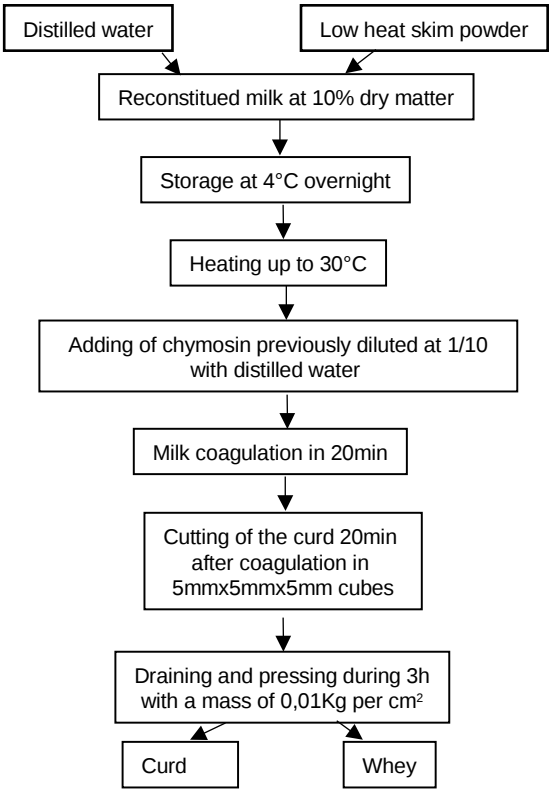
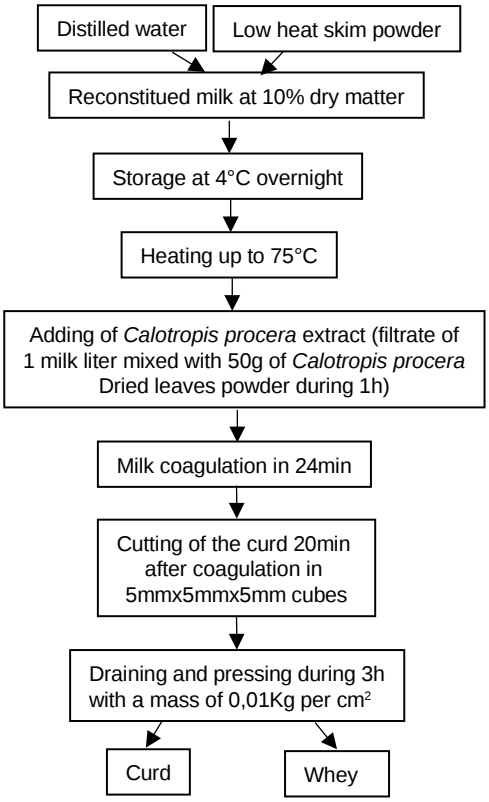

Distilled water
Low heat skim powder
Reconstitued milk at 10% dry matter
Storage at 4°C overnight
Heating up to 30°C
Adding of chymosin previously diluted at 1/10 with distilled water
Milk coagulation in 20min
Cutting of the curd 20min after coagulation in 5mmx5mmx5mm cubes
Draining and pressing during 3h with a mass of 0,01Kg per cm2
Curd
Whey


Distilled water
Low heat skim powder
Reconstitued milk at 10% dry matter
Storage at 4°C overnight
Heating up to 75°C
Adding of Calotropis procera extract (filtrate of 1 milk liter mixed with 50g of Calotropis procera Dried leaves powder during 1h)
Milk coagulation in 24min
Cutting of the curd 20min after coagulation in 5mmx5mmx5mm cubes
Draining and pressing during 3h with a mass of 0,01Kg per cm2
Curd
Whey