Risk management and communication in informal dairy sector in Côte d'Ivoire: Options for sustainable livelihoods

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Intervention in food and nutrition is the best investment for our collective future in term of managing co-morbidity in population. This investment should combine agricultural system with health and education. Fermented dairy products (FDP) play an important role for prolonged shelf life, microbial safety and nutrition. FDP was proved to be contaminated in Kenya, Somalia, Mali and Côte d'Ivoire by foodborne pathogens including *Staphylococcus aureus* and *Escherichia coli.* Recently, it has been showed that FDP is predominated by a novel *Streptococcus infantarius* subsp. *infantarius (Sii)* variant. *Sii*-produced bacteriocin and fermentation activity could contribute to the suppression of pathogens and possibly mitigate socioeconomic and health risks. However, *Sii* as member of the *Streptococcus bovis/Streptococcus equinus* complex (SBSEC) which is associated with human and animal infections. Therefore, a potential application of *Sii* as adapted African starter culture for enhanced food safety requires a thorough safety assessment and institutional and political supports.

Research work conducted in: Korhogo, Côte d'Ivoire

Key messages

- Informal practices resulted in poor quality of low productivity of FDP
- About 90% of milk produced on average per day per farm (10.4 l) were sold via collectors, generating daily 150-450 FCFA/Liter (1560-4680 F CFA/ day) and the remaining 10% were consumed within the farm
- Milk was contaminated by SBSEC
- Strains of SBSEC were found in milk consumers stool

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Involved Institutions

CSRS Centre Suisse de Recherches Scientifiques en Côte d'Ivoire

Swiss TPH Swiss Tropical and Public Health Institute
Schweizerisches Tropen- und Public Health-Institut
Institut Tropical et de Santé Publique Suisse

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ETH Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Donors

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Objective

Assess local technologies and the dairy value chain in relation to *Sii* prevalence, followed by a participatory stakeholder workshop to validate findings and derive adapted interventions.

Methods

A cross-sectional study was conducted in Korhogo (Côte d'Ivoire) from May to August 2014 with farmers, collectors, vendors and household members using participatory approach.

Epidemiology Consumers	Technology Processing	Socio-economic Feasibility	Dairy model Appraisal
■ Questionnaires at household (n= 355) and farm (n= 30) level ■ Milk, FDP and stool sample collection ■ Isolation and molecular characterization of *Sii* from FDP and stool	■ Questionnaire at farm (n= 30), collector (n= 30), vendors (n= 13) and household (n= 50) level ■ Local milk technologies and FDP properties ■ Validation of improved technologies ■ Isolation and molecular characterization	■ Socio-economic analysis at farm (n= 30), collector (n= 28) and vendors (n= 15) level ■ Focus group discussions on equity and gender ■ Cost-effectiveness analysis	■ Stakeholder involvement and analysis ■ Designing a dairy unit ■ Financial appraisal and funding mechanism ■ Management system and impact assessment
Risk of infective endocarditis, colon cancer/adenomas	Description of current technology/ adapt it to reduce the risk and improve the quality	Development of dairy unit model for good quality FDP production
Medical Doctor student	**Msc in food technology**	**Msc social science Msc economy**

Next step

Future interventions identified by stakeholders comprised:

(i) awareness on local dairy hygiene and nutritional value for the population especially school children

(ii) stakeholders organization around cooperative to develop sustainable dairy model (public dairy with private management)

(iii) promote healthy milk products for school canteen programme in Korhogo through adapted local dairy technology.

Results

Tableau 1: Price of milk per actor of dairy chain based on the season

Level	Raining season		Dry season	
	Minimum price of selling milk (FCFA/Liter)	Maximum price of selling milk (FCFA/Liter)	Minimum price of selling milk (FCFA/Liter)	Maximum price of selling milk (FCFA/Liter)
Farm	150	200	250	450
Collector	175	250	300	500
Vendor	300	400	400	600

Table 2: Number of milk samples contaminated by SBSEC at different level of dairy chain

	Farmers	Collectors	Vendors	Households	Total
Raw milk in tank (n=98)	14 / 30	13 / 30	5 / 12	7 / 26	39
Fermented milk (n=73)	18 / 29	2 / 5	7 / 13	7 / 26	34
Total	32	15	12	14	73

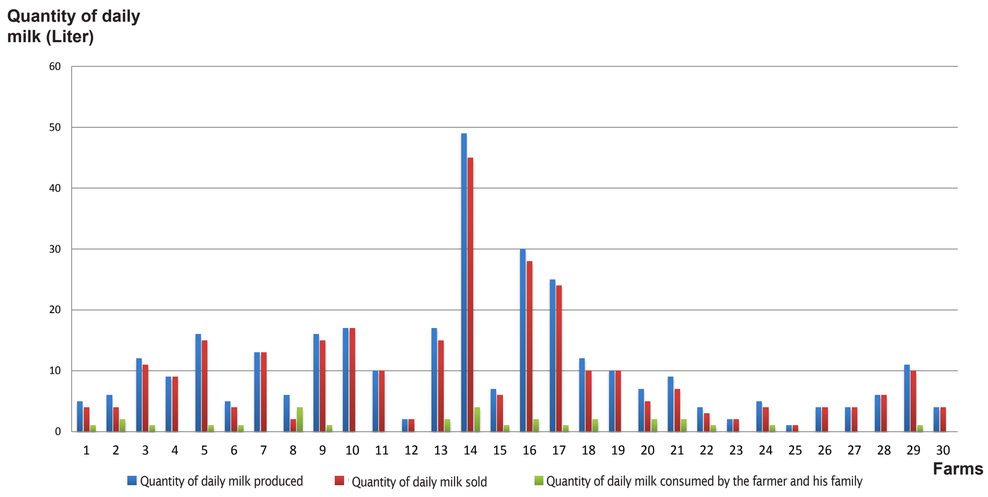
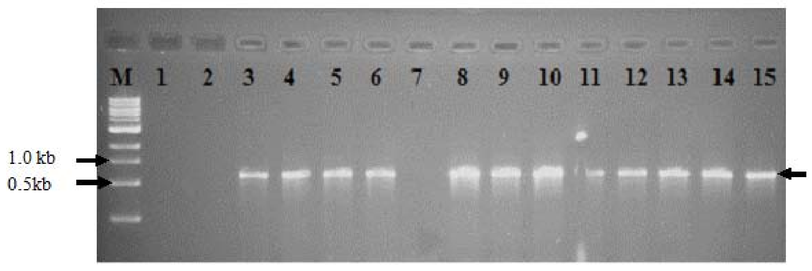


Figure : Quantity of daily milk produced, sold and consumed at farms level



M : 1 kb DNA Ladder
1 : No DNA, distilled H2O
2: Negative control, *S. thermophilus* DNA
3: Positive control, *S. infantarius* CJ18 DNA
4-6 and 8-15: Positives isolates DNA

Picture : Strains of SBSEC isolated from milk consumers stool