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Status of milking equipment park, hygiene practices and milk quality in Tunisia ; How poorly controlled development of mechanization can lead to disaster

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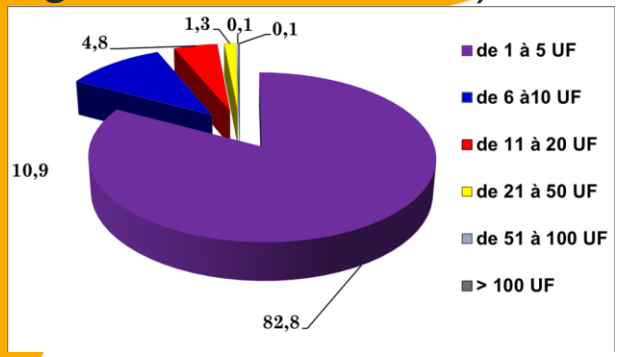
Introduction

- Tunisia is the African country with the most organized milk chain and the higher degree of mechanisation.
- Despite apparent good results in some official communications, a poor milk quality (nutritional, technological and sanitary) is frequently reported in scientific litterature (*Kamoun, 2011, Gargouri et al, 2014…).*
- The data available is more often from the biggest farms and are not representative. (*Sakly et al, 2014, OEP, 2021*),



- An important impact of mechanization on milk quantity and quality was suggested in the middle east (Sahel) region of Tunisia (M'sadak et al, 2010, 2014).

Research questions

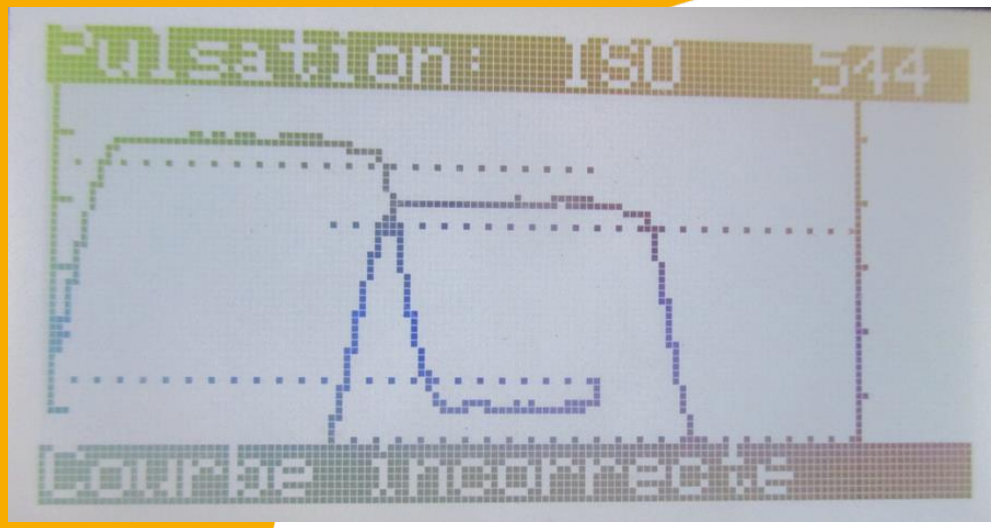
- Are milking equipment status and function as milking routine management correct in all type of farms and regions in Tunisia?
- Is the prevalence of mastitis important in dairy cows in Tunisia and are these mastitis mainly of “environmental” or “contagious” origin?
- Is there relationships between these points on milk qualities?...

Material and methods

- **A representative sample:**
  - 11 large scale herds (out of the 66 for all Tunisia) and 128 small holder farms (out of 40000 for all Tunisia) were selected to be representative of the composition of Tunisian dairy sector.
  - Farms were selected in 3 governorates of the two main dairy production regions of Tunisia with help of local extension organization **(ODESYPANO/OEP)**

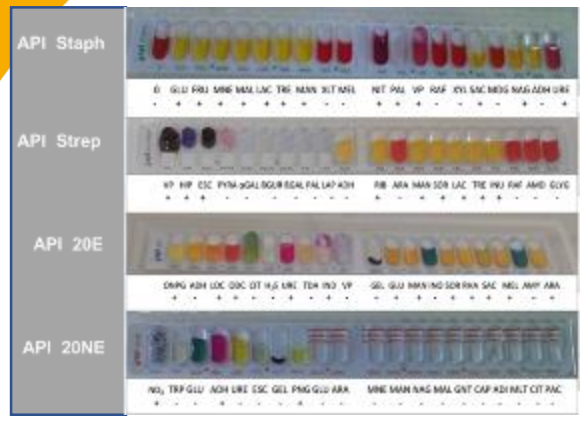
Material and methods (2)

- **Measurements / observations about milking equipment**:
  - Visible condition
  - Function of equipment by means of Optitraite French protocol based on ISO standards 5707 and 6690 using a Pulsograph MT52 (Milkotest), and Optiflo® flow controler.



Material and methods (3)

- **Measurements about milk quality:**
  - Tank and buckets milk samples were collected for classical analysis (Fat, Protein, SCC), and for Total Aerobic Flora (TAF)
  - Quarters Samples of 186 individuals cows with subclinical and clinical mastitis (CMT score >2) from 31 small holder's farms were analyzed microbiologically for germs identifications.



Material and methods (4)

- **Epidemiological survey:**
  - Zootechnical parameters and breeding management as well as breeding and milking practices.
  - Animal with clinical signs of mastitis.
  - Cleanliness scoring of animal (Faye & Barnouin, 1985)

Results

- **Very old european milking parlors (23.4 ± 0.7y)**
- **Recent bucket milking trolley (6,4 ± 1.6y) but non conform to ISO standards)**

71.9% Turkish

22,7 % Italian

5,5 % other

Results (2)

- **Liner Status: BAD!**
  - **In 45.3% of bucket milking trolley**
  - **In 81.8% of parlor milking equipment (P<0.01)**

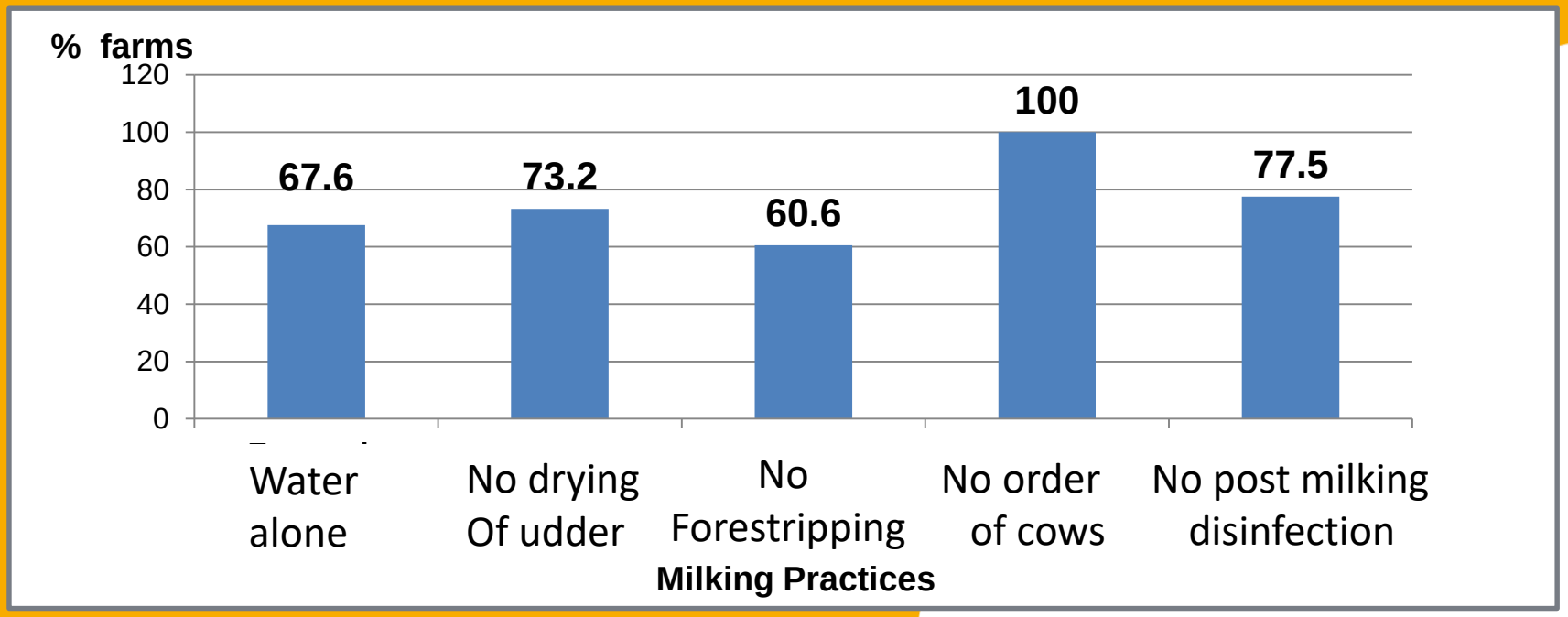
- **Air leaks:**
  - **In 38.3% of bucket milking trolley**
  - **In 36.4% of milking clusters in parlors.**

Results (3)

- **Equipment cleanliness: BAD!!**
  - **In 36.4% of bucket milking trolley**
  - **In 27.3% of Parlor milking equipment**

Results (4)

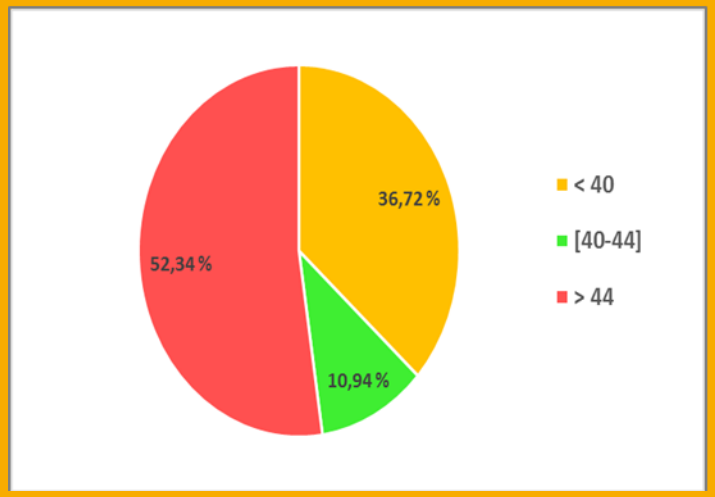
- **Hygiene practices**
  - Scarce usage of detergent (and no one with right dilution nor adapted temperature of action)
  - Scarce usage of NaClO for sterilization



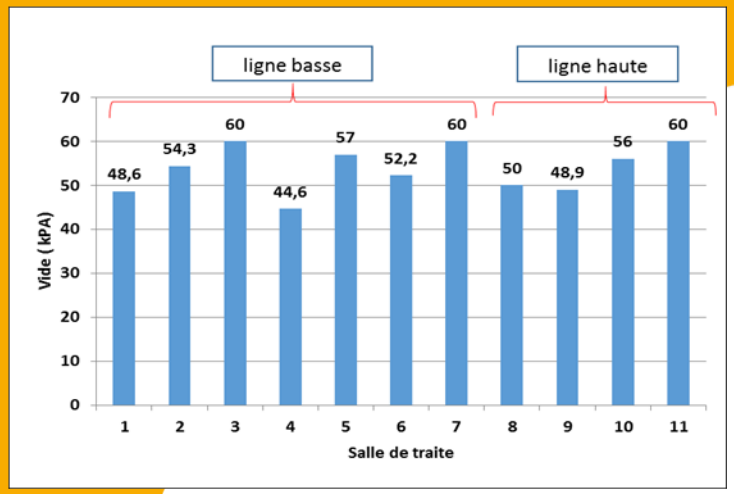
Results (5)

- **Machine settings:**
  - **Vacuum:** 65 % over the Standard ISO recommendations (40-44 Kpa).

Buckets



Parlors



  - **Pulsation:** 85 % over the Standard ISO recommendations (60 P/min) and 6,5% out of order and 20.3% of pulsator for small ruminants!

Results (6)

- **Milk quality:**
  - **Low milk richness: 3.23% Fat, 2.69% Prot.**
  - **Very High SCC: 1.309 Cell/ml (*10^6) (75,6%> 400 000 Cell/ml).**
  - **Very high Prevalence of mastitis : 33.3% to 45.9% for parlor and buckets milking system respectively.**
  - **Amazing germ concentrations:**

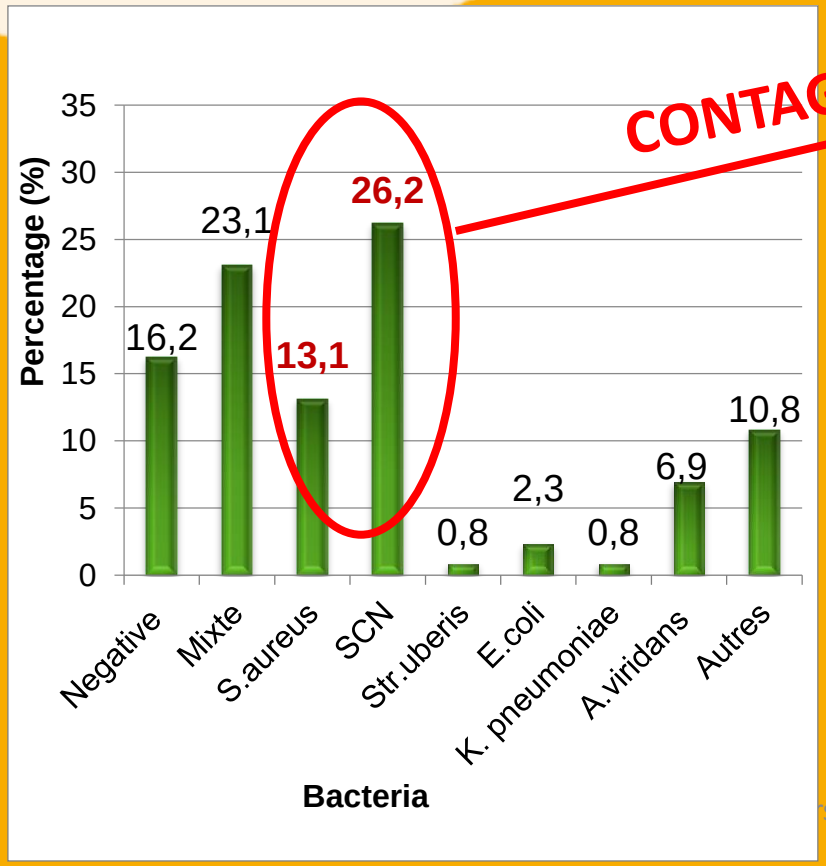
Milk analyzed	TAF($\times 10^6$/ml)			
	Mean	SD	min	max
Bucket milking farms	101,918 (n=43)	172,944	1,200	720,000
Parlor milking farms	15,723 (n=7)	154,487	1,170	32,000

(French standard: <100,000 /ml)

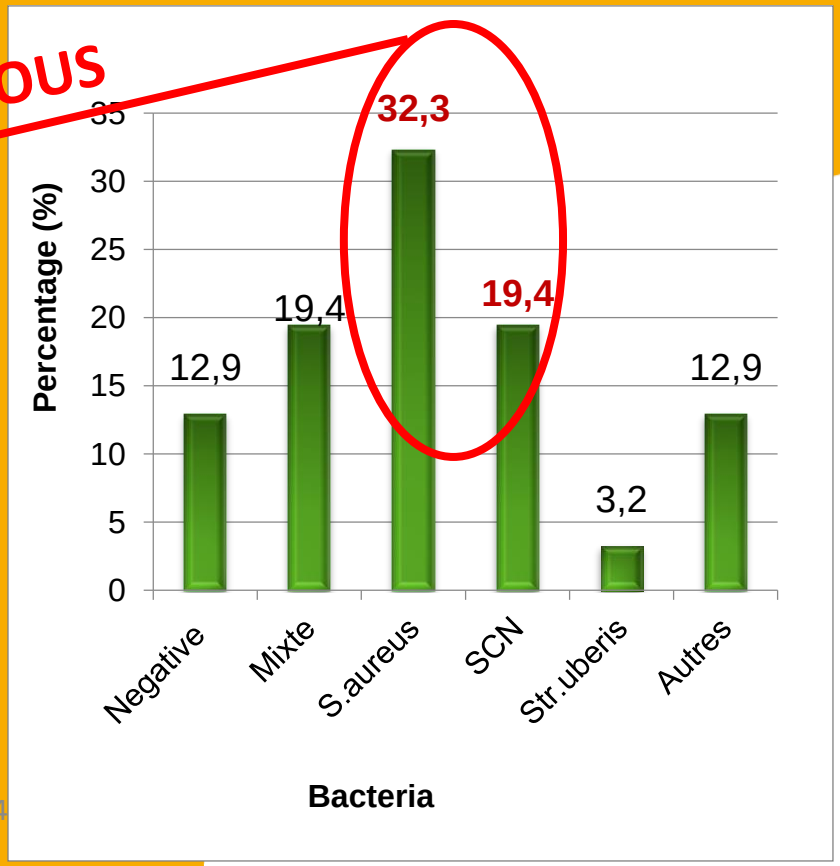
Result (7)

- **Bacterial etiology of bovine Mastitis**

Subclinical Mastitis

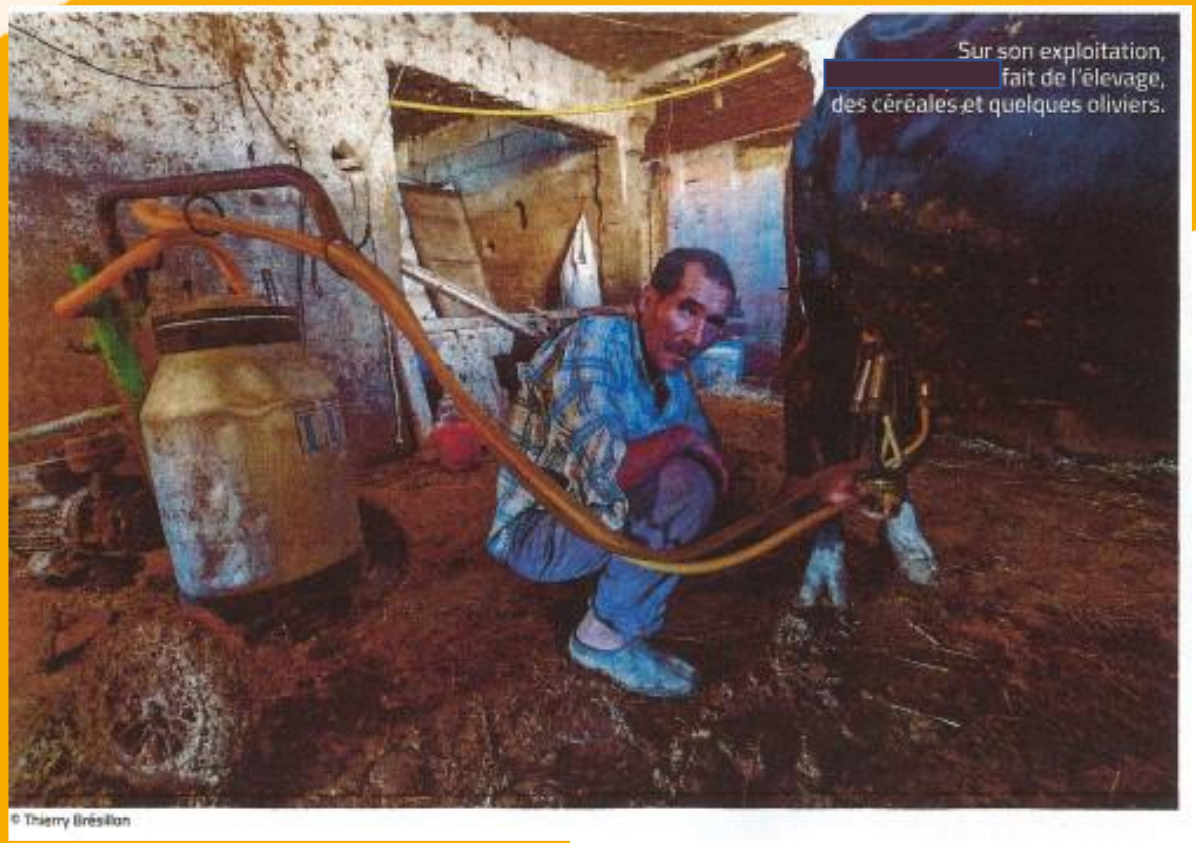


Clinical Mastitis



Result (8)

- Cow cleanliness (and housing cleanliness)
  - ➢ **40,8% were classified dirty or very dirty**



Discussion/conclusions

- **An unacceptable situation :**
  1. A bad nutritional and techno-functional milk quality.
  2. A dangerous sanitary status of milk.
  3. A very bad milking equipment status and function.
  4. Poor overall hygiene and insufficient zootechnical and machine milking skills of breeders.
- **Animal health and welfare not respected.**
- **Total lack of work simplification and efficiency (loss of attractiveness)**
- **Loss of production over 30% with such results.**
- **May explain the massive and rapid disappearance of Tunisian dairy farms.**

Discussion/conclusions

- **Mechanization development of milking need:**
  1. Equipment which complies to ISO or US standard (adjustable and controllable).
  2. Annual inspection of milking equipment by governmental agencies (independent of equipment and hygienic products distributors).
  3. Distributor of milking equipment with sufficient spare parts and wearing parts.

  => **Need strict specifications for the imported and distributed materials and hygienic products.**

  3. **Training and information** of farmers and technicians (milking routines, milking equipment control and maintenance, hygiene of cows and material).

Thanks a lot for your attention

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