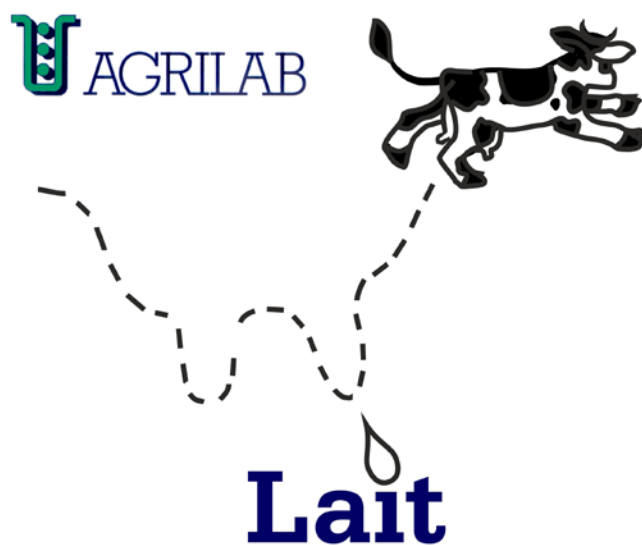


Agrilab:

How we deal with mastitis management in Italy



Agrilab is a laboratory in the province of Cuneo, Piedmont in Italy that, since 1978, offers its service in the field of microbiological and chemical analysis on milk, water and food; from raw materials to semi-finished products, to the finished product ready for commercial distribution.

Agrilab: the internal staff

The Agrilab team is made up of over 18 professionals in the field, including:

- > 7 veterinarians
- > 3 biologists
- > 4 chemical industrial experts
- > 2 food technologists
- > 1 quality systems manager
- > 1 graduate in business administration

Since 2011, the analysis and consultancy reports have multiplied, mainly in the field of dairy cattle. In 6 years, the amount of chemical and microbiological analyses of milk has become almost ten times bigger. Thus was Agrilab Lait initiated and developed (lait in the Piedmontese dialect means milk). The aim was to improve milk quality – no longer limited to laboratory analyses – but developed in a strategic plan of advice and assistance aimed at the specific cases that are found in each farm. Agrilab Lait offers a comprehensive service of assistance and consultancy on all matters and issues of mastitis. In 2012, substantial help came from rural development plans, that made it possible for many farmers to have economic incentives to spend on a milk quality and mastitis management program, that then continued in the following years.

Agrilab: the external staff

There is also a group of external professionals working closely with Agrilab:

- > 12 Veterinarians operating in the field of large animal, including VetPro (www.vetpro.it)
- > Diversified food technologists in various production and processing sectors
- > Agronomists
- > An engineer specializing in work safety

With Agrilab each farmer can choose between:

- a laboratory analysis service
- or a full service of assistance, that is analysis plus the support of a veterinarian from our team

The offer of assistance has made it possible to establish a continuous working relationship with more than 90 dairy farms and to collect data concerning milk quality, mostly in terms of SCC and bacteriology, at the level of bulk tank milk, at cow level and for individual quarters.

Agrilab Lait often is called in by the dairy farmer when there is a poor situation regarding bulk tank SCC levels or a substantial number



The Agrilab team is made up of over 18 professionals in the field.

of mastitis cases. However, there are also many well-managed dairies that work with us without a specific problem. Their aim is to improve mastitis management and reduce the use of antimicrobials.

In both cases, the partnership always starts from an overview of the trends in the last number of years on the dairy farm (often thanks to data compiled using the software Dairy-Comp 305) and the analysis of an initial bulk tank milk sample. This allows us to understand if there is one or more contagious pathogens to deal with. Then an audit in the dairy farm and milking parlour enables us to understand the strengths and weaknesses of the specific farm. A few days later, a veterinarian from Agrilab Lait meets the farmer and his co-workers (milkers or professionals) for a discussion and to provide concrete guidelines to follow and to set goals.

Agrilab Lait takes care of the pickup of the milk samples, the analysis and the advice within a 24 hours period for cases of clinical mastitis. A key role is mandated to Lattelab (an internal software suite at Agrilab) in which all the data are recorded and easily retrieved for each quarter of each cow analyzed.

The importance of data recording

The record keeping in the internal software Lattelab concerns every single analysis performed (both bacteriology and SCC results) plus the advice given by Agrilab Lait. The data recorded includes

- Name of the dairy farm
- Date
- Type of sample
 - > Bulk tank
 - > Group of cows
 - > Individual
 - > Single quarter
- Reason for the analysis, divided into five main categories for cows and/or quarters:
 - > clinical mastitis (M) with a severity score
 - > subclinical mastitis (S)
 - > pool sample of a post partum cow (F)
 - > before dry off (A)
 - > recheck (R)

For bulk tank milk or a group of cows samples the majority of the analyzes is in regard to the monitoring of contagious pathogens in the herd, such as *Staphylococcus aureus*, *Streptococcus agalactiae* and *Prototheca* spp.

- Treatment decision: the product, duration, dosage, route of administration
- Notes



Agrilab Lait offers a comprehensive service of assistance and consultancy on all matters and issues of mastitis.

This huge data store updates itself automatically as soon as the analyses are completed and it is consulted and modified daily, based on treatment decisions. Lattelab is essential otherwise we could not take advantage of the amount of data recorded for each dairy/cow/bacterium/or product used.

In our experience the issue of mastitis and its control must be managed with a detailed and on-going strategy (see for example the fertility program). This way of working has highlighted remarkable results and successes resulting from an increase in the milk quality, with a higher price for the delivered milk, the best efficacy of the therapies and simultaneously, a reduction in the use of antimicrobials. Agrilab believes that the consultancy and assistance in the company, as support to the analysis, are fundamental to a "safe" growth of the same.

The objective of this partnership with the dairies has a health-related bivalence: On the one hand, as we noted, it decreases the number of mastitis cases and obtains higher quality and better paid

milk; on the other hand it guarantees the consumer a safer milk coming from dairies which observe correctly the hygienic-sanitary criteria and animal welfare standards, rationalizing the use of drugs in order to avoid the phenomenon of antimicrobial resistance.

Inside the lab: the analysis

The acceptance phase of each sample is crucial in order to avoid mistakes. The sample needs to be labeled correctly, marked in the right way according to the reason for the withdrawal, and the most suitable culture media has to be selected according to the sample to be analyzed. For example: if I want to check the contagious pathogens in a bulk tank sample it is useless to use blood agar media; instead selective media must be used that makes possible a qualitative-quantitative estimate of each pathogen studied.

Then the samples, together with the acceptance sheets, are ready to be analyzed, first in the microbiological unit and then in the chemical unit.



The microbiological analyses are all carried out in Agrilab by culture media on plates under standard conditions using blood agar and many other selective media for Gram positive and Gram-negative bacteria and *Prototheca spp.*, with incubation for 24 to 48 hours at 37 ± 1 °C.

Chemical analyses for SCC are performed through the use of Fosso-matic 360 (FOSS), with the ISO 13366-2: 2006 method, which is accredited by ACCREDIA.

Small ruminants: no less important than cows

We think that it is possible to reduce the antimicrobial usage related to mastitis in goats and sheep also. During the past two years a veterinarian at Agrilab Lait has specialized in the breeding of goats and sheep, and we believe that it is possible to achieve good results in terms of mastitis prevention, recovery and a more rational use of drugs in these species.

To date, we monitor 18 farms and 11 cheese factories producing and using the milk of small ruminants located in the Piedmontese valleys, and an objective is to expand this work, helping farmers with both the health of the animals and the analysis on milk and cheese.

Goals for the future

Our goal is to continue to raise the awareness of the farmers in Piedmont to the importance of a rational use of the antimicrobials used to treat or prevent mastitis, including both lactation and dry treatments, which are one of the main items of cost on farms.

The objectives set for Agrilab Lait include a reminder that greater attention regarding the cost-benefit ratio in a milk quality & mastitis management program is vital, and it is important to make economic estimates and discuss them with the farmer.

The program of assistance enables benefits to be gained even if the dairy has good SCC results. We have estimated there is a gain of 18,000 € per year on a farm of 100 lactating cows if there is a reduction in the bulk tank SCC from 200,000 cells/mL to 100,000 cells/mL, because of the attention paid to the following:

- > clinical mastitis (some 50% to 60% of cases do not need antimicrobial treatment)
- > subclinical mastitis assistance allows the farmer to avoid or limit the number of chronic cows; and to focus on the prevention of mastitis and reach higher milk production
- > dry cow therapy: with a selective approach not all cows are treated, just those infected at dry off
- > milk quality awards: it would be easier to reach the SCC standards set by the cheese factory

Agrilab Lait main working topics with dairy farmers

Clinical mastitis	Subclinical mastitis
<ul style="list-style-type: none"> • The most important service perceived by the farmer • Analysis and advice in less than 24 hours • The advice is based on the pathogen, the severity score of mastitis and the history of the cow (obtainable thanks to Lattelab and Dairy-Comp 305) • A huge opportunity to use less antimicrobials when not needed and a better usage when needed • Usually the main cost savings item 	<ul style="list-style-type: none"> • At first, less important for the farmer, then perceived as a great chance to prevent chronic infection in cows • Every month there is a prospectus of the cows' SCC trend, with particular attention to the list of cows with new infections and those that are chronic • Agrilab Lait proposes a list of cows that are identified for a milk sample at quarter level, especially addressed to the new infections and those quarters with mastitis in the last month (as a recheck)
Biosafety	Selective dry cow treatment
<ul style="list-style-type: none"> • Bedding Management • To verify correct hygiene and cleaning of animals and mammary glands • To maintain an optimal and constant milking routine • To have an unambiguous method to identify those cows under antimicrobial treatment and the milk withdrawal times • Milking parlor: correct hygiene and cleaning of milkers, and the application of pre and post dipping products • To verify the animal welfare of cows (both lactating and dried-off), and also heifers and new born calves 	<ul style="list-style-type: none"> • At quarter level • Every quarter of every cow gets teat sealant as standard practice; the use of antimicrobials depends on the results of the bacteriological analysis and the history of the cow • A great opportunity to use fewer antimicrobials. According to our data, in certain dairies some 75 % of the quarters at dry off are negative at the bacteriological culture, thus a teat sealant correctly applied is sufficient • Cows are always checked both before dry off and in the post partum period

Our aims mostly concern milk quality and scientific research and the release and analysis of the huge amount of data we generate. In fact every year we focus on one or two articles for publication and presentation at conferences in Italy addressed to veterinarians or farmers, in which we show our results and engage in discussions about mastitis (see www.agrilab.com or <https://www.facebook.com/AgrilabSrl?fref=ts>). Agrilab Lait stresses the importance of the disclosure and dissemination of data regarding mastitis, both for treatment and prevention, in order to make progress together with the farmers.

Agrilab Lait: main publications

- > *Prototheca*: an underestimated mastitis agent (2013)
- > Bulk tank milk: contagious pathogens data in Piedmont (2015)
- > Dry cow therapy: first data from a selective approach (2016)
- > Clinical mastitis: an innovative management, results from a 16 months trial in 4 dairy farms, 534 mastitis cases (2017)
- > *Escherichia coli*: "the dark period" of *Escherichia coli* mastitis (2017)
- > Selective dry cow therapy at quarter level: first study in Piedmont, 11 dairy farms, 347 cows (2018) **M²**