Introduction of working protocols to reduce the use of antibiotics on dairy cattle farms

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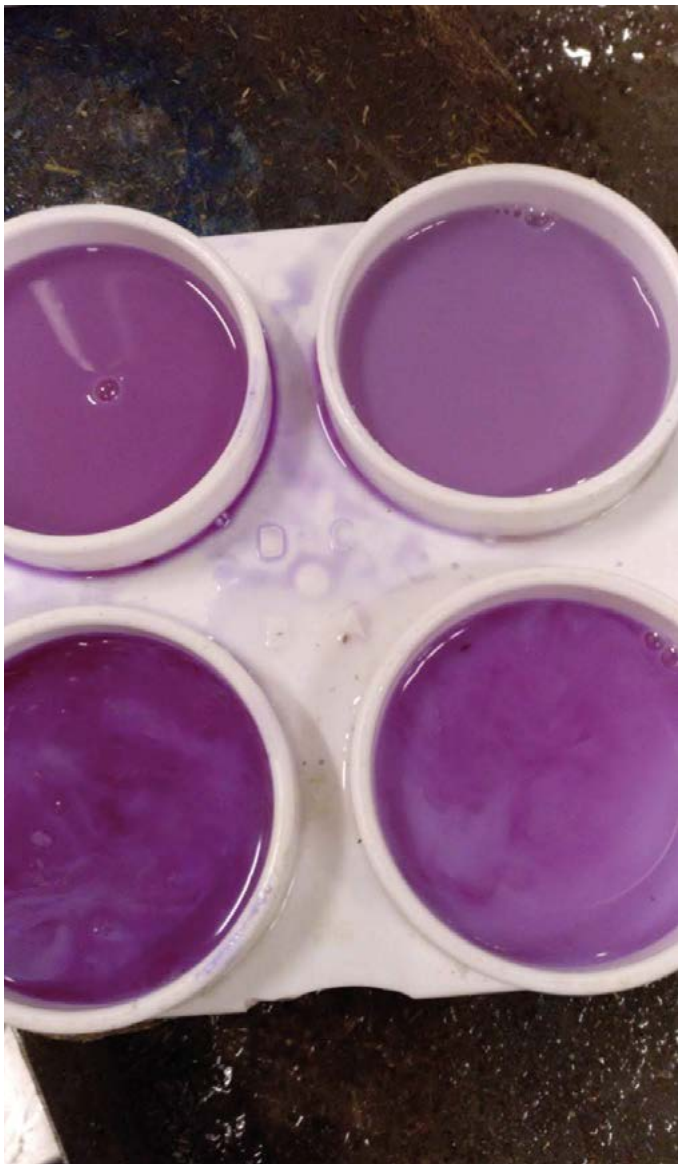
01. Rationale

The increase of antimicrobial resistance is a fact that has been confirmed by the European health authorities, which in 2015 drafted Regulation 2015/C 299/04 which gives recommendations for the prudent use of antimicrobials in veterinary medicine. These guidelines promote hygiene and disinfection measures for both personnel and facilities, improvements in housing and a decrease in prophylactic programmes that resort to the systematic use of antibiotics.

Of the various measures that can be taken to reduce the use of antibiotics in animal production, this project focuses on the implementation of two specific measures included in the EU recommendations: avoiding systematic treatment in drying-off and developing preventive practices (specifically for intrauterine pathologies in the post-partum period).

In addition, 2019 saw the launch of the 2019-2021 *Spanish National Plan against Antibiotic Resistance (PRAN)*, which imposed the requirement to communicate antibiotic prescriptions in the field of animal health and to publish the categorisation of antibiotics.

Laboratory antibiograms of milk samples from cows with high somatic cell counts using the minimum inhibitory concentration (MIC) technique. Photo: Lourdes Migura.



Performance of the California Mastitis Test (CMT) at farm level to assess the level of somatic cells prior to drying-off. Photo: Laura Blanco.

Some antibiotics widely used in the field of animal production such as third- and fourth-generation cephalosporins and fluoroquinolones have been categorised as level 2, which means their use requires bacteriological testing.

This fact has led to a third action within the working group, consisting of two controls during the course of one year to isolate bacteria in the main pathologies in the field of dairy production (mastitis and metritis) to assess the annual evolution of antibiotic resistance on farms.

The main objective of the project is to establish working protocols that allow for reduced and more rational use of antibiotics on dairy farms, specifically:

1. Assess the impact of selective drying-off as a tool to reduce the preventive use of antibiotics.
2. Evaluate the use of intravaginal probiotics in antepartum to reduce the risk of intrauterine infections during the postpartum period.

3. Use antibiotics taking into account the results of bacteriological tests (bacterial isolation and antibiogram).

02. Results and conclusions

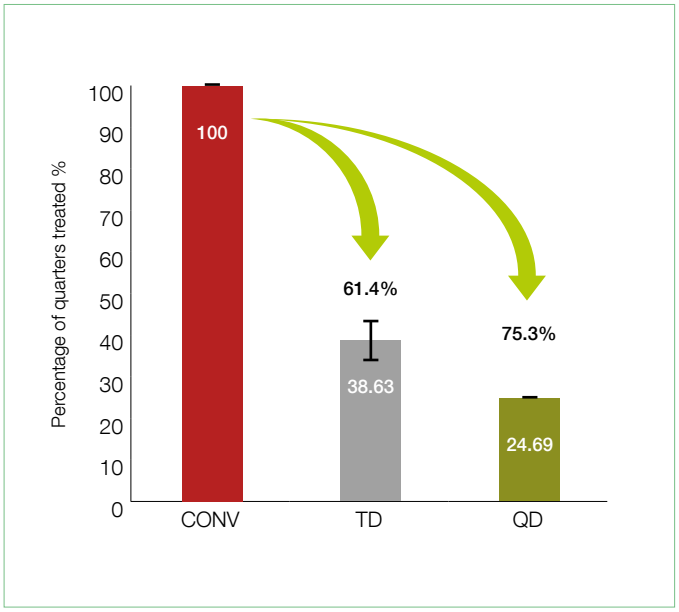
The selective drying-off protocol (antibiotic treatment of those quarters with growth of more than 15 bacterial colonies) in animals with low somatic cell counts (<200,000 cells/mL) in the last milk control and no history of mastitis throughout lactation, has shown favourable results as it does not increase the risk of intramammary infection (around 10% in this study) in the following lactation when compared to conventional drying-off using preventive antibiotics for all quarters. It should be remembered that selective drying-off must always be accompanied by management practices that keep the animals in good housing and hygienic conditions as indicated by European Regulation 2015/C299/04.

The use of probiotics in the prepartum period as a strategy to reduce postpartum intrauterine infections has not given good enough results to recommend this practice, as the incidence of metritis is low (11%) and the management strategy too complex (six applications of probiotics during prepartum) considering the scant benefit in cows of more than one lactation.

It is hoped that isolation of bacteria from mammary gland and womb infections and subsequent antibiograms can be recommended as a working tool for a more rational use of antibiotics on dairy cattle farms.

In conclusion, the introduction of selective drying-off measures on dairy cattle farms reduces the use of preventive antibiotics without increasing the risk of intramammary infections. Other measures proposed in the project, such as the reduction of the incidence of metritis, have not been shown to have sufficient benefits to justify their implementation.

Finally, it is considered that the dairy cattle sector must take action against the increase in antibiotic resistance and continue to look for strategies to reduce the use of antibiotics.



Reduction of the percentage of antibiotic use when applying a selective total drying-off (TD) treatment, where all quarters are treated if one is CMT positive, or selective drying-off at the quarter level (QD) compared to conventional drying-off (CONV) which consists of systematically treating all quarters regardless of their somatic cell count. Author: Georgina Maynou.

	Sampling March 2019	**Sampling November 2019**
Farm A	PIRL-TET S PIRL	ERY+PIRL+TET PEN+ERY+PIRL+TET
Farm B	SDM PEN S	TET+SDM ERY SDM PIRL ERY+PIRL+TET

Antibiotics tested: AMP: ampicillin; PEN: penicillin; CEP: cephalothin; XNL: ceftiofur; ERY: erythromycin; PIRL: pirlamycin; TET: tetracycline; SDM: sulphadimexotine; SMX: sulfamethoxazole; TMP: trimethoprim; COL: colistin; GEN: gentamicin; OXA: oxacillin; S: sensitive to all antibiotics tested

Evolution of antibiotic resistances of bacteria isolated from cows with high somatic cell counts in the March and November 2019 samplings. Source: Operational Group.

Generalitat de Catalunya
Departament d'Agricultura, Ramaderia, Pesca i Alimentació

The European Agricultural Fund for Rural Development: Europe investing in rural areas

Project co-financed through Operation 16.01.01 (Cooperation for Innovation) of the Catalan Rural Development Programme 2014-2020.