



Editorial

Advances and trends of dairy production in Uruguay

Avances y tendencias de la producción láctea en Uruguay

Avanços e tendências da produção leiteira no Uruguai



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The dairy industry of Uruguay has long been a fundamental driver of national economic and social development. However, after 30 years of dynamic growth (> 4.5% annual accumulative rate; 1985-2015), a predominantly stagnant period has ensued. Indeed, the Uruguayan dairy chain faces deep and multifaceted economic, productive, and environmental challenges. Beyond the last decade restrictive and volatile global conditions for dairy exporting countries, Uruguayan dairy farmers face local and particular challenges that entice them to reestablish the grounds for sustainable competitive growth. This *Agrociencia* special issue addresses how recent research could help to navigate these challenges, with a focus on establishing a sustainable path forward amidst these complexities.

A collection of seven papers examines the current state and prospects of dairy systems in Uruguay, offering insights into both problems and potential solutions. The issue begins with Chilibroste et al. and Pedemonte et al. analyzing current farm growth dynamics and types. These articles provide new insights and set the stage for a deeper understanding of the sector's foundational structures, while also identifying promising pathways for farms future improvement in terms of economics. A pivotal topic in this issue is the delicate balance between economic gains and environmental sustainability. The paper by Stirling et al. presents nitrogen budgets for farms at a national level, showing both the current national status and how the impact of an envisaged intensification trajectory based on increasing stocking rates would eventually imply a trade-off between economic and environmental performance. This is complemented by the study by Irisarry et al., which assesses the effect of application of raw effluents on soil fertility and plant biomass nutrient content, as well as on sanitary risk, as an opportunity for nutrient recycling.

Tools that allow evaluating whole-farm level changes and scenarios are key to face this future with several trade-offs, as demonstrated by the simulation model proposed by Llanos et al. to anticipate biophysical performance of dairy systems to changes in feeding strategies or biotype. Furthermore, Fiol et al. address dairy heifers' management strategies in Uruguay, reviewing the opportunities to improve replacement growth efficiency, which is essential for improving the overall efficiency and growth of dairy production. Finally, Bruni et al. explore the use of multienzyme complexes for rumen fermentation modulation to enhance digestive efficiency and overall animal health.

A proper foundation for the Uruguayan dairy chain to thrive must integrate a robust horizontal institutional network with a strong vertical integration of research platform. This integration should span from on-farm applied studies to fundamental cellular processes, ensuring that innovative research leads to tangible improvements at the farm level and strengthen the value chain. This Special Issue is a building block for sharing knowledge and fostering dialogue among researchers, policymakers, and industry stakeholders, thereby contributing to the sustainable development of the Uruguayan dairy sector.