

GOTA: Guide for the Optimisation of the Use and Treatment of Drinking Water for Fattening Calves

Summary

Water is key to the future of human and animal activity, as it will be an increasingly limited resource and its quality is expected to reduce in the coming years. It is estimated that there will be an increase in the demand for drinking water due to the growth of the human population and the consequent increase in agricultural production required to supply people with food, and also due to changing rainfall patterns caused by climate change (Doreau et al., 2012). There are various methodologies used to calculate water needs, each one producing a different final value, but the most accepted method states that producing 1 kg of beef requires 15,415 l of water (Mekonnen & Hoekstra, 2012).

This figure is questionable and a value should be provided in accordance with our production system, given that efficiency values, water consumption values, and the slaughter age of the animals have been assumed. Water quality is getting worse. Water quality can be defined in terms of its organoleptic, physical and chemical and microbiological aspects. There are two aspects that are of particular interest in terms of decreasing quality: nitrate contamination and microbiological quality, in addition to possible treatments to improve the situation.

What actions can be taken and where?

- a) Determine the consumption of water in the various fattening phases (consumption curves in accordance with age and time of year). Match supply with demand. Contribute data to calculate the water footprint.
- b) Optimise consumption: reduce wastage by assessing the type and number of drinking troughs.
- c) Determine its optimal quality: nitrates.
- d) Study optimal drinking water treatments: effect on consumption, efficiency.

Objectives

The end goal of the GOTA project, as its name indicates, is to prepare a Guide to Optimising the Use and Treatment of Drinking Water for fattening calves.

Its Catalan acronym, GOTA, translates as drop, symbolising the value of a drop of water in today's world. The intensive cattle fattening sector is aware that water is an increasingly scarce resource and although it is the most important nutrient (it is essential for life and it limits feed consumption), it has not been a priority for the sector until now.

Description of the actions carried out in the project

Different actions were carried out in the project to achieve four specific objectives:

- a) Determine the water consumption in the various fattening phases (consumption curves in accordance with age and time of year).
- b) Optimise consumption: maximise consumption and reduce wastage by studying the design and number of drinking troughs.
- c) Determine its optimal quality (nitrates).
- d) Study the optimal drinking treatments.

Moreover, the data may be used in the future to estimate the water footprint of the Catalan cattle fattening system.

Final results and practical recommendations

With the aim of advancing the sector (fattening calves), the GOTA project will produce:

- data to enable the calculation of the water footprint
- practical guide for the optimisation of the use and treatment of water in the sector.

Conclusions

- The project has provided water consumption curves in relation to the feed consumption (suckling) and live weight (fattening) and weather, showing that the water footprint of beef production in Catalonia appears to be smaller than the estimated mean global footprint.
- Initially, having two troughs per pen does not seem to increase water consumption or improve animal growth, even though temperatures are hotter by the end of fattening. It should be noted, however, that the troughs were cleaned weekly.
- Apparent consumption with bowls is lower and the differences are greater in periods of hotter temperatures; checks should be made on whether the difference in consumption is waste (played with and spilling water) or affects growth.
- The water chlorination purification/sanitation treatment and/or water conditioning (acidification of water pH) favourably modified physico-chemical and microbiological water quality parameters, especially the combination of acidification and chlorination. It should be noted that the sampling location is essential to interpreting the data.
- Chlorination treatment and/or water conditioning (acidification of water pH) had no negative effect on the consumption of water, feed and straw and numerically acidification and chlorination increased the kg per carcass.
- Water conditioning (acidification of water pH) only reduced the digestibility of fibre at the start of the study; by the end, chlorination had slightly increased starch digestibility.
- Chlorination treatment and/or water conditioning (acidification of water pH) did not affect the health of calves.
- Calves were able to detect high levels of nitrates and reduce water consumption while protecting themselves from possible poisoning; it is important to establish whether this has an impact on production data; currently it does not seem to affect animal health.

Leader of the Operational Group

ORGANISATION: CORPORACIÓ ALIMENTARIA DE GUISSONA SA

CONTACT E-MAIL: josep.ribo@bonarea.com

Coordinator of the Operational Group

ORGANISATION: ALCARRÀS CATTLE ENTREPRENEURS ASSOCIATION

CONTACT E-MAIL: gestio@alcarrasbovi.net

Other members of the Operational Group (grant recipients)

ORGANISATION: NANTA, SA

CONTACT E-MAIL: j.riera@nutreco.com

ORGANISATION: SOLUCIONES INTEGRALES PARA LA NUTRICIÓN

CONTACT E-MAIL: tatje@sinual.com

Other members of the Operational Group (not recipients of the grant)

ORGANISATION: SETNA NUTRICION SAU

CONTACT E-MAIL: joangrau@setna.com

ORGANISATION: ASOPROVAC CATALUNYA
 CONTACT E-MAIL: catalunya@asoprovac.com
 ENTITY: ASFAC
 CONTACT E-MAIL: direccio@asfac.org ENTITY:
 IRTA
 E-MCONTACT E-MAIL: maria.devant@irta.cat

Subject area(s) of application

- Agricultural production system
- Agricultural practice
- Agricultural equipment and machinery
- Livestock farming and animal welfare
- Vegetable production and horticulture
- Landscape / Territorial management
- Pest and disease control
- Fertilisation and nutrient management
- Soil management
- Genetic resources
- Forestry
- Water management
- Climate and Climate Change
- Energy management
- Waste and by-product management
- Biodiversity and environmental management
- Food quality/processing and nutrition
- Supply chain, marketing and consumption
- Competitiveness and agricultural and forestry diversification
- General

Geographical area(s) of application

PROVINCE(S)	REGION(S)
Lleida	La Noguera, La Segarra

Dissemination of the project (publications, seminars, multimedia, etc.)

Dissemination will focus on comparing current results with those obtained using other calf-fattening systems, calculating the water footprint and writing the GOTA Guide.

In addition, the contents of the GOTA Guide will be divided into popular (Albeitar) and scientific (J. Anim. Sci.) abstracts and articles:

- 1) PUBLISHED IN ANEMBE MAGAZINE: MARCH 2019

EL AGUA EN TERNEROS DE CEBO. NECESIDADES Y SOSTENIBILIDAD

Devant¹, M., M. Verdú², C. Medinyà³, J. Riera⁴, A. Anton⁵, and S. Martí¹

- 2) ABSTRACT SENT TO THE 2019 ASAS MEETING

Voluntary water intake of calves and fattening Holstein bulls fed high-concentrate diets

Devant¹, M., M. Verdú², C. Medinyà³, J. Riera⁴, and S. Martí¹

3) ABSTRACTS SENT TO ASAS MEETING 2020

Increasing the number of water troughs does not increase water intake or improve calf performanceSonia Martí¹, Marçal Verdú², Carles Medinyà³, Joan Riera⁴, and Maria Devant¹**Drinking device can reduce apparent water consumption and improve device cleanliness without impairing calf performance**Maria Devant¹, Marçal Verdú², Carles Medinyà³, Joan Riera⁴, and Sonia Martí¹**Project website**

There is no specific one; see the IRTA projects website

More information on the project

PROJECT DATES	TOTAL BUDGET
Start date (month-year): June 2018	Total budget: €201,400.00
Completion date (month-year): September 2020	DARP funding: €82,308.00
Current status: Executed	EU funding: €62,092.00
	Own funding: €57,000.00

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Order ARP/133/2017 of 21 June, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ARP/1868/2017, of 20 June, announcing the call for the grant.



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



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