

Proposal master thesis

Topic:

Modelling the economic impact of milk yield reduction before dry-off

Background:

Dairy cows are usually dried off around 6-8 weeks before the next calving. This phase is important so that the udder (and the pregnant cow) can regenerate and prepare for the next lactation. Dry off reduces the risk of disease and contributes to a higher milk yield in the following lactation. It is an important part of management in dairy farming.

Milk yield of dairy cows is significantly increased by genetic selection and improved management practices. One of the consequences is that cows maintain high yields until the end of lactation and are thus to be dried off even when daily milk yields may still amount > 20 kg milk/day.

Dry-off is commonly performed by abrupt cessation of milking. This approach is critical with regard to health and welfare. High yielding cows may experience discomfort and pain when being dried off abruptly due to increased intramammary pressure caused by udder tissue engorged with milk. A high milk production at dry-off increases the risk of an intramammary infection (IMI) during the dry period.

Reduction of feed or milking frequency are common methods to reduce the milk yield at the end of lactation - with different advantages and disadvantages.

Automated reduction of milk yield before dry-off (with a milking software) could thus counter-intuitively have a positive economic impact because of its positive impact on the health and productivity of cows.

The goal of the study is to i) review the literature on the topic, ii) build a bio-economic model to evaluate the economic impacts of milk yield reduction, iii) simulate the impacts based on data from experiments with a software for milk yield reduction before dry-off under current conditions and climate change conditions.

Material and Methods

The student is expected to conduct i) a literature review on the topic, ii) build a bio-economic model, iii) simulate economic impacts under different scenarios.

Data on prices, milk yields, costs, and climate change will come from KTBL.

Data of milk yield reduction regimes before dry-off and potential impacts under current conditions will come from Ute Müller (Institute of Animal Science, ute-mueller@uni-bonn.de).

Literature

Martin LM, Sauerwein H, Büscher W, Müller U (2020): Automated gradual reduction of milk yield before dry-off: Effects on udder health, involution and inner teat morphology. *Livest Sci* 233: 103942.

Müller U, Hefter LM, Wedeking SD, Büscher W, Barth K (2023): Incomplete milking before drying off does not impair the udder health of cows infected with minor pathogens. *J Dairy Res* 15: 1-5.