Effect of **SOP STAR COW** on Enteric Gaseous Emissions and Dairy Cattle Performance

Summary for Policymakers

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THE BACKGROUND

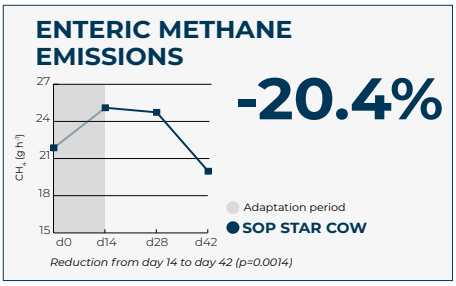
Animal-sourced foods have been under increased scrutiny due to public awareness and concern over environmental impacts.
Animal-sourced foods can also improve national agricultural alignment to several UN Sustainable Development Goals by providing nutritious food to the population and stable livelihoods for rural communities [1], where the lack of arable land makes it possible only for ruminants to convert non-edible plants into food. Nevertheless, the agricultural livestock sector has been identified for its contributions to greenhouse gas (GHG) production. In the United States, the livestock sector is estimated to contribute 35% of the anthropogenic methane (CH_4), 72% of which originates from enteric fermentation and 28% from manure management [2]. At EU level, 53% of anthropogenic methane emissions come from agriculture from which 80.7% are originated from enteric fermentation of ruminant species and 17.4 % from manure management [3].
Several strategies, from changes in feed composition to breeding low methane producing cows, have been investigated. Feed additives are looked at as one of the most promising strategies, although some of them manifested issues, including toxicity to the animal or the environment, short-term effects, or are not yet available to the market due to regulatory constraints.
In this work https://www.mdpi.com/2071-1050/12/24/10250, Prof. Mitloehner and his team at UC Davis study the efficacy of SOP STAR COW in reducing enteric GHG emissions and on milk production.

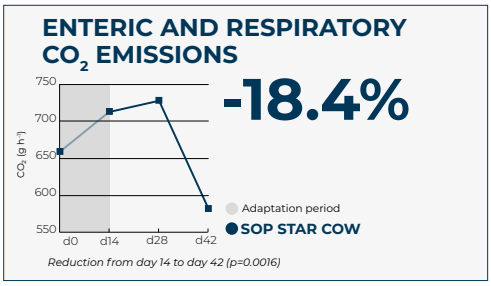
THE STUDY

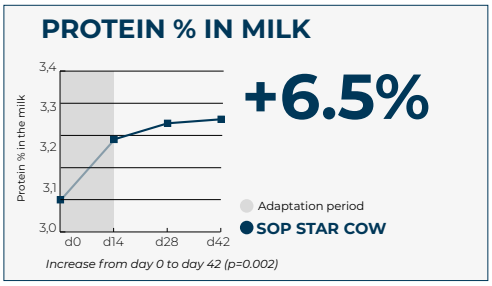
The study was performed on two groups of 10 cows (control and SOP treated) in mid to late lactation for 6 weeks (42 days), the first two of which were considered as adaptation period to SOP STAR COW. GHG emissions were measured for individual cows with head chambers [4] for 12 hours every two weeks. Milk parameters were also analysed in the same day to give a full representation of the cows response to the SOP treatment.

THE RESULTS

A comparison was made for each group (control and SOP treated cows) along the test days. The analysis of CH_4 data showed that the emissions from within the SOP group had a significant decrease from day 14 to day 42 with a reduction of 20.4%. Carbon dioxide CO_2 emissions also showed a decrease from day 14 to day 42 (-18.4%), while the emissions from within the control group did not show significant differences over time for neither gas.
In addition to that, the SOP treatment resulted in a significant increase in % milk protein throughout the study period (+4.9% from day 0 to day 14 and +6.5% from day 0 to day 42).







SOP AND THE UN SUSTAINABLE DEVELOPMENT GOALS (SDGs)

SOP products have already shown their ability to mitigate GHG emissions from the dairy industry. Two previous studies (Borgonovo et al, 2019, from the University of Milan, https://www.mdpi.com/2071-1050/11/18/4998 and Peterson et al, 2020, again from Prof. Mitloehner's team at UC Davis, https://www.mdpi.com/2071-1050/12/4/1393 showed the efficacy of SOP LAGOON to reduce GHG and odorous emissions from liquid manure. Due to the gaseous emission reductions, the life cycle assessment (as in Borgonovo et al.), and the ability to improve the nutritional characteristics of milk the integration of SOP into the UN SDG framework for a more sustainable world is recognized and encouraged, especially for SDG2 (Zero Hunger), SDG3 (Health and Well-being), SDG6 (Water quality) and SDG13 (Climate action). The ability of SOP solution to reduce odorous emissions also allows the farms to mitigate their impact on potential conflicts with the surrounding communities, improving their compliance with SDG11 (Sustainable communities) and SDG17 (Partnership for the goals).

THE RESEARCH TEAM

Prof. Dr. Frank Mitloehner, PhD, is Professor and Air Quality Extension Specialist, Department of Animal Science at University of California - Davis. He served as Chairman at FAO for the Partnership Project for the Benchmarking of Environmental Impacts of the Global Livestock Supply Chains, LEAP. His team's research areas include measurements and mitigation of greenhouse gases, ammonia, and the study of their effects on human- and animal health and welfare, investigating the nexus of agricultural productivity and environmental sustainability. Dr. Marcello Chiodini, PhD researcher at the University of Milan and SOP collaborator, supplied the technical details regarding the product.

THE SOP PRODUCT

SOP STAR COW is a feed additive, based on natural materials, produced by SOP - Save Our Planet and has been commercialized in several countries in Europe since 2015. The SOP technical process is designed to work positively with the microbial communities present in the rumen and the digestive system, inside the animals, and in the bedding/stalls. The primary commercial goals of SOP STAR COW are to improve the productivity and resilience of dairy cows for a better livelihood of dairy farmers.

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For more information, please contact:
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[1] Adesogan et al., Animal source foods: Sustainability problem or malnutrition and sustainability solution? Perspective matters. Glob. Food Secur. 2020
[2] USEPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015. 2017
[3] European commission (2020). Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions on an EU strategy to reduce methane emissions
[4] Place et al., Construction and operation of a ventilated hood system for measuring greenhouse gas and volatile organic compound emissions from cattle. Animals 2011