SOP
Save Our Planet

A SOP Research Report

Reducing by up to 50% Enteric Gaseous Emissions of Methane and Carbon Dioxide from dairy cows.

BACKGROUND

Animal-sourced foods have come under increased scrutiny due to public awareness and concern over their environmental impacts. Animal-sourced foods can also improve national agricultural alignment to several of the UN Sustainable Development Goals by providing nutritious food to the population and provide 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 (CH4), 72% of which originates from enteric fermentation and 28% from manure management [2]. At the EU level, 53% of anthropogenic methane emissions come from agriculture of which 80.7% originate from enteric fermentation of ruminant species and 17.4 % from manure management [3].

Recently, a new model to calculate the relative contribution of different substances to Global Warming has been developed, which takes into account the short life of Methane in the atmosphere. The GWP* model attributes greater warming potential to CH4 in the short term, making variations (increases or decreases) in the emission rates of this gas more significant regarding climate. The model calculates that constant emission rates do not contribute to global warming. In addition to this, it shows that reductions of methane emissions of over 10% with respect to current levels would be equivalent to removing CO2 from the atmosphere, with a potential consequent cooling action.

Several strategies, from changes in feed composition to breeding low methane producing cows, have been investigated. Feed additives are seen as one of the most promising strategies, although some of them have manifested issues, including toxicity to the animals or the environment, short-term effects, or are not yet available to the market due to regulatory constraints.

[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.

THE SOP SOLUTION:

Star Cow is a feed additive, based on natural materials, and has been commercialized in several countries in Europe since 2015. It requires a very limited dosage (8 grams per animal per day), it is safe to use and is already approved for use in some of the most stringent and demanding food production categories, such as Italy's Grana Padano and Parmigiano Reggiano. 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 goals of the Star Cow product are to reduce methane, improve the productivity and resilience of dairy cows, to enhance the quality of the milk produced, all of which are intended to improve the livelihood of dairy farmers while also providing significant benefits to our collective, global fight to mitigate against and adapt to the dramatic effects of climate change.

RESEARCH & IN-FIELD PROVEN RESULTS

SOP continuously strives to validate the efficacy of its solutions via a combination of constant internal laboratory research processes, in field validation with numerous clients as well as peer review efforts with the leading agricultural universities of the world.

SOP's in field research has demonstrated the ability of Star Cow to reduce enteric emissions of Methane and Carbon Dioxide by up to 50%.

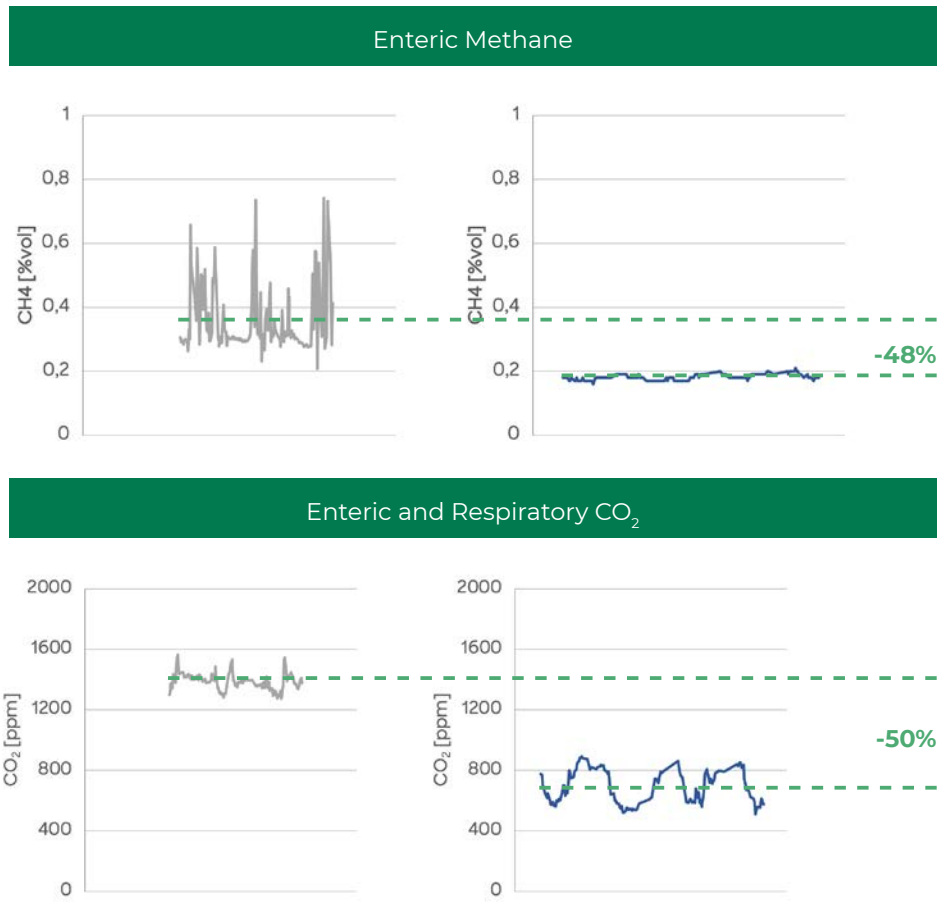

Figure 1: Reduction of enteric Methane and Carbon Dioxide emissions in dairy farms. Benchmark measurements, left, in gray, and measurements from animals using Star Cow, right in blue.

These measurements have been made utilizing carefully calibrated monitoring units that are installed in barns, typically placed in the area(s) where high-level production cows are housed. The units are able to continuously sample the air and provide data corresponding to a ground surface area of approximately 500 m^2. The benchmark monitoring is done prior to commencing the deployment of the Star Cow product. The subsequent measurements are taken at least ten weeks later in order to allow for sufficient adaptation of the cows' rumen to the conditioning enabled by the use of Star Cow.

These in-field research data points represent a further update of previous studies, performed in laboratory conditions, where the measurements were interrupted after only six weeks, resulting in reductions of "only" approximately 20% of the enteric GHG emissions. Those preliminary results were published in the scientific journal "Sustainability" in December 2020[4]. More recent extended monitoring studies commenced in late 2020 and continue to date. These in-depth studies are being conducted in several commercial farms located in northern Italy, utilizing sensors designed to measure the concentrations in the air of Methane, Carbon Dioxide and Ammonia as well as more common environmental parameters, such as temperature and humidity. The results captured continue to support actual reductions of these two critical GHG's by up to 50%.

CONCLUSIONS

The combination of university studies and empirical in-field analysis confirm the efficacy of Star Cow in mitigating enteric emissions by up to 50% regarding both Methane and Carbon dioxide from dairy cattle. The products very low application rate, its proven safety and numerous other benefits for dairy cows and farmers make it a highly scalable, actionable and economic tool for dairy farmers to reduce their carbon footprint, improve their livelihood while also providing significate benefits to our collective, global fight to mitigate against and adapt to the dramatic effects of climate change.

[4] https://www.mdpi.com/2071-1050/12/24/10250.