World Business Council for Sustainable Development

Measuring the impact of carbon avoiding solutions in Dairy Production: *A Case Study*

Agrifood company Ajinomoto, is creating low-carbon solutions for the dairy & beef production sector

1.01 tCO_2e avoided emissions annually per cow

when using AjiPro®-L, decreasing emissions by 0.37 tCO_2e due to feed cultivation and 0.64 tCO_2e due to nitrogen emissions from manure while maintaining milk productivity

→ *10% of global GHG emissions*

are caused by the supply chain of cattle.[1]

This translates into 3.2 tCO_2e emissions produced per cattle per year.[2]

Capturing avoided emissions *— assessment details*

- → **Functional Unit:** kg CO_2e/kg milk
- → **Impact:** 0.09 kg CO_2e/kg milk annually
- → **Time Period:** Year-on-year
- → **Scope:** United States[3]
- → **System Boundaries:** Feed cultivation, amino acid production, feed mix, dairy herd emissions including N_2O manure management, until farm gate. (Other factors such as methane emissions from both enteric fermentation and manure are excluded from consideration for a more conservative result)
- → **Application:** This solution is also applicable to beef cattle

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The Business-As-Usual Scenario

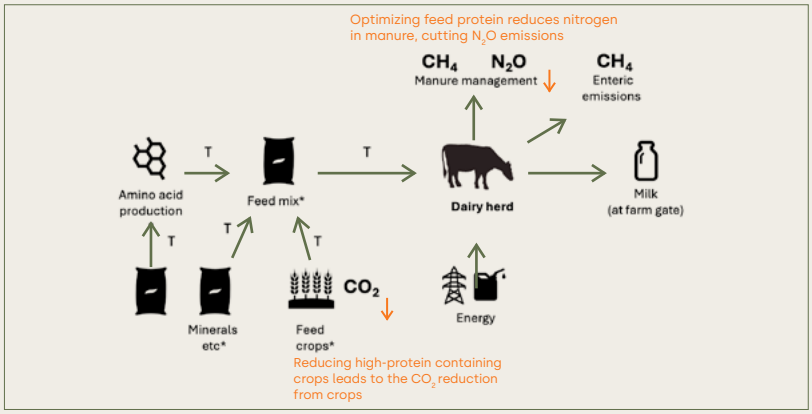
- → Dairy cows are fed high-protein feed which lacks specific essential amino acids (e.g., lysine), leading to inefficient protein use and the excretion of redundant amino acids that result in manure containing nitrous oxide (N_2O), which is a greenhouse gas with 300 times the warming potential of carbon dioxide (CO_2)
- → This high-protein feed is usually composed of GHG-intensive ingredients such as soybean and blood meal, emitting significant CO_2 through cultivation and production

The Low-Carbon Scenario

- → AjiPro®-L delivers the most deficient amino acid in the ordinary feed: lysine, with high efficacy. This optimizes the amino acids balance, allowing for a reduction of the amount of high protein/GHG-intensive ingredients in the feed
- → Feeding the amino acids balanced feed described above to cows can abate N_2O emissions from manure while maintaining health and productivity of cattle
- → Less usage of GHG-intensive ingredients decreases lifecycle GHG emissions from crop cultivation

How It Works

System boundaries



* Energy, raw material inputs and wastes included
T transport

Farmers reduce their scope 1 N_2O emissions from manure and scope 3 emissions from feed cultivation, while dairy manufacturers reduce their scope 3 emissions from milk production.

WBCSD Avoided Emissions Eligibility Gates

☑Gate 1 (Climate Action Credibility) ☑Gate 2 (Climate Science Alignment) ☑Gate 3 (Contribution Legitimacy)

Environmental and Social Side Effects

Improves cow health and lowers feed costs by $192/cow/year through the transition to low-protein feed.

Third-Party Verification

The protocol has been registered with Athian, and third-party certification has been completed.
https://www.athian.ai/methods
*The lifecycle emissions of AjiPro®-L are not disclosed.

[1] From FAO (2017) Livestock solutions for climate change
[2] Ibid (Annual GHG emissions from livestock for cattle: 4.73 $GtCO_2e$). Number of cows globally: 1.5 billion (from statista) = 3.2 tCO_2e
[3] Manure management system and feed design utilized in the calculation are based on the weighted averages from US practices