

**Comment 1 for Dairy Subgroup 3 Comment Docket (for research and enteric)  
(dairysubgrp3-ws) - 1st Workshop.**

First Name: Todd  
Last Name: Shuman  
Email Address: tshublu@yahoo.com  
Affiliation: Wasteful Unreasonable Methane Uprising

Subject: Enteric Emissions Research Request and Sub-Group #3  
Comment:

To ARB and CDFA,

I request that ARB and CDFA explore, fund, and promote (through funding for pilot projects) measures to capture and or reduce enteric methane emissions from livestock. I am resubmitting for the record the most salient section from previous group SLCP RS comments submitted to ARB in January, 2017 concerning this matter so as to inform the Dairy and Livestock Subgroup #3 that is being convened on August 14, 2017.

I also request that ARB and CDFA seriously explore and encourage widespread adoption of the red seaweed methane mitigation approach that Dr. Jim Stewart has previously mentioned in oral comments to ARB. Below is an abstract concerning this approach that has been demonstrated in vitro. In vivo demonstration of this approach is reportedly currently under way.

Sincerely,

Todd Shuman, 2260 Camilar Dr. Camarillo, CA 93010 805.236.1422  
<http://wumu-wuru.my-free.website/>

A:

Excerpt from January 17, 2017 Comments to ARB:

"We again propose that CA ARB, the legislature, and the Governor explore and consider enacting some or all of the following to reduce enteric emissions in California: measures to promote mandatory livestock herd size reduction; mandates that compel the development of enclosed barns-vented-to-biofilter treatment systems that capture emitted dairy-associated methane before it escapes into the atmosphere \*\*; and requirements that grazing cattle shall wear gas-collecting, plastic-bag-expanding backpack technology that captures emitted enteric methane so it can be burnt rather than belched into the atmosphere.

Concerning the latter strategy, we submit for the record the attached Government of Argentina INTA Reports, in Spanish and Google-translated English, as well as again submitting internet links concerning this approach. [Use Google Search to access the following links to see demonstrations of the technology:  
<http://www.fastcoexist.com/.../these-backpacks-for-cows...>,  
<http://www.dailymail.co.uk/.../Now-THATS-wind-power-Cows...>,  
<http://grist.org/.../crazy-clip-shows-what-happens.../...> See also the video, on YouTube, titled "producción de energía de gases ruminales"]

We propose that CA ARB explore the idea of evaluating, replicating, financing, and promoting further development of the biotech

gas-collecting cow backpack methane capture concept and technological system to facilitate capture of ruminant-associated methane due to enteric fermentation.

We encourage CA ARB to procure a full translation of the full report, and evaluate the experimental results in the context of the SLCP Reduction Strategy CEQA analysis currently underway, and also make an English translation of the report available to the public.

We believe that this approach may be one that might potentially meet the requirements of the enteric emissions provision of SB 1383 in the future, though it is possible that more work may need to be done to address the question of economic viability, along with other requirements specified in SB 1383. A more extensive collective infrastructure might (or might not) ultimately be required to make implementation and widespread dissemination of this biotechnological approach a reality.

Still, the concept deserves a "good faith" evaluation by CA ARB and an assessment as to what might be needed to establish enhanced viability of this particular biotechnological methane capture approach in the future. [We also note that the technique developed by INTA also captures a substantial amount of rumen-generated carbon dioxide, which could constitute a source gas for future CO2 conversion into ethanol - see <http://www.popularmechanics.com/science/greentech/a23417/convert-co2-into-ethanol/>]."

\*\* I wish to note for the record that the recommendation that ARB investigate the enclosed freestall barn approach for methane capture was first stated (and submitted to ARB) by a large coalition of organizations as far back as June 10, 2015: "By letter dated June 10, 2015, environmental justice and environmental organizations urged the State Board to investigate and include additional control options in the Strategy, including ... (2) enclosed freestall barns and anaerobic digesters vented to biofilter systems to capture and treat methane and volatile organic compound (VOC) emissions without the negative consequence of increased NOx emissions in the San Joaquin Valley. [10] "

[10] Letter from Brent Newell, et al. to Ryan McCarthy and Craig Segall, June 10, 2015. {Quote taken from CRPE comments to ARB, late October, 2015}

B:

<http://www.publish.csiro.au/an/AN15576>

The red macroalgae *Asparagopsis taxiformis* is a potent natural antimethanogenic that reduces methane production during in vitro fermentation with rumen fluid

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Animal Production Science 56(3) 282-289  
<https://doi.org/10.1071/AN15576>  
Submitted: 14 September 2015 Accepted: 23 November 2015  
Published: 9 February 2016

Abstract

Livestock feed modification is a viable method for reducing methane emissions from ruminant livestock. Ruminant enteric methane is responsible approximately to 10% of greenhouse gas emissions in Australia. Some species of macroalgae have antimethanogenic activity on in vitro fermentation. This study used in vitro fermentation with rumen inoculum to characterise increasing inclusion rates of the red macroalga *Asparagopsis taxiformis* on enteric methane production and digestive efficiency throughout 72-h fermentations. At dose levels of 1% of substrate organic matter there was minimal effect on gas and methane production. However, inclusion of 2% reduced gas and eliminated methane production in the fermentations indicating a minimum inhibitory dose level. There was no negative impact on substrate digestibility for macroalgae inclusion of 5%, however, a significant reduction was observed with 10% inclusion. Total volatile fatty acids were not significantly affected with 2% inclusion and the acetate levels were reduced in favour of increased propionate and, to a lesser extent, butyrate which increased linearly with increasing dose levels. A barrier to commercialisation of *Asparagopsis* is the mass production of this specific macroalgal biomass at a scale to provide supplementation to livestock. Another area requiring characterisation is the most appropriate method for processing (dehydration) and feeding to livestock in systems with variable feed quality and content. The in vitro assessment method used here clearly demonstrated that *Asparagopsis* can inhibit methanogenesis at very low inclusion levels whereas the effect in vivo has yet to be confirmed.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2017-08-14 13:46:54

No Duplicates.

**Comment 2 for Dairy Subgroup 3 Comment Docket (for research and enteric)  
(dairysubgrp3-ws) - 1st Workshop.**

First Name: PETER

Last Name: WILLIAMS

Email Address: PETER.WILLIAMS@ADVANTECASSOCIATES.COM

Affiliation: ADVANTEC ASSOCIATES, INC.

Subject: PRODUCT TO REDUCE ENTERIC METHANE EMISSIONS IN RUMINANTS

Comment:

Please find attached an introductory letter regarding Agolin - a product fed to ruminant animals to reduce enteric methane (by about 20%), while improving meat and milk yield/quality. Also attached - a summary of European Research Institute Trials and a product brochure.

The Product is widely used in Europe to improve efficiency while reducing methane emissions. In the USA it is used for efficiency improvements, with methane mitigation being of growing interest.

Please would you consider this product (Agolin) as a potential candidate to help reduce enteric methane production on California dairies/beef units.

My business is based in Davis, California.

Thank you.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/4-dairysubgrp3-ws-AGFRMFA+BTpSPQRq.zip>

Original File Name: Agolin.zip

Date and Time Comment Was Submitted: 2017-08-14 15:11:40

No Duplicates.

# **Comment 3 for Dairy Subgroup 3 Comment Docket (for research and enteric) (dairysubgrp3-ws) - 1st Workshop.**

First Name: Joshua  
Last Name: Kim  
Email Address: joshua.kim@arb.ca.gov  
Affiliation:

Subject: Comment on Research Subgroup Topics (Kickoff Meeting)  
Comment:

[The following was a comment/question submitted by email at the August 14, 2017 Subgroup #3 Kickoff Meeting]

From: Cherie Blatt  
Affiliation: North Coast Regional Water Quality Control Board

Dear Subgroup 3 members,  
Thank you for allowing comments during the meeting. I listened to the meeting today and have the following comments:

The Regional Water Boards in CA have dairies under permit and require annual reporting therefore have information that could be shared with the Air Board or related researchers. The North Coast Regional Water Quality Control Board has contact information and data on the 120 dairies in our region. These dairies are all covered by our waste discharge permits.

1. At least one, maybe more, dairies in the north coast are all grass-fed pasture-based dairies, meaning they do not feed grain. This may be of interest to your researchers measuring enteric fermentation. More pertinent data may be collected from these grass fed operations found rarely in CA. You may contact us or Western United Dairymen for the grass fed dairy contact information if comparison research on this dairy type is desired.

2. Air Board researchers have collected information from the regional water boards in the past regarding number of cows, acres of pasture, etc. If the Air Board or related researchers need specific information on dairies that has not yet been collected by Air Board staff or information that needs to be asked of dairies in the state, then the regional water boards may be able to help. Please let us know if there is anything we can do.

Thank you.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2017-08-23 15:52:50

No Duplicates.

**Comment 4 for Dairy Subgroup 3 Comment Docket (for research and enteric)  
(dairysubgrp3-ws) - 1st Workshop.**

First Name: Joshua

Last Name: Kim

Email Address: joshua.kim@arb.ca.gov

Affiliation:

Subject: Comment on Research Subgroup Topics (Kickoff Meeting)

Comment:

[The following was a comment/question submitted by email at the  
August 14, 2017 Subgroup #3 Kickoff Meeting]

From: John Shears

Affiliation: CEERT

The management of dairy manure is a nutrient management problem and both C and N are closely linked. Need to make sure that emissions of compounds such as N<sub>2</sub>O do not result as an unintended consequence of whichever solution is being contemplated. Likewise for nutrient flows into the irrigation or water flows.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2017-08-23 15:52:50

No Duplicates.

**Comment 5 for Dairy Subgroup 3 Comment Docket (for research and enteric)  
(dairysubgrp3-ws) - 1st Workshop.**

First Name: Joshua

Last Name: Kim

Email Address: joshua.kim@arb.ca.gov

Affiliation:

Subject: Comment on Research Subgroup Topics (Kickoff Meeting)

Comment:

[The following was a comment/question submitted by email at the  
August 14, 2017 Subgroup #3 Kickoff Meeting]

From: Peter Williams

Affiliation: Advantec Associates

Public Question: I work with a rumen active product which diverts methane energy into milk/meat. We have a lot of research work from European Institutions. Currently feeding around 100,000 cows in California for the economic benefits to milk production - as well as interest in the impact on methane.

My question is: With whom should I discuss this application/product in order that it may be considered as part of the research toward reducing enteric methane. I have had some discussions with with Dan as well as Frank Mitloehner.

Thank you.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2017-08-23 15:52:50

No Duplicates.

**Comment 6 for Dairy Subgroup 3 Comment Docket (for research and enteric)  
(dairysubgrp3-ws) - 1st Workshop.**

First Name: Joshua

Last Name: Kim

Email Address: joshua.kim@arb.ca.gov

Affiliation:

Subject: Asparagopsis Taxiformis Research

Comment:

[The following was a comment/question directed to Subgroup #3 during the Main Working Group Meeting held on Jan 5th, 2018]

From: Brandon Scott Barney

Affiliation: Primary Ocean Producers

Comment: Will methane mitigating dairy and livestock feeds be subsidized by this program when Dr. Rob Kinley's Asparagopsis Taxiformis research is published? When will there be more information about that?

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2018-01-08 12:03:32

No Duplicates.



**Comment 7 for Dairy Subgroup 3 Comment Docket (for research and enteric)  
(dairysubgrp3-ws) - 1st Workshop.**

First Name: Morten  
Last Name: Toft  
Email Address: mt@biocover.dk  
Affiliation: Biocover A/S

Subject: Methane gas emission mitigation through use of acidification  
Comment:

Dear Sirs,  
Your research efforts have completely overlook acidification as a tool to mitigate Methane emission. It is extremely effective with +80 % reduction at below ph 6.0 and it also reduces ammonia emissions with 50%. Our last calculation on the societal value in Germany was + 2 billion euro. This is very easily achieved with commercially available systems.  
The technology may be used on small scale- as well as very large scale operations and it is cost neutral.  
There are lots of science documentation behind the claims of efficiency. It is also most effective with digested slurry.  
Regards  
Morten Toft

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2018-10-05 01:33:39

No Duplicates.

**There are no comments posted to Dairy Subgroup 3 Comment Docket (for research and enteric) (dairysubgrp3-ws) that were presented during the Workshop at this time.**