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California Air Resources Board
Dairy Methane Emissions Reduction

Subject: Feed Additive Rearch-Strategy Recommendation for Enteric Emission Reduction

To Whom It May Concern,

Agricultural Waste Solutions, Inc. ("AWS"), headquartered in Westlake Village, California, wishes to express our gratitude to CARB for the opportunity to provide comments on CARB's Analysis of Progress Towards Achieving Methane Emissions Target from Dairy and Livestock Sector webinar on May 21, 2020, as well as for inviting comments from stakeholders and the public. AWS works with California farmers to produce low carbon transportation fuels and carbon negative co-products such as biochar that reduce GHG emissions and improve water quality while creating new profit centers from manure and other ag resources.

Please see below our comments from the May 21, 2020 CARB Methane Emissions Target from Dairy and Livestock Sector webinar.

- Enteric methane reduction through the use of feed additives is an excellent approach in targeting enteric reductions. Ourselves, our farming partners, and several other interested partners acknowledge the efficacy of pharmaceutical feed additives for their potential consistency; however, we are concerned with the known toxicity potential of 3-NOP and Nitrates within yjr livestock and dairy population. Nitrate within ruminant feeds has the potential to induce moglobinaemia and is a recognized carcinogen (Chanhee Lee, 2014). Nitrate induced into the rumen through feed supplements undergoes conversion from nitrate, to nitrite, to ammonia, which will be transferred into the animal's manure and into its blood, negatively impacting the state's SLCP goals through ammonia reductions. Nitrate within the blood stream itself is not toxic; however, a portion of the nitrate will be absorbed into the organs and tissues during the conversion process. (Ishigami, 1976) The nitrite levels within the blood can result in moglobinaemia, or nitrate poisoning.
- Concerns with 3-NOP are based its high probability that it will be found in trace levels of the milk due to 3-NOP's high water solubility and being metabolized by the lactose enzyme. Scientific research has shown that lactose is the major metabolite of 3-NOP in the aqueous phase of milk (A. Thiel, 2019). The California Dairy industry is in a constant battle between animal welfare activists and consumer perception. Adding another "chemical" (3-NOP and its major plasma metabolite, NOPA) to be found in milk, although scientific research may deem it safe for human consumption, will negatively impact the dairy industry and further compound the downturn of the California Dairy Industry from a consumer perception perspective.
- We are concerned that large pharmaceutical companies will profit from the state's goals of methane reduction through feed additives via 3-NOP and Nitrates. The California livestock industry, especially California Dairy Farms, are mostly family owned, multi-generational farms. We do not need major pharmaceutical companies taking advantage of our California family farmers, or any other farmers for that matter, who are already struggling financially.
- Another issue we are interested in is gaining approval of the use of natural feed additives that accomplish similar and better results than chemical pharmacueticals, without the lengthy process

required for approval through state and federal agencies. We recommend that CARB SLCP staff and researchers consider alternative feed additives such as biochar, a recognized feed supplement that has the potential to reduce enteric methane and improve livestock health in achieving the state's goals within its methane mitigation strategy. The application of biochar as a feed supplement for animal farming is built on the basis of the use of activated charcoal in treating digestive disorders in humans and animals.

- A 0.8% addition of biochar to dry matter feed reduced methane emissions (g/kg DMI) by 18.4% in beef steers in both growing and finishing diets relative to no biochar treatments with no hinderance of feed intake. (Winders, 2020)
- The addition of biochar could increase weight gain of cattle, pigs, chickens and other livestock animals. It can also reduce enteric methane emissions from ruminants by providing favorable habitats for methaneogenic-methanotropic microbial interactions in the gut, enchancing anaerobic methane oxidation. (Ka Yan Man, 2020)
- A review article summarixing the state of knowledge up to the year 2019 evaluated 112 relevant scientific publications that show positive effects on different parameters such as toxin adsorption, digestion, blood values, feed efficiency, meat quality and/or greenhouse gas emissions could be found when biochar was added to feed - for all investigated farm animal species. Even studies that are statistically non-significant showed result tendencies that were mostly positive. The use of biochar as a feed additive has the potential to improve animal health, feed efficiency and livestock housing climate, to reduce nutrient losses and greenhouse gas emissions, and to increase the soil organic matter content and thus soil fertilizty when eventually applied to soil. (Hans-Peter Schmidt, 2019)
- There is an excess of waste biomass from the nut industry within the Central Valley. This waste is a clean feedstock source to generate biochar through thermochemical conversion technologies such as pyrolysis. We encourage the state to support these next-generation waste biomass conversion technologies, as several value added products such as enteric biochar, soil amendment biochar, syn-gases, and liquid transportation fuels can be generated from agricultural waste biomass through these technologies.

Sincerely,

Stephen McCorkle, CEO
Agricultural Waste Solutions, Inc.

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