



260 SW Madison Ave. Ste 106 | Corvallis, OR 97333 | www.tilth.org | PH 503.378.0690 | FX 541.753.4924 | organic@tilth.org

April 8, 2014

Ms. Michelle Arsenault
National Organic Standards Board
USDA-AMS-NOP
1400 Independence Avenue, SW
Room 2648-So, Ag Stop 0268
Washington, DC 20250-0268

**RE: Docket: AMS-NOP-14-0006
NOSB Livestock Sub-Committee
Carbon Dioxide (CO₂) for Use in Aquatic Plant Production**

Dear Ms. Michelle Arsenault,

Introduction:

Oregon Tilth disagrees with the proposed allowance for the use of synthetic CO₂ in aquatic plant production. CO₂ is a potent greenhouse gas and air pollutant. It could have two uses in aquatic plant production: as a nutrient supply of carbon and as a pH adjustment tool. For both of these uses synthetic CO₂ would be prohibited under the current organic crop standards. The evaluation criteria for the inclusion of a synthetic material on the national list states that, “the substance cannot be produced from a natural source and there are no organic substitutes” [205.600(b)(1)]. Because natural sources of CO₂ are available, synthetic CO₂ does not meet the minimum criteria for inclusion on the National List.

CO₂ Currently Prohibited as a Macronutrient Supply

Carbon is an essential macronutrient needed for plant production. The average carbon content in algae is around 50% by dry weight (Lee and Lee, 2002). Although algae do require carbon from CO₂ to grow, supplying it synthetically will effectively be fertilizing the algae with a synthetic macronutrient. Synthetic CO₂ is currently a prohibited synthetic for organic crop production, even though its use can increase plant growth, especially in greenhouse conditions. As stated in the petition; nonsynthetic sources of CO₂ are available, including that produced from microbiological respiration (e.g. yeast; pg. 9). The decomposition of organic material in a natural pond ecosystem produces dissolved CO₂, and such a system could be mimicked by organic algae producers (Knud-Hansen, 1998).

CO₂ Currently Prohibited as a pH Adjustment Tool:

OTCO certifies many aquaponic and hydroponic producers. For these organic producers, there is no synthetic means of pH adjustment allowed under the organic standards (e.g. phosphoric acid to lower pH, or potassium hydroxide to raise pH). Organic aquaponic and hydroponic producers must use nonsynthetic means of pH adjustment, including lactic acid, vinegar, and oyster shells (OTCO, 2013). The allowance of synthetic CO₂ to adjust pH will create a new precedent and open up an unnecessary inconsistency in the application of the organic standards.

CO₂ as an Environmental Contaminant

The Environmental Protection Agency has deemed CO₂ to be a regulated air pollutant and greenhouse gas (EPA, 2014). This proposed allowance would open up the doors to regular, not intermittent, use of synthetic CO₂ in organic crop production. Although the petition is optimistic that recycled CO₂ could be used, the primary sources of recycled CO₂ from industrial waste (flue gas, etc.) would contain other contaminants including nitrous oxides and sulfurous oxides (Brown, 1996). For pure CO₂ to be used in aquatic plant production it is probable that new synthetic CO₂ would need to be produced, which would ultimately add additional greenhouse gas into the environment. OTCO believes that the Listing Motion, “for use in contained systems such as tanks and ponds,” is not sufficient to prevent the eventual release of new CO₂ into the atmosphere.

Conclusion

The allowance for synthetic CO₂ as a macronutrient or pH adjustment tool is inconsistent with the organic standards and will contribute to environmental contamination. In addition, nonsynthetic CO₂ is available, and would increase in availability if synthetic CO₂ continued to be prohibited. We encourage the subcommittee to reevaluate whether CO₂ should be an allowed synthetic for aquatic crop production.

Respectfully Submitted,

Oregon Tilth

Oregon Tilth is a nonprofit organization supporting and promoting biologically sound and socially equitable agriculture through education, research, advocacy, and certification. Oregon Tilth advocates sustainable approaches to agricultural production systems and processing, handling, and marketing.

Citations

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- EPA, 2014. Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units. Environmental Protection Agency: Proposed Rule. <https://www.federalregister.gov/articles/2014/01/08/2013-28668/standards-of-performance-for-greenhouse-gas-emissions-from-new-stationary-sources-electric-utility#h-9>
- Lee, K., & Lee, C. G. (2002). Nitrogen removal from wastewaters by microalgae without consuming organic carbon sources. *Journal of microbiology and biotechnology*, 12(6), 979-985.
- Knud-Hansen, C. F., & Clair, D. (1998). Pond fertilization: ecological approach and practical application. K. McElwee, & J. Baker (Eds.). Corvallis, Oregon: Pond Dynamics/Aquaculture Collaborative Research Support Program, Oregon State University.
- OTCO, 2013. OTCO Hydroponic FAQs. Oregon Tilth Certified Organic. <http://tilth.org/farmers/otco-hydroponic-faqs>