NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

AMENDMENTS FOR TREATMENT OF AGRICULTURAL WASTE

(AU)

CODE 591

DEFINITION

Treatment of manure, process wastewater, storm water runoff from lots or other high intensity areas, and other wastes, with chemical or biological additives

PURPOSE

To alter the physical and/or chemical characteristics of the waste stream to facilitate the implementation of a waste management system to:

- Improve or protect air quality
- Improve or protect water quality
- Improve or protect animal health
- Alter the consistency of the waste stream to facilitate implementation of a waste management system

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where the use of a chemical or biological amendment will alter the physical and chemical characteristics of the waste stream as a part of a planned waste management system. This practice does not include amendments added to the animal feed.

CRITERIA

General Criteria Applicable To All Purposes

Laws, Rules and Regulations. Use of amendments as a part of a waste management system shall be planned and implemented to meet all Federal, state, and local laws, rules and regulations.

Criteria Applicable for Poultry Litter Treatment

Refer to Table 1 for a list of acceptable amendments for poultry litter. The amendments address the rate, timing, method, and safety concerns of the products.

General Requirements for All Uses

Labeling and Instructions for Use. Products to be used as manure amendments shall be labeled or accompanied by instructions containing the following information as a minimum:

- Active ingredients and their percentage of the whole. Proprietary terminology may be used as long as the actual chemical and/or biological names are included.
- The purpose(s) for which the amendment is intended.
- Recommended application rate(s) to achieve the intended purpose(s).
- Application timing and methodology to optimize the effectiveness of the amendment.
- Incorporation requirements (if any).
- Special handling and storage requirements for the amendment.
- Any safety concerns relating to the use of the amendment and recommended measures to overcome the safety concern, including any required personal protective equipment.

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Validation of Product. The specific rate, timing and application methodology of an amendment to achieve a needed level of treatment addressing a specific purpose must be documented by a university or other independent research entity acceptable to the NRCS. Documentation from peer reviewed journals is preferable. The effectiveness of the amendment under different climatic factors shall be included in the documentation, or if there are no difference in effectiveness, the documentation shall so state. Potential adverse impacts of the amendment on the ecosystem shall also be identified in the documentation. It shall be the responsibility of the amendment provider to furnish the documentation to the NRCS.

CONSIDERATIONS

The use of an amendment may alter the composition of the waste stream. The use of amendments should be limited to situations where impacts of the altered waste stream on other aspects of the planned system have been identified.

Some amendments have been shown to effectively impact multiple purposes of this standard and other aspects of a livestock production operation. Preference should be given to amendments with the greatest environmental and economic benefit.

The use of amendments to reduce ammonia and other emissions from manure in confined spaces may allow altered ventilation strategies at an appreciable energy savings. The reduction of ammonia emissions will also increase the proportion of nitrogen in the manure.

The selection of amendments should be mutually agreed by all contractual parties and compatible with the intended end use of the litter.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s). Specifications for the use of an individual amendment will be developed in accordance with the label directions and other instructions provided by the vendor. As a minimum, the plans and specifications shall provide the following:

- Where the amendment will be added
- The name of the amendment, the purpose(s) for its use, and the planned outcome(s).
- Application methodology, including rates, timing, mixing instructions, temperature requirements, etc.
- Required tests to determine the effectiveness of the amendment as appropriate.

OPERATION AND MAINTENANCE

A site-specific operation and maintenance (O&M) plan shall be developed and reviewed with the operator and owner prior to implementation of the practice. The O&M plan shall be consistent with the purposes of the practice, safety considerations, and label directions and other instructions provided by the vendor.

The O&M plan shall provide sufficient detail as to amendments to be used, application rates and timing, and equipment to be used.

The O&M plan shall detail all safety precautions necessary when handling, applying, or storing the specific chemicals or biological amendments to be used.

The O&M plan shall provide for record keeping in sufficient detail to describe the amendment's use, actual application rates and timing, and any tests performed (including nutrient analysis).

REFERENCES

1. Agricultural Waste Management Field Handbook, April 1992.

2. Cotterill, O.J. and A.R. Winter. Some Nitrogen Studies of Built-Up Litter. Poultry Sci. 32:365-366. 1953.

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5. Kristin E. Staats, Yuji Arai, Donald L. Sparks. Aluminum Amendment Effects on Phosphorus Release and Distribution in Poultry Litter–Amended Sandy Soils, Journal of Environmental Quality 33: 1904-1911. 2004.

6. Moore, P.A., T.C. Daniel, D.R. Edwards and D.M. Miller. Evaluation of Chemical Amendments to Reduce Ammonia Volatilization from Poultry Litter. Poultry Sci. 75:315-320. 1996.

7. Moore, P.A., T.C. Daniel, and D.R. Edwards. Reducing Phosphorus Runoff and Improving Poultry Production with Alum. Poultry Science. 78:692-698, 1999.

8. Pope, M.J. and T.E. Cherry. An Evaluation of the Presence of Pathogens on Broilers Raised on Poultry Litter Treatment – Treated Litter. Poultry Sci. 79:1351-1355. 2000.

9. Terzich, M. Poultry Litter Treatment – PLT. Proceedings to the 1998 National Poultry Waste Management Symposium. pp. 108-116.

10. USDA, NRCS. Agronomy Technical Note No. 3. Treating Poultry Litter with Aluminum. May 6, 2003.

11. Worley, J.W., M.L. Cabrera and L.M. Risse. Reduced Levels of Alum to Amend Broiler Litter. Applied Engineering in Agriculture. 16:441-444, 2000.

Table 1 – Amendments for the Treatment of Poultry Litter[1]

Active Ingredient-Chemistry; % Active Ingredient	Sodium Hydrogen Sulfate- $NaHSO_4$ (91 – 94%) and Sodium Sulfate (4.5-8%)	Acidified Clay- H_2SO_4 (40-50%) and Fullers Earth (50-60%)	Dry Alum- $Al_2(SO_4)_3$-$14H_2O$ (98 – 100%)	Acid + Liquid Alum- H_2SO_4 (<10%); $Al_2(SO_4)_3$-$14H_2O$ (>45%); and Water (>45%)
Container Size	50 lb bag and 2000 lb super sack	50 lb bag, 1000 and 2000 lb super sacks	50 lb bag., 2000 lb super sack and bulk	Bulk
Purpose	Decrease litter pH, bind ammonia	Decrease litter pH, bind ammonia	Decrease pH, bind ammonia and soluble phosphorus	Decreases litter pH, bind ammonia and soluble phosphorus
Rates of application	100 lbs. per 1000 sq ft	100 lbs. per 1000 sq ft	100 lbs. per 1000 sq ft	25 gal. per 1000 sq ft
Time of application in brood and growout chambers	Apply to whole-house as close to chick placement as possible and not more than 1-day prior. For split applications, apply in off-chamber as close to bird migration as possible. This product can be applied with birds present.	As close to chick placement as possible or movement to growout chambers and not more than 3 days prior. For split applications apply three days before movement into new section while birds are separated by curtains.	Apply whole-house 1-7 days before chick placement. Apply 5-7 days for dry litter prior to chick placement. For very dry litter, consider liquid acid alum.	Apply whole-house 1-5 days before chick placement, 1-2 days if wet litter, 3-5 days if dry litter. Cannot be used with birds in the house
Method of application	Spinner or drop spreader, no incorporation	Spinner or drop spreader, no incorporation	Spinner or drop spreader, incorporate top 1 inch if dry litter	Certified applicator, no incorporation
Safety concerns	Wear gloves, goggles, particle mask and clothing to protect exposed skin	Wear gloves, goggles, particle mask and clothing to protect exposed skin	Wear gloves, goggles, particle mask and clothing to protect exposed skin	Wear gloves, goggles, particle mask and clothing to protect exposed skin
Special handling/storage	Hygroscopic, store in dry location.	Hygroscopic, store in dry location. DOT - HAZMAT	Hygroscopic, store in dry location.	Requires special equipment and trained applicator. DOT - HAZMAT.

[1]Other products with ammonia and/or phosphorus-binding efficacy may be added when scientific documentation becomes available.

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APPROVAL AND CERTIFICATION

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PRACTICE STANDARD APPROVED:

John W. Mueller
State Conservation Engineer

12/13/05
Date

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