

PATENT SPECIFICATION

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(54) ANIMAL AND POULTRY FEED ADDITIVE

(71) We, NAREMCO INC., a corporation organised and existing under the laws of the State of Missouri, United States of America, of P.O. Box 1572 S.S.S., Springfield, State of Missouri 65805, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an animal and poultry feed additive which may be employed in animal and poultry husbandry, and, in particular, to a feed additive which can be readily mixed into animal and poultry feeds to effectively inhibit or prevent harmful microbial activity and fungal and mold growth in the feed. The invention also embraces methods for preparing the feed additive and to feeds containing same.

Due to steady changes in the ecology resulting from the introduction of more intensive methods of farming, and increasing use of chemicals which alter the microbial populations of soils and plants, the growth of toxin-producing and infectious molds in both human foods and animal feedstuffs has during recent years become a matter of increasing concern from the view point of both animal and human welfare. Considerable research has been devoted to the development of methods for inhibiting mold growth in poultry and animal feeds. Heating of freshly ground feeds, a result of stimulation of mold growth as moisture is released during grinding and processing, is now a widely occurring problem. Mold growths are activated directly in proportion to the moisture content of the feed-stuff, i.e. the greater the moisture content, the greater the hazard of mold growths, and the production of growth inhibiting toxins.

Methylrosaniline chloride (Gentian Violet or Crystal Violet) is known to be an effective mold and fungi inhibitor. Hoffman and Scott, U.S. Patent Specifications Nos. 2,946,722 and 3,231,466, disclose the incorporation of this substance into animal and poultry formulations with the objective of inhibiting the

growth of molds and specific bacteria in the contents of the guts of animals and birds. In its solid form, however, methylrosaniline chloride cannot be uniformly dispersed in feedstuffs. It is electrostatic and therefore the particles tend to cling together. This problem has been solved by dissolving methylrosaniline chloride in a volatile organic solvent, dispersing the solution in a premix, and, incorporating the premix in the animal or poultry ration.

The present invention is based upon the discovery that the effectiveness of methylrosaniline chloride for inhibiting or preventing microbial activity and fungal and mold growth in feedstuffs is considerably enhanced by the treatment of a premix or carrier on which the methylrosaniline chloride is dispersed with a small amount of an acid. The acid may be absorbed by the carrier or may react to form non-toxic water soluble salts with the constituents of the premix or carrier. In any event, the presence of the acid or its reaction products in intimate contact with the methylrosaniline chloride appears to release more effectively this mold-inhibiting material in the feed environment when it is needed.

According to the present invention there is provided an additive for animal or poultry feeds comprising a finely-divided, acid-treated, non-toxic mineral carrier having methylrosaniline chloride dispersed thereon.

The invention also provides a poultry or animal feed product comprising a feed ration in intimate admixture with a finely-divided, acid-treated mineral carrier having methylrosaniline chloride dispersed thereon.

Suitable carriers for use in the present invention include any of a wide variety of substances which can be incorporated into feedstuffs without adverse effect, and preferably with beneficial effect, upon the animals or birds which consume the feedstuff. Such carriers comprise natural minerals such as clays, diatomaceous earths, calcium or magnesium carbonates, phosphates or silicates and mineral salts of both organic and inorganic nature, such as the salts of trace elements

[Price 33p]

price 75p

commonly added to feedstuffs, e.g. magnesium, copper, iron, manganese, cobalt and zinc sulfates and combinations thereof. While any non-toxic, finely-divided solid of a mineral nature can be used, it is obviously advantageous to use those which, individually or in various combinations (as in mineral premixes) can be factored into poultry or animal feeds as desirable or commonly used parts of the primary feed formula. The carrier may be a mineral premix or a component of such a premix. Examples of mineral additives and premix formulations are set forth in the aforementioned U.S. Patent Specifications Nos. 2,946,722 and 3,231,466 and other premix formulations are well known in the art. Advantageously, finely divided limestone, dolomite, defluorinated rock phosphate, tricalcium phosphate, dicalcium phosphate or calcium carbonate may be used. Calcium carbonate or ground limestone are preferred materials because in minimal quantities they are components of virtually all formulated feedstuffs, and when used as dispersing agents the amounts used can be calculated by the nutritionist, the result in effect being that virtually no dilution of the nutrient value of the feedstuff occurs as a result of the addition of the mold inhibitor.

The acid used for treating the carrier is one which in the amounts used will not be harmful, either as such or indirectly as a result of its reaction products with the carrier, in the feed product. The function of the acid, either as such or in the form of its reaction products with the carrier, is to provide a material which is in intimate association with the methylrosaniline chloride on the carrier and which will facilitate release of the methylrosaniline chloride in the feedstuff environment. Organic acids, such as acetic, citric, propionic, butyric and lactic acids can be used, as well as mineral acids provided they do not form water-insoluble reaction products with the components of the carrier. Ordinary vinegar may be used as the source of the acid.

The more finely-divided the carrier material the more thoroughly it can be incorporated into the feedstuff. This, of course, is an important consideration in view of the fact that quantities or additive as small as one-half pound or less per ton of feed may be incorporated in the feed product. In general, the amount of the additive is in the range of from 0.01% to 5.0% depending on the concentration of methylrosaniline chloride in the additive. The carrier is preferably sufficiently finely divided so as to pass through a 100 mesh U.S. standard sieve and conveniently is in the minus 325 mesh size range.

The methylrosaniline chloride is dissolved in a volatile organic solvent, such as an alcohol or ketone, for dispersion on the carrier. The acid can be included in the same solvent

or can be added to the carrier before or after addition of the methylrosaniline chloride.

The percentage of methylrosaniline chloride dispersed on the carrier can be varied from minute but effective mold-inhibiting amounts when the carrier is incorporated in the feed up to the maximum amount the particular carrier will tolerate and still retain its capacity for distribution in the feedstuff. Conveniently, the amount will be that which will provide the minimum quantity necessary for effective mold control when the carrier is mixed with the feed in the amount commonly used. Effective mold control has been obtained by use of the invention when as little as 8 grams of methylrosaniline chloride per ton of feed is present in the feed. Thus, if the normal requirement of calcium carbonate for a particular feed is 10 pounds per ton, the amount of methylrosaniline chloride to be incorporated in the calcium carbonate for addition to this feed would be about 0.2% by weight based on the weight of the calcium carbonate. However, no exact critical range may be specified. Effective mold control for some feeds may be obtained with less than 8 grams of methylrosaniline chloride per ton and others may require more. In general, it is contemplated that the amount of methylrosaniline chloride dispersed on the carrier would be in the range of from 0.05% to 5% based on the weight of the carrier and that this material would then be incorporated in the feedstuff in the amount of from 0.1 to 25 pounds per ton.

Similarly, no exact critical range can be given for the acid component. The amount of acid employed is such that an improvement in mold-inhibiting effectiveness of the methylrosaniline chloride in the feedstuff is realized. Generally, from 0.1% to 10% by weight of the acid, based on the weight of the carrier, is added.

A preferred embodiment of the present invention is an additive for animal or poultry feeds comprising a finely-divided, acid-treated, non-toxic mineral carrier having dispersed thereon from 0.1% to 5.0% by weight, based on the weight of the carrier, of methylrosaniline chloride.

The mineral carrier is preferably calcium carbonate which has been treated with from 1% to 10% by weight, based on the weight of the calcium carbonate, of acetic acid.

In a typical method of manufacture, the methylrosaniline chloride and acid are both dissolved in the volatile solvent and the resulting solution is added to the dry carrier material in a suitable mixer. Alternatively, separate solutions of methylrosaniline chloride and acid may be added to the dry ingredients in any order. Mixing can be continued until the materials are thoroughly mixed and the volatile solvent is substantially evaporated. Where reaction occurs between the carrier and

acid some heat is given off which aids in the evaporation of the solvent. However, even without heating, a solvent which is sufficiently volatile, such as methyl alcohol, will substantially evaporate during mixing.

Thus, the present invention also provides a method of preparing an additive for poultry feeds which method comprises mixing finely divided calcium carbonate with from 0.1% to 10% by weight, based on the weight of calcium carbonate, of an acid which will form therewith a non-toxic, watersoluble calcium salt, and with a solution of methylrosaniline chloride in a volatile organic solvent, and continuing the mixing until the solvent is substantially completely evaporated.

The invention will now be further described and illustrated by way of two specific Examples.

Example 1

95.2 parts by weight of -325 mesh calcium carbonate and 1.7 parts by weight of diatomaceous silica were placed in a vented, two-speed, stainless steel blender which was provided with micronizing blades to provide a "plough-shear" blending action. The blender was turned on at low speed to mix the dry ingredients. In the meantime, 1.6 parts by weight of Gentian Violet (methylrosaniline chloride) and 1.0 parts by weight of acetic acid were dissolved in 1.5 parts by weight of methyl alcohol and 0.5 parts by weight of water. After the dry ingredients had mixed for about five minutes, the blender was turned on high speed and the solution was added slowly through an injector. After all the liquid had been added the blender was operated at high speed for another fifteen minutes to allow for thorough dispersion of the Gentian Violet throughout the product, for evaporation of methyl alcohol and water and for evolution of carbon dioxide. The blender was then turned to low speed and the product was discharged and packed into appropriate containers. This product contained about 1.6% by weight of Gentian Violet.

Example 2

The product of Example 1 is substituted for one pound of the ground limestone in the following poultry feed ration:

Ingredients	lb./ton
Ground yellow corn	1290
Soybean oil meal (50% protein)	640
Steamed bone meal	40
Ground limestone	20
Iodized salt	10
Minor amounts of vitamins, etc.	

Likewise, the product may be incorporated in other basal rations for poultry, swine, cattle and horses.

Similarly, Gentian Violet and acid is incorporated in other mineral and mineral salt carriers in the appropriate amounts for the specific needs.

It will be noted that there is very little feed dilution when this mold inhibitor is used. No toxic or growth inhibiting stress on the animal or fowl consuming the inhibited feed has been found. Gentian Violet is not absorbed from the intestine of the bird or animal and therefore it leaves no chemical residue which can become an undesirable component of human food. The Gentian Violet appears to be in the form of a surface coating on the carrier particles in intimate association with the acid or acid reaction products which have been formed in situ during the mixing operation.

Tests of anti-microbial activity indicate that Gentian Violet on the acid-treated mineral carrier is about ten times as effective in feeds as the same percentage of Gentian Violet dispersed on a carrier of vegetable origin such as corn cob meal.

WHAT WE CLAIM IS:—

1. An additive for animal or poultry feeds comprising a finely-divided, acid-treated, non-toxic mineral carrier having methylrosaniline chloride dispersed thereon.

2. An additive as claimed in claim 1, wherein the mineral carrier is a poultry feed supplement.

3. An additive as claimed in claim 1, wherein the mineral carrier comprises calcium carbonate.

4. An additive as claimed in any one of claims 1 to 3, wherein the mineral carrier has been treated with acetic acid.

5. An additive for animal or poultry feeds comprising a finely-divided, acid-treated, non-toxic mineral carrier having dispersed thereon from 0.1% to 5.0% by weight, based on the weight of the carrier, of methylrosaniline chloride.

6. An additive as claimed in claim 6, wherein the mineral carrier comprises calcium carbonate which has been treated with from 1% to 10% by weight, based on the weight of the calcium carbonate, of acetic acid.

7. An additive as claimed in any one of the preceding claims wherein the methylrosaniline chloride has been solvent deposited on the carrier from a volatile organic solvent.

8. An additive as claimed in claim 1, substantially as hereinbefore described.

9. An additive as claimed in claim 1 substantially as hereinbefore described in Example 1.

10. A poultry or animal feed product comprising a feed ration in intimate admixture with a finely-divided, acid-treated mineral carrier having methylrosaniline chloride dispersed thereon.



acid some heat is given off which aids in the evaporation of the solvent. However, even without heating, a solvent which is sufficiently volatile, such as methyl alcohol, will substantially evaporate during mixing.

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WHAT WE CLAIM IS:—

1. An additive for animal or poultry feeds comprising a finely-divided, acid-treated, non-toxic mineral carrier having methylrosaniline chloride dispersed thereon.

2. An additive as claimed in claim 1, wherein the mineral carrier is a poultry feed supplement.

3. An additive as claimed in claim 1, wherein the mineral carrier comprises calcium carbonate.

4. An additive as claimed in any one of claims 1 to 3, wherein the mineral carrier has been treated with acetic acid.

5. An additive for animal or poultry feeds comprising a finely-divided, acid-treated, non-toxic mineral carrier having dispersed thereon from 0.1% to 5.0% by weight, based on the weight of the carrier, of methylrosaniline chloride.

6. An additive as claimed in claim 5, wherein the mineral carrier comprises calcium carbonate which has been treated with from 1% to 10% by weight, based on the weight of the calcium carbonate, of acetic acid.

7. An additive as claimed in any one of the preceding claims wherein the methylrosaniline chloride has been solvent deposited on the carrier from a volatile organic solvent.

8. An additive as claimed in claim 1, substantially as hereinbefore described.

9. An additive as claimed in claim 1 substantially as hereinbefore described in Example 1.

10. A poultry or animal feed product comprising a feed ration in intimate admixture with a finely-divided, acid-treated mineral carrier having methylrosaniline chloride dispersed thereon.

11. A feed product as claimed in claim 10, wherein the acid-treated carrier contains from 0.1% to 5% by weight, based on the weight of the carrier, of methylrosaniline chloride, and the acid-treated mineral carrier is present in the feed product in an amount of from 0.1 to 25 pounds per ton of feed. 30
12. A feed product as claimed in claim 10 or claim 11, wherein the mineral carrier is a poultry feed supplement which has been treated with acetic acid. 35
13. A feed product as claimed in claim 10 or claim 11, wherein the mineral carrier is calcium carbonate which has been treated with acetic acid. 40
14. A poultry or animal feed product comprising a feed ration in intimate admixture with an additive as claimed in any one of claims 1 to 9. 45
15. A feed product as claimed in claim 10, substantially as hereinbefore described in Example 2. 50
16. A method of preparing an additive for poultry feeds which method comprises mixing finely divided calcium carbonate with from 0.1% to 10% by weight, based on the weight of calcium carbonate, of an acid which will form therewith a non-toxic, water-soluble calcium salt, and with a solution of methylrosaniline chloride in a volatile organic solvent, and continuing the mixing until the solvent is substantially completely evaporated.
17. A method as claimed in claim 16, wherein the volatile organic solvent is methyl alcohol.
18. A method as claimed in claim 16 or claim 17, wherein the calcium carbonate is mixed with a solution of methylrosaniline chloride and acetic acid in methyl alcohol.
19. A method as claimed in claim 16, substantially as hereinbefore described.
20. A method as claimed in claim 16, substantially as hereinbefore described in Example 1.
21. An additive as claimed in claim 1, whenever prepared by a method as claimed in any one of claims 16 to 20.
22. A poultry or animal feed product comprising a feed ration in intimate admixture with an additive as claimed in claim 21.

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