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[54] Title of Invention

Method for Stabilizing Acephate and Dry
Pesticide Preparation Containing Stabilized
Acephate

[57] Abstract

The present invention relates to a method for stabilizing acephate. The method comprises adding condensed sodium phosphate and/or synthetic silicic acid with alkylsilylated silanol groups on the surface to acephate or a dry pesticide preparation containing acephate, and relates to stabilized acephate added with condensed sodium phosphate and/or synthetic silicic acid with alkylsilylated silanol groups on the surface.

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Claims

What is claimed is:

1. A method for stabilizing acephate, comprising adding an effective amount of condensed sodium phosphate and/or an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface to acephate.
2. A method for stabilizing acephate in a dry preparation, comprising mixing acephate with an effective amount of condensed sodium phosphate.
3. A method according to claim 2, wherein a weight ratio between acephate and condensed sodium phosphate is 1: 0.01 to 1: 10.
4. A method for stabilizing acephate in a dry preparation, comprising mixing acephate with an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface.
5. A method according to claim 4, wherein a weight ratio between acephate and synthetic silicic acid with alkylsilylated silanol groups on the surface is 1: 0.05 to 1: 10.
6. A dry pesticide preparation, comprising acephate and an effective amount of condensed sodium phosphate and/or an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface.
7. A dry pesticide preparation, comprising acephate and an effective amount of condensed sodium phosphate.
8. A dry pesticide preparation, comprising acephate and an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface.
9. A dry pesticide preparation according to claim 7, wherein a weight ratio between acephate and condensed sodium phosphate is 1: 0.01 to 1: 10.
10. A dry pesticide preparation according to claim 8, wherein a weight ratio between acephate and synthetic silicic acid with alkylsilylated silanol groups on the surface is 1: 0.05 to 1: 10.
11. A dry pesticide preparation according to claim 7, wherein the preparation is dustable powder, non-floating dustable powder, wettable powder, water soluble powder, granule, water soluble granule, water dispersible granule, dry flowable, tablet or pill.
12. A dry pesticide preparation according to claim 7, wherein the preparation is dustable powder, non-floating dustable powder, water soluble powder, granule, water soluble granule, water dispersible granule, dry flowable, tablet or pill.
13. A dry pesticide preparation according to claim 8, wherein the preparation is dustable powder, non-floating dustable powder, wettable powder, water soluble powder, granule, water soluble granule, water dispersible granule, dry flowable, tablet or pill.

Description

Method for Stabilizing Acephate and Dry Pesticide Preparation Containing Stabilized Acephate

The present invention relates to a method for stabilizing acephate and a dry pesticide preparation containing stabilized acephate.

Acephate (O,S-dimethyl-N-acetylthiophosphoramidate) is a known compound with insecticidal activity as described at the first page of the Pesticide Manual Edition 8 (published by the British Crop Protection Council, 1987), and currently is used as an active ingredient for agricultural insecticide because it has effective control activity against various pests and diseases.

In contrast to other organophosphorus compounds with insecticidal activity, acephate is less stable in pesticide preparations. Therefore, acephate in the preparations may be decomposed violently with the change of storage conditions, thereby unable to effectively show activity all the time. Under these circumstances, there is a need for a method to impart stability to acephate in the preparations, and a need to develop a pesticide composition that can effectively play the insecticidal activity of acephate.

The inventors conducted extensive research on this subject and found that condensed sodium phosphate and/or synthetic silicic acid with alkylsilylated silanol groups on the surface can improve the stability of acephate in dry preparations, thereby completing the present invention.

Therefore, the present invention relates to a method for stabilizing acephate, i.e., adding an effective amount of condensed sodium phosphate and/or an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface to acephate; relates to a method for stabilizing acephate in a dry preparation, i.e., mixing acephate with an effective amount of condensed sodium phosphate and/or an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface; and a dry pesticide preparation containing acephate and an effective amount of condensed sodium phosphate and/or an effective amount of synthetic silicic acid with alkylsilylated silanol groups on the surface.

In the scope of the present invention, condensed sodium phosphate refers to a compound made by condensing two or more sodium phosphates via an oxygen atom, such as sodium polyphosphate, sodium tripolyphosphate or sodium pyrophosphate.

The synthetic silicic acid with alkylsilylated silanol groups on the surface used in the present invention can generally be prepared by the following method: use dialkyl dichlorosilane or alkyl trichlorosilane to alkylsilylate wet-method synthetic silicic acid obtained by adding an inorganic acid (such as hydrochloric acid and sulfuric acid) to a sodium silicate water solution or dry-method synthetic silicic acid obtained by using oxyhydrogen flame to decompose silicon tetrachloride. The alkyl is generally a lower alkyl group, such as methyl and ethyl, and the number of silanol groups on the surface is generally significantly reduced to 3 or less/nm². The synthetic silicic acid with alkylsilylated silanol groups on the surface obtained in this way are available on the market, such as Carples[®] CS-701 or Carplex[®] CS-801 produced by Shionogi Pharmaceuticals, Reolosil[®] MT-10 produced by Tokuyama Soda, and Aerosil[®] R972,

Sipernat[®] D17 or Sipernat[®] D10 produced by Degussa.

The amount of condensed sodium phosphate for stabilizing acephate is generally 0.01 to 10 parts by weight per part by weight of acephate, preferably 0.05 to 1 part by weight per part by weight of acephate.

The amount of synthetic silicic acid with alkylsilylated silanol groups on the surface for stabilizing acephate is generally 0.05 part by weight or more per part by weight of acephate, preferably 0.05 to 10 parts by weight per part by weight of acephate.

The content of acephate in a dry pesticide preparation described in the present invention is generally 0.5 to 99 (wt) %, preferably 5 to 95 (wt) %. The content of condensed sodium phosphate in the dry pesticide preparation is an amount that can stabilize acephate, generally 0.01 to 50 (wt) %, preferably 1 to 20 (wt) %, more preferably 1 to 10 (wt) %. The content of synthetic silicic acid with alkylsilylated silanol groups on the surface is an amount that can stabilize acephate, generally 1 to 99 (wt) %.

In addition to acephate and condensed sodium phosphate, a dry pesticide preparation using condensed sodium phosphate may further contain solid carriers for pesticide preparation in general. The solid carriers include, for example, mineral carriers such as kaolin, attapulgite, sericite, pyrophyllite, montmorillonite, zeolite, bentonite, acid clay, activated clay, serpentine, talc and diatomite, inorganic salts such as sulfate, nitrate, chloride and carbonate, inorganic carriers such as synthetic carriers (e.g. silica), or organic carriers such as sucrose, starch, dextrin, flour, soy flour, corn flour and wood flour.

A dry pesticide preparation using synthetic silicic acid with alkylsilylated silanol groups on the surface in the present invention may comprise acephate and synthetic silicic acid with alkylsilylated silanol groups on the surface, but may further contain solid carriers for pesticide preparation. The solid carriers include the carriers mentioned above.

The content of the solid carriers in the dry pesticide preparation can be generally 1 to 90 (wt) %, preferably 20 to 70 (wt) %.

A dry pesticide preparation in the present invention may contain adjuvants for pesticide preparation, for example at least one of surface active agents, coating agents, fragrance and known stabilizers, and their content is generally 0.1 to 35 (wt) %, preferably 2 to 10 (wt) %.

Surface active agents that can be used in the present invention include for example anionic surface active agents, such as alkyl sulfates (e.g. sodium lauryl sulfate), alkyl arylsulfonate (e.g. sodium alkylnaphthalene sulfonate), lignin sulfonate (e.g. sodium lignosulfonate), succinate derivatives, polycarbonate, polyethylene glycol alkyl aryl ether sulfonate and aromatic sulfonate formaldehyde condensate, or nonionic surface active agents, such as polyoxyethylene alkyl ether, polyoxyethylene alkyl aryl ether and polyoxyethylene aryl aryl ether.

A dry pesticide preparation in the present invention may further contain other insecticidal active ingredients, such as synthetic pyrethrin compounds, like Fenprothrin, Fenvalerate and S-fenvalerate.

A dry pesticide preparation in the present invention can be dustable powder, non-

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