

1

2,886,580

WATER-SOLUBLE ORGANIC COPPER COMPOUNDS

Karl Hintzmann, Leverkusen-Schlebusch, and Max Kramer, Koln-Stammheim, Germany, assignors to Farbfabriken Bayer Aktiengesellschaft, Leverkusen, Germany, a corporation of Germany

No Drawing. Application August 4, 1955
Serial No. 526,556

Claims priority, application Germany September 2, 1954

7 Claims. (Cl. 260—438)

This invention relates to water-soluble organic copper compounds and to a process for their production.

Copper pentachlorophenate, which is known to have a strong fungicidal action, is used in the treatment of textiles and is preferably produced on the fabric to be protected by a two-bath impregnation process. It can also be introduced in aqueous dispersion together with synthetic resins.

It is also known that quaternary relatively highly alkylated benzyl-ammonium compounds of the cetyl benzyl dimethyl ammonium chloride type are used as emulsifiers for preservatives and particularly for pentachlorophenol.

It is an object of the present invention to provide new and useful water-soluble organic copper compounds having a strong fungicidal action.

Another object is to provide a process for making water-soluble organic copper compounds having a strong fungicidal action.

Further objects will become apparent from the following description.

It has now been found that products with particularly valuable fungicidal properties are surprisingly obtained if copper salts of pentachlorophenol are reacted with excess organic quaternary nitrogen compounds, such as cetyl benzyl dimethyl ammonium chloride. The copper pentachlorophenate can also be formed in situ from an alkali metal pentachlorophenate and the equivalent amount of a copper salt during the reaction with the said organic quaternary nitrogen compounds.

Examples of organic quaternary nitrogen compounds which are suitable according to the invention are compounds which can be represented by the formula:



in this formula, R_1 and R_2 represent lower aliphatic radicals having 1 to 4 carbon atoms, R_3 is a long-chain paraffin having 8 to 24 carbon atoms, preferably a lauryl, stearyl, or cetyl radical, R_4 stands for a benzyl radical which may be substituted in the aromatic nucleus by lower aliphatic radicals, halogen atoms or nitro groups, X means an anion, e.g. chlorine, bromine, or a sulfuric acid radical.

The aforesaid organic quaternary nitrogen compounds are used in an excess of 0.2–10 mols, preferably 1–5 mols, referred to copper pentachlorophenate. The reaction is carried out in the melt at a temperature between 20 and 100° C., preferably 30–60° C.; a small amount of water or alcohol may be present in the reaction.

The products of the invention give a colloidal solution in water and are even substantively absorbed on cellulose. Consequently, the strong fungicidal action is maintained during soaking. The treated textile fibres are extremely resistant to the influence of weather. The effects produced in hitherto known manner by means of the two-bath process are therefore clearly inferior to those obtained with the copper compounds which can be

2

produced by the process of the present invention. Yet another advantage of the product obtained is that the treated materials do not assume the brown colouring of the copper pentachlorophenate, but remain unaffected with their natural colour.

The following examples further illustrate the invention but do not limit same in any way:

Example 1

1 part of dry copper pentachlorophenate is heated with 3 parts of cetyl benzyl dimethyl ammonium chloride to a temperature of 45° C. while stirring, heating being continued until a homogeneous water-soluble paste is formed. This paste, after being diluted with water, can be used without any further treatment for the treatment of cellulose fibres.

Example 2

2.8 gm. of copper formate are intimately mixed with 25.0 gm. of cetyl benzyl dimethyl ammonium chloride while heating to 45° C. 10.4 gm. of sodium pentachlorophenate in finely powdered form in 10 cc. of water are thereafter added and the temperature is kept at about 45° C. until the paste is homogeneous and is soluble in water without leaving any residue. Without further preparation, a dilute solution thereof can be used for impregnating textile material containing cellulose.

Example 3

If the procedure indicated in Example 2 is followed, but with a final addition of 1 gm. of colloidal silica in order to improve the resistance of the product to ageing and increase in temperature, there is obtained a paste which is stable for a particularly long time and which has all the properties possessed by the compounds prepared as described in Examples 1 and 2.

Example 4

27.0 g. of stearyl benzyl dimethyl ammonium chloride are melted with the addition of 4.6 g. of copper sulfate and with stirring. The temperature is kept at 50° C. and 10.4 g. of sodium pentachlorophenate are added with stirring together with 10.0 cc. of water. Stirring is continued until the paste has become homogeneous and completely water-soluble.

Example 5

To 10.5 g. of copper acetate there is added a solution of 21.6 g. of cetyl benzyl dimethyl ammonium chloride in 23.9 cc. of water. The mixture is heated up to 45° C. and 10.4 g. of finely powdered sodium pentachlorophenate are added with stirring. The temperature is maintained and the paste stirred until it has become homogeneous and dissolves in water without a residue.

We claim:

1. A process for the production of water-soluble organic copper compounds, which comprises mixing copper pentachlorophenate with an excess of a quaternary alkylated benzyl ammonium compound of the general formula:



R_1 and R_2 representing a lower aliphatic radical having 1 to 4 carbon atoms, R_3 being a long-chain paraffin having 8 to 24 carbon atoms, R_4 being a member selected from the group consisting of a benzyl radical and a chlorinated benzyl radical and X is an anion, until a homogeneous, water-soluble paste is obtained.

2. A process as claimed in claim 1, wherein the reaction is carried out in the melt at a temperature between 20–100° C.

3

3. A process as claimed in claim 1, wherein the reaction is carried out in the melt at a temperature between 30-60° C. in the presence of a small quantity of water.

4. A water soluble organic copper compound obtained by the process claimed in claim 1.

5. A water soluble cetyl benzyl dimethyl ammonium chloride copper pentachlorophenate compound obtained by the process claimed in claim 1.

6. A water soluble stearyl benzyl dimethyl ammonium chloride copper pentachlorophenate compound obtained by the process claimed in claim 1.

4

7. A water soluble lauryl benzyl dimethyl ammonium chloride copper pentachlorophenate compound obtained by the process claimed in claim 1.

References Cited in the file of this patent

UNITED STATES PATENTS

2,264,150	Hueter	Nov. 25, 1941
2,309,592	Hueter	Jan. 26, 1943
2,651,648	Meyer	Sept. 8, 1953