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OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Silver-Copper Zeolite  
DP Barcode: D157179  
ID No: 59824-R

FROM: Douglas J. Urban, Acting Chief  
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*Douglas J. Urban*  
9/15/92

According to Kanebo Zeolite USA's label for silver-copper zeolite, the chemical may be used in the following manufacturing processes: fibers (indoor nonfood); plastic films and molded plastics (indoor nonfood); paper (aquatic nonfood industrial); paint (indoor nonfood); adhesives (indoor nonfood); and water treatment (aquatic nonfood industrial).

EEB requires four tests to support the registration of chemicals with indoor nonfood uses: 71-1(a) avian acute oral, preferably with the bobwhite quail; 71-2(a) avian dietary, preferably with the bobwhite quail; 72-1(c) fish acute toxicity, preferably with the rainbow trout; 72-2(a) aquatic invertebrate toxicity, preferably with *Daphnia magna*. Three additional tests, estuarine/marine acute studies, are currently required to support uses in once-through cooling towers, oil recovery drilling muds/packer fluids, secondary oil injection waters and pulp and paper mills. Because of silver-copper zeolite's paper processing uses and because the label does not specify the water treatment uses (leaving it uncertain as to whether or not the chemical may be used in once-through cooling towers, etc.) 72-3(a) fish acute toxicity, preferably with the sheepshead minnow; 72-3(b) mollusc acute toxicity, preferably with *Crassostrea virginica*, and 72-3(c) shrimp acute toxicity, preferably with the mysid shrimp are required.

Kanebo Zeolite USA, Inc. submitted 5 studies to support the registration of Bactekiller AC, silver-copper zeolite, an industrial use antimicrobial:

71-2, Mallard duck LC <sub>50</sub>	{MRID No. 416158-11}
71-2, Bobwhite quail LC <sub>50</sub>	{MRID No. 416158-12}
72-1, Bluegill sunfish L <sub>50</sub>	{MRID No. 416158-13}
72-1, Rainbow Trout LC <sub>50</sub>	{MRID No. 416158-14}
72-2, <i>Daphnia magna</i> EC <sub>50</sub>	{MRID No. 416158-15}

It should be noted that because Kanebo tested the end-use products, if the concentration of the active ingredients (4±1% silver and 6±1% copper) are raised, additional testing may be required.

Neither the mallard nor the quail acute toxicity study fulfills guideline requirements. The studies may be upgraded if the chemical analysis of the feed is submitted. The nominal concentration indicates that silver-copper zeolite is practically nontoxic to waterfowl and upland gamebirds. The LC<sub>50</sub> > 5620 for both species.

An acute oral LD<sub>50</sub> with the bobwhite quail is still required.

The aquatic studies also do not fulfill guideline requirements. The results of the analysis for both silver and copper in the test solutions indicate that the concentrations of the metals were much less than desired. Silver levels were often not detected. This may be due to the inherently low solubility of these metals or to insufficient detection methods. The study does, however, indicate that silver-copper zeolite is very highly toxic to aquatic invertebrates and has a similar toxicity to aquatic invertebrates to both silver zeolite and silver-zinc zeolite.

The studies indicate that silver-copper zeolite is very highly toxic to aquatic invertebrates (EC<sub>50</sub> = .60 ppm), moderately toxic to warmwater fish (LC<sub>50</sub> = 3.4 ppm), and slightly toxic to coldwater fish (LC<sub>50</sub> = 100 ppm). The *Daphnia magna* and one fish study (rainbow trout preferred) should be repeated and the actual content of the various metals in the test solution more accurately measured.

Estuarine/marine testing is also required: 72-3(a) fish acute toxicity, preferably with the sheepshead minnow; 72-3(b) mollusc acute toxicity, preferably with *Crassostrea virginica*; and 72-3(c) shrimp acute toxicity, preferably with the mysid shrimp.

Kanebo mentioned that it would be "willing to delete the proposed uses for the products to treat water against slime producing microorganisms in recirculating waters, pending review of the

data." EEB points out that even if Kanebo submits a label that specifies that the allowable water treatment uses of silver-copper zeolite are such that the chemical may not be used in once through cooling towers (or drilling muds/packer fluids or secondary oil recovery injection waters), the company still must delete the paper production use in order to be exempt from performing the estuarine/marine testing. Kanebo would then only need to submit the results of the chemical analysis from the two avian dietary studies, perform an avian LD<sub>50</sub>, and repeat the acute aquatic studies with the rainbow trout and *Daphnia magna* (using silver-copper zeolite) in order to satisfy the data requirements for silver-copper zeolite.

The attached data table reiterates the current status of the data requirements for silver, silver-zinc, and silver-copper zeolite. If there are any questions, please contact Heather Mansfield (305-5064).