

# AGMIN NEWSLETTER No. 231

## Some Frequently Encountered Objections to the Use of Algicides

### 1. Copper Sulphate “works and its cheap”

Despite the fact that copper sulphate has been used for more than 50 years, the NRA has **not registered** this raw material as an approved algicide.

- Copper Sulphate is not an efficient algicide, especially in hard water
- Copper Sulphate requires at least 1.0 ppm added copper to be effective, up to 3.0 ppm in hard water
- Copper Sulphate creates high load of copper in the sediments, due to precipitation of copper hydroxide
- Copper Sulphate is more toxic to fish and invertebrates than chelated copper in Cupricide®.

### 2. Copper is “a toxic heavy metal”

- Copper is an **essential micronutrient** for all plants, animals and humans
- Copper-chelate of Cupricide® is rapidly and preferentially absorbed by algae within 3 hours
- Copper-chelates are strongly absorbed by clay particles within 24 – 48 hours and are thereby immobilised in the sediments
- Copper concentrations in water treated with Cupricide® return to ambient, background levels within 24 – 48 hours
- Ambient copper concentrations in dams and water storages are in the range 10-50 µg/L, which is not harmful to fish or aquatic plants
- WHO has set an upper limit of 1000 µg/L copper in drinking water.

### 3. Treating Algal Blooms “will release toxins” into water

- Harmful algal blooms of blue-green algae release toxins into water even without treatment, since 10 – 20% of the total cells die or become leaky through natural causes during a bloom
- Toxin production is directly proportional to the total cell numbers of toxic algae
- It is preferable to kill algal blooms at an early stage of development, when cell numbers are less than 15,000 cells/mL (Alert Level 2)
- Algal blooms can double in cell counts within 3 days and increase ten-fold in 10 days
- An algal bloom at Alert Level 2 will grow to 140,000 cells/mL in 10 days, releasing toxins from 10% (14,000 cells/mL) of the total mass
- A strategy “to do nothing” is not a responsible approach to reducing the risks as far as reasonably practicable (see Section 6)
- The continuous use of carbon filters to remove toxins is very expensive compared to the costs of using Cupricide®.

#### 4. Copper is “toxic to fish”

- Copper at the required level is an essential micronutrient for fish
- Ambient total copper concentrations in fresh-waters, especially in contained water-bodies, fall in the range 10-50 µg/L
- Chemical speciation of copper is an important factor in determining toxicity; copper is present as free copper ions, inorganic complexes, organic chelates, clay-sorbed fractions and hydrous metal oxides
- Fish can tolerate certain levels of copper, depending on the water quality, chemical speciation, exposure times and fish species
- Exposure times to copper for fish in waters treated with Cupricide® is <24 hours, since the added copper is rapidly removed within this period
- Copper sulphate is five-times more toxic to fish than Cupricide®.

#### 5. Copper Sulphate “costs less to use”

- Copper sulphate requires 5 – 10 times higher copper concentration when compared to Cupricide®
- Copper sulphate is inactivated by hard water; only 30 – 60% of the added copper is algicidal
- Copper sulphate is difficult and hazardous to dispense as crystals and is slow to dissolve; this increases the total costs of application
- Copper sulphate leaves large residues of copper hydroxide on the sediments, thereby increasing the environmental costs
- Cupricide® is a superior algicide on the basis of:
  - Algicidal effectiveness (5 – 10 times better),
  - Ease of application: liquid vs solid,
  - Negligible environmental impact on fish, invertebrates and sediments,
  - Total costs of achieving the desired outcome.

#### 6. We can “rely on filtration systems” to remove algal blooms

- A standardised “risk assessment” procedure should be used to reduce the risks from harmful algal blooms
- Risk is the product of Likelihood x Consequence
- What is the likelihood of a hazardous event from algae reaching the filtration plant
- What are the consequences of blockage of water treatment plants and of toxin release into municipal water supplies
- Can the risk be reduced, as low as reasonably practicable, by controlling algal blooms
- What are the costs and consequences of using expensive carbon filtration systems compared to using Cupricide®.



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