



CRC for Water Quality  
and Treatment

## USING ALGICIDES FOR THE CONTROL OF ALGAE IN AUSTRALIA

Registered Products for Use Against  
Algae and Cyanobacteria in Dams,  
Potable Water and Irrigation Water  
Supply Systems, in Australia.

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Registered Products for Use Against Algae and Cyanobacteria in Dams, Potable Water and Irrigation Water Supply Systems, in Australia.

Prepared by Jenny House, Michael Burch CRC for Water Quality and Treatment

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## Introduction

Using algicides to control algae or cyanobacteria is a long-standing practice for the control of problems caused by these organisms. When used appropriately they can provide immediate short-term and cost-effective control.

This document is intended to provide a summary of the algicides or chemical products that may be used in Australia for the control of algae in specified areas of either potable water, dams (farm dams), tanks or irrigation supplies. There is also a description of the process of registration of these chemicals and the conditions associated with their use as algicides.

It is important to be aware of the responsibilities associated with use of algicides as with any other chemicals under any local regulations, particularly in relation to occupational health and safety, water quality and environmental protection.

## Types of Algicides

The chemicals currently registered for use against different types of algae are listed in two tables (1&2). **Table 1** contains all of the chemicals that are currently registered **Australia-wide**, and includes a range of copper compounds and one other halogen-based biocide. **Table 2** contains products that have a **restricted** registration, either by geographic location for application, or by specific user. These chemicals include a group

of simazine-based herbicides, which are registered for use in Western Australia only, and four specific registrations of copper sulphate by prescribed individual users.

These tables provide summary information only. Further details can be obtained from the appropriate label for each product, from relevant Material Safety Data Sheets, and also from the web sites of manufacturers listed. It cannot be emphasised too strongly that the chemicals are to be used only in accordance with the respective manufacturer's label conditions. It is recommended that users read all directions, including any precautionary statements, safety directions and first aid instructions before use.

The registered algicides basically fall into three groups of compounds – copper compounds, simazine compounds and other compounds.

Eight copper compounds were registered at the time of preparation of the list (January 2002). Four of these compounds are generally available (Table 1) and four are a type of specific individual registration (Table 2). In the latter case, four agencies have gained exclusive registration for their own prescribed use. In these cases the registrants buy raw commodity copper sulphate which is not otherwise supplied as an algicide and apply it under the conditions of their labels for their water storages.

The only other nationally registered compound is a halogen-based biocide registered for use for the control of algae in irrigation lines (see Table 1).

The categories/situations for use require some clarification. In particular, the category 'dam' on the labels of chemicals listed here is intended to mean 'farm dams' as opposed to large water storages dedicated for public drinking water supplies (NRA advice).

## Environmental Considerations and Approvals

Many algicides are based on copper, which is a toxic heavy metal in the aquatic environment. It can affect non-target species (bacteria, fish, zooplankton, other macroinvertebrates). In many cases it may not be necessary to seek clearance from state agencies to use a registered chemical,

## Tips for Algicide Application

Manufacturers provide advice on the use and application of their products and it is essential to comply with label conditions and recommendations. The following are tips to optimise the use of algicides to treat cyanobacteria.

Cyanobacteria tend to accumulate near the surface because of their buoyancy, and under calm conditions the highest concentration of cells will usually be found there. In extreme situations, this leads to the formation of green surface scums. The cyanobacteria will also tend to accumulate in the surface mixed layer if strong thermal stratification is present. It is possible to take advantage of these buoyancy characteristics and accumulation in the surface layer to achieve optimum dosing and minimise chemical use.

The following tips are based on experience in the treatment of cyanobacteria in particular, and are intended to help determine appropriate dose rates and increase efficiency of application.

- **Determine whether the reservoir is stratified and assess how strong the separation of the surface layer is** – this needs to be done as close as possible prior to the time of treatment.
- **If the reservoir is strongly stratified (diagram right), calculate the total amount of algicide required, based on the dose rate needed to treat the volume of the surface layer** – this is where most of the cyanobacteria will be if the stratification is strong.
- **Start the application early in the morning** – cyanobacteria tend to be most buoyant at this time and are likely to be near the surface if conditions are calm.
- **If possible, apply the treatment under calm conditions** – under windy and well-mixed conditions, the cells or colonies will be mixed deeper throughout the water column and are likely to be exposed to a lower copper concentration than if they are right at the surface where the algicide is applied.
- **Treat the scum** - if scums can be identified, treatment should be concentrated in these areas.

It may be necessary to refine these procedures by trial and error for individual situations.

provided the use is in accordance with the label, and an impact "off-site" is unlikely. Notwithstanding this, before using an algicide it is important to carefully assess the circumstances of its intended use. For example, if the chemical is to be added to an on-stream water storage, where the treated water may

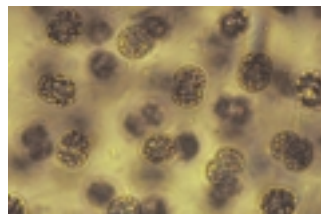


be discharged via a downstream release, it would be essential to seek further advice before treatment. In general this would also be specified on the label. In the case where

a dedicated storage does not have releases, it may however have other beneficial environmental uses, eg. fish and other aquatic life, that may need to be protected.

In these circumstances it is advisable to seek advice from the

relevant local authority (eg. Environmental Protection Agency, Chemical Standards Branch or similar, in State Agriculture or Primary Industries Departments) as to whether they would impose any restrictions or conditions upon the use of an algicide in the particular case. It is



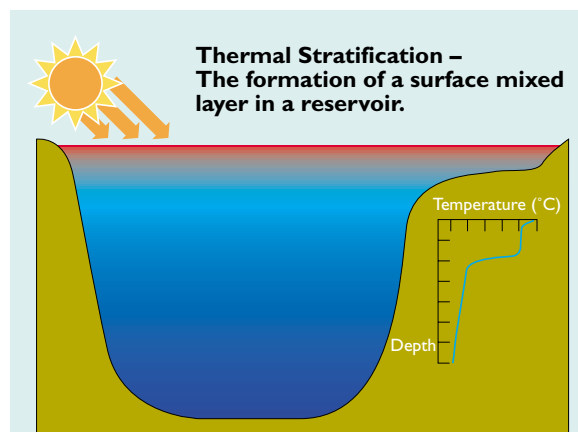
important to note that in some states there are prescribed notification requirements to health and environment agencies in all cases where algicides are used in public water supply.

## Application and Follow-up Monitoring

The product label gives clear advice on the application of the chemical. If further advice is required, it should be sought from the manufacturer.

When algicides are used to treat toxic or odorous algal blooms, the algal cells lyse releasing the toxin/odour into the water body. It is therefore important to consider the intended use of the water directly after treatment. This would be particularly relevant if the water were to be used, for example, for human consumption, stock watering or irrigation (including agriculture).

Toxins and odours degrade over time. Although there is little information on the withholding period, it could exceed 14 days for toxin breakdown in lakes (Jones and Orr, 1994).



*Thermal stratification is the formation of discrete layers of different density as a result of surface heating, and it can have a big impact on the dispersal of a chemical at the surface of a reservoir.*

*A temperature difference of >3-4°C over a depth of 2-3 metres indicates a strong separation of the water column into layers.*

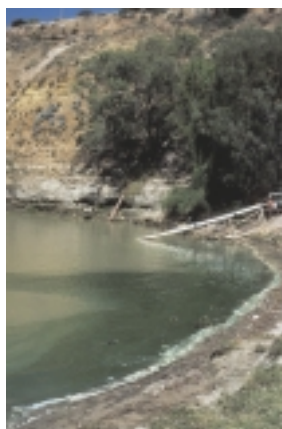
*A gradient of only 1-2°C suggests quite weak stratification. With strong stratification, a temperature gradient will persist overnight (and possibly over several days or longer), indicating resistance to normal night-time cooling and mixing.*

*Where strong and persistent stratification is present, the algicide applied at the surface will tend to disperse only in the surface layer. In this case, if the algae are also mostly restricted to this layer, it is possible to calculate the dose rate based on the volume of this layer only.*

Follow-up monitoring of toxins/odours after algicide treatment may be necessary to determine when the water is acceptable for use. Monitoring of copper residuals may also be appropriate.

## Registration of Agricultural Chemicals in Australia

All agricultural chemical products must be registered before they can be supplied, distributed or sold anywhere in Australia, under the Agricultural and Veterinary Chemicals Code Act 1994 (AGVET). The body responsible for registering agricultural (and veterinary) chemical products is the National Registration Authority for Agricultural and Veterinary Chemicals (NRA). The NRA must also approve the active constituents of a product and the label for a product's container (NRA, 1996).



Algicides come under the definition of an 'agricultural chemical' in the Agricultural and Veterinary Chemicals Code 1994. This means that algicide products must be registered by the NRA (or be subject to a permit) before being sold, supplied or used in Australia.

In Australia, there is a two-stage process for the registration and use of an agricultural chemical.

The first stage requires NRA registration of the chemical product or formulation for sale. The product label is the legal registration document allowing sale for the purpose listed on the label (Jones and Burch, 1997). Data required for registration includes information on the chemistry and manufacture, toxicology, metabolism and toxicokinetics, residues and overseas trade, occupational health and safety, environmental studies, efficacy and safety and other special data requirements.

Registration ensures that agricultural and veterinary chemical



products meet prescribed standards before they are sold and distributed in Australia. The assessment criteria include the effectiveness of the product, safety for target animals and

plants, safety for operators and other exposed persons, safety for consumers and users (food residues), safety for the environment, quality and suitability of the active constituents, labelling, packaging and disposal (NRA, 1996).

The second stage of registration relates to the use of the registered chemical. Individual state agencies, usually the Agriculture agency and/or relevant Environment Protection Authority, have the responsibility to determine whether the

use of the chemical, after sale, complies with relevant state legislation. In the case of chemicals added to water bodies, the legislation is normally in the form of a Clean Waters or Environment Protection Act (Jones and Burch, 1997).



## References and Further Reading

Hrudey, S., Burch, M., Drikas, M. and Gregory R., 1999. Remedial Measures. Ch 9, pp 275-312 in I. Chorus and J. Bartram (Eds). Toxic Cyanobacteria in Water: A guide to their public health consequences, monitoring and management. E&FN Spon, London.

Jones, G. and Burch, M., 1997. Algicide and Algistat Use in Australia. Occasional Paper, ARMCANZ Sub-Committee on Water Resources, Canberra.

Jones, G. and Orr, P., 1994. Release and degradation of microcystin following algicide treatment of a *Microcystis aeruginosa* bloom in a recreational lake, as determined by HPLC and protein phosphatase inhibition assay. *Water Research*. 28(4), 871-876.

National Registration Authority for Agricultural and Veterinary Chemicals, 1996. The Requirements Manual for Agricultural Chemicals. NRA, Canberra.

NRA Website. [www.affa.gov.au/nra/welcome.html](http://www.affa.gov.au/nra/welcome.html)



Name Manufacturer/ Web site/ e-mail	NRA No	Active Constituent	Pack Size	Liquid/ Solid	Descrip- tion (as per label)	Target Organism, and Category/Situation of use	Application Rates
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### Copper Compounds

Yates Bluestone Copper Sulphate Aurthur Yates & Co Pty Ltd <a href="http://www.yates.com.au">http://www.yates.com.au</a>	45027	250 g/kg copper as copper sulphate	1 kg	Solid	Not given	For the control of algae (green slime) in dams	4 g per 1000 L water
Coptrol Aquatic Algicide Ruth Consolidated Industries Pty Ltd <a href="mailto:Info@rci.com.au">Info@rci.com.au</a>	31030	107 g/L copper present as mixed copper chelates	20 L	Liquid	Aquatic algicide	For the control of most types of blue-green algae, in irrigation canals, farm dams, industrial ponds, ornamental ponds, raceways, rice paddies & potable water supplies	0.2 – 0.5 mg/L copper for free floating algae 0.5 – 1 mg/L copper for filamentous algae 0.5 – 1 mg/L copper for <i>Chara</i> and <i>Phormidium</i> algae
Cupricide Algicide Agmin Chelates Pty Ltd <a href="http://www.agmin.com.au">http://www.agmin.com.au</a>	52384	105 g/L copper present as copper-ethanolamine complexes	1,5,20, 200 & 1000 L	Liquid	Algicide	For the control of algae in lakes - potable water reservoirs, farms, fish and industrial ponds, fish hatcheries, rice paddies, raceways, crop & non-crop irrigation conveyance systems, ditches, canals & laterals	0.2 – 0.5 mg/L copper for planktonic algae 0.5 – 1.0 mg/L copper for filamentous algae, <i>Chara</i> and <i>Nitella</i>
Cupricide 110 Algicide Agmin Chelates Pty Ltd <a href="http://www.agmin.com.au">http://www.agmin.com.au</a>	52542	110 g/L copper present as mixed copper-ethanolamine complexes	1,5,20, 200 & 1000 L	Liquid	Algicide	For the control of algae in lakes - potable water reservoirs, farms, fish and industrial ponds, fish hatcheries, rice paddies, raceways, crop & non-crop irrigation conveyance systems, ditches, canals & laterals	0.2 – 0.5 mg/L copper for planktonic algae 0.5 – 1.0 mg/L copper for filamentous algae, <i>Chara</i> and <i>Nitella</i>

### Other Compounds

YM-FAB Nylate Halogen Based Broad Spectrum Biocide Post Harvest Chemicals – Division of Wobelea Pty Ltd	47352	920 g/kg Bromo chloro dimethyl hydantoin	Not given	Solid	Halogen based broad spectrum biocide	For control of algae in irrigation lines	For initial treatment: 1.75–2.63 g per 100 L water For monthly maintenance: 0.875–1.75 g per 100 L water
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### Simazine Compounds (registered for use as algicides in Western Australia only)

Nufarm Flowable Simazine Liquid Herbicide Nufarm Ltd <a href="http://www.austarab.com.au/nufarm/nufarm_operations.html">http://www.austarab.com.au/nufarm/nufarm_operations.html</a>	31855	500 g/L Simazine	20,200 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL per 1000 L water
Nufarm Simazine 900 DF Herbicide Nufarm Ltd <a href="http://www.austarab.com.au/nufarm/nufarm_operations.html">http://www.austarab.com.au/nufarm/nufarm_operations.html</a>	31856	900 g/kg Simazine	10, 15, 50x10 kg	Solid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	2 g per 1000 L water
Farmoz Simazine 500 Flowable Herbicide Farmoz Pty Ltd	40546	500 g/L Simazine	20 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL per 1000 L water
Farmoz Simazine 900 WDG Herbicide Farmoz Pty Ltd	46811	900 g/kg Simazine	Not given	Solid, granules	Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	2 g per 100 L water
Davison Simazine 900 WDG Herbicide Joyce Rural Pty Ltd (Davison Industries) <a href="http://www.joyce.com.au">http://www.joyce.com.au</a>	47284	900 g/kg Simazine	10 kg	Solid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	2 g per 100 L water
Flowable Herbicide Simamax Flowable Artferm Pty Ltd	48573	500 g/L Simazine	20 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL per 1000 L water

Table 1: Chemicals Registered for the Control of Algae in Australia

Table 2: Chemicals Registered for the Control of Algae – Restricted Users or Location

Table 2: Chemicals Registered for the Control of Algae – Restricted Users or Location

Name Manufacturer/ Web site/ e-mail	NRA No	Active Constituent	Pack Size	Liquid/ Solid	Description (as per label)	Target Organism, and Category/Situation of use	Application Rates
Flowable Gesatop 500 SC Liquid Herbicide Novartis Crop Protection Australasia Pty Ltd <a href="http://cp.au.novartis.com">http://cp.au.novartis.com</a>	48659	500 g/L Simazine	5, 20, 200 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL per 1000 L water
Sipcam Pacific Amizina 900WDG Herbicide Sipcam Pacific Australia Pty Ltd	50166	900 g/kg Simazine	1, 5 kg	Solid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	2 g per 100 L water
Novartis Simazine Flowable 500 SC Liquid Herbicide Novartis Crop Protection Australasia Pty Ltd	50021	500 g/L Simazine	20 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL per 1000 L water
Acres Simazine Flowable Liquid Herbicide Selchem Pty Ltd	52617	500 g/L Simazine	20L 200 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL/1000 L water
Crop Care Simazine Flowable Herbicide Crop Care Australasia Pty Ltd <a href="http://www.cropcare.com.au">http://www.cropcare.com.au</a>	52582	500 g/L Simazine	20 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL/1000 L water
Dalgety Simazine DF Herbicide Wesfarmers Dalgety Ltd <a href="http://www.dalgety.wesfarmers.com.au">http://www.dalgety.wesfarmers.com.au</a>	52613	900 g/kg Simazine	10, 15 kg	Solid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	2 g/1000 L water
Dalgety Simazine Flowable Liquid Herbicide Wesfarmers Dalgety Ltd <a href="http://www.dalgety.wesfarmers.com.au">http://www.dalgety.wesfarmers.com.au</a>	52614	500 g/L Simazine	20, 200 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL/1000 L water
Simagranz Herbicide Crop Care Australasia Pty Ltd <a href="http://www.cropcare.com.au">http://www.cropcare.com.au</a>	49965	900 g/kg Simazine and related triazines	15 kg	Solid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	2.2 g/1000 L water
Simazine 500 Flowable Herbicide Dow Agrosiences Australia Ltd	51634	500 g/L Simazine	5, 20 L	Liquid	Group C Herbicide	For the control of filamentous blue-green algae in dams, tanks and troughs, in WA only	4 mL/1000 L water
<b>Copper compounds registered by a specific user (not available for general sale)</b>							
SA Water Copper Sulphate SA Water Corporation	51854	250 g/kg copper present as copper sulphate pentahydrate	25, 500, 1000 kg	Solid	Algicide	For the control of blue green algae (cyanobacteria) in water supply reservoirs	1–2 mg/L
Melbourne Water Cupricide Algicide Melbourne Water Corporation	52606	250 g/kg copper present as copper sulphate pentahydrate	Comme rcial Pack Size	Solid	Algicide	For the control of blue green algae (cyanobacteria) in water supply reservoirs	NA
SWWA Copper Sulphate Algicide South West Water Authority	54168	250 g/kg copper present as copper sulphate pentahydrate	Comme rcial Pack Size	Solid	Algicide	For the control of blue green algae (cyanobacteria) in water supply reservoirs	NA
South Gippsland Water Copper Sulphate South Gippsland Water Authority	53633	250 g/kg copper present as copper sulphate pentahydrate	Comme rcial Pack Size	Solid	Algicide	For the control of blue green algae (cyanobacteria) in water supply reservoirs	NA

The list of registered chemicals was obtained from the National Registration Authority (NRA) and was complete at the time of this document's publication. However, there are regular updates on a product's registration status and also the inclusion of newly registered products. Please refer to the NRA website database (PUBCRIS) for these updates. The pack sizes given in Tables 1 and 2 were taken directly from the relevant label, however for some chemicals there are other pack sizes available. Please refer to the manufacturer if you require further information on pack sizes.