

## Water Colourants and Prevention of Algae Blooms

### Overview

Pure water is clear and colourless, but a layer of pure water appears slightly blueish. To see it one has to look into a deep water column, or at least into a white pail full of water. In the ocean water appears as a very dark navy blue. Absorption, and to some extent the scattering of light, are the reasons why water has a blueish tint. The blue wavelengths of light in water are scattered, like the scattering of blue light in the sky. Absorption in water is strong in the red, orange, and yellow part of the light spectrum and weak in the blue, indigo, and violet part of the light spectrum, thus red light is absorbed quickly leaving water blue. When sunlight hits the ocean, some of the light is reflected directly back, but most of it penetrates the ocean surface and interacts with the water molecules that it encounters. Water molecules can vibrate in three different modes when they interact with light. Almost all sunlight (red, yellow, and green wavelengths) that enters the deep ocean is absorbed by water molecules, except when very close to the coast. The red, orange, yellow, and sometimes green wavelengths of light are absorbed, so the remaining light seen consists of the shorter wavelengths of blues and violets. This is the main reason for why the ocean's color is blue.

Pond dye is a liquid colouring agent designed to improve water quality by blocking UV light and preventing algae development, enhance the beauty of the pond or pool, and provide a natural pond shade.

Water colourant has certain benefits for ponds, dugouts, or even pools! In addition to the

conversion of a murky body of water into a beautiful turquoise oasis straight from your dreams, it can also decrease algae development, algae blooms, weed growth, and defend fish in the body of water from birds.

### Why blue water colouration prevents algae and weed development?

- As we already know water molecules absorb red, yellow, and partially green lights, while blue lights penetrate water to a [greater depth](#).
- The colours of visible light do not carry the same amount of energy. Violet has the shortest wavelength and therefore carries the most energy, whereas red has the longest wavelength and as such carries the least amount of energy. Thus, blue lights carry a substantial amount of energy.
- Plants and algae [contain chlorophyll](#), a pigment that gives plants their green colour, and helps plants create their own food through [photosynthesis](#).
- During photosynthesis, chlorophyll absorbs energy from blue and red light waves, and reflects green light waves, making the plant appear green.
- There are two types of chlorophyll: *a* and *b*. Chlorophyll *a* absorbs light in the blue-violet region, while chlorophyll *b* absorbs red-blue light. Neither *a* nor *b* absorb green light; because green is reflected or transmitted, chlorophyll appears green.
- Chlorophyll absorbs blue light waves (energy), which are converted into chemical

energy that supports plant growth.

- Water coloured with blue pigment reflects the blue portion of the light away from the surface.
- The chlorophyll in plants works best in blue or red light. Therefore the reflection of blue light by the pigment inhibits plant growth.
- Algae and weeds require sunlight in order to grow. By minimizing the amount of blue spectrum wavelengths from sunlight that are available, we can reduce submerged aquatic plant growth.
- It is important to understand that water colourant prevents or slows down plant and algae growth, but does not kill them as algaecides or herbicides do.
- Note that pond colourants do not inhibit the growth of emergent plants (e.g. cattails) or floating plants (e.g. water lily).

### Why water colourants protect fish?

When water colour is darkened, it is more opaque to overhead bird predators. Birds are one of the most prominent predators to fish. While blocking sunlight, the colouring of ponds or dugouts can also help camouflage fish in the pond, making it harder for birds to see under the water's surface.

As temperatures increase, dissolved oxygen levels in the pond decrease, this is because of the solubility of oxygen in particular temperature range. Using blue water colourant will keep the water cooler (due to the reflection of sunlight) and allow fish to breathe easier during the summer.

### Is Pond Colourant Safe?

There is a concern that water colourant will stain clothing, skin, or other surfaces. It is important to know and remember that in its concentrated form, water colourant can cause stains, so be sure to wear PPE (personal protective equipment) while adding it to your pond, dugout, or pool. After 24 hours, once the colourant has diluted in the water, it will no longer stain.

When mixed with water, water colourant is completely safe for agriculture and irrigation. After treatment, coloured water body can be used for recreation, fishing, and other activities. Water colourants are not recommended for drinking water ponds intended for human consumption, although it is safe for swimming, watering horses, livestock, birds, pets, fish, and wildlife.

### BlueWave™:

Osorno produces [BlueWave™ pond and pool colourant](#) at a high concentration. It is made from food-grade colours. [BlueWave™ is sold](#) in 4 L jugs and 20 L canisters.

1 L of BlueWave™ treats 100,000 L (100 m<sup>3</sup>) of water.

### How to apply BlueWave™?

- Pour the BlueWave™ into the pond at multiple locations. Pour it from all sides of the pond, pool, or dugout, letting it seep in towards deeper areas. Allow for natural mixing to occur over the next 24-48 hours. Start as soon as the seasonal ice melts.
- Always wear disposable PPE (clothing, gloves, and goggles) during handling and application.
- Keep pets and people out of the pond for up to 24 hours post-treatment to avoid potential skin and fur colouration.
- Reapply BlueWave™ as needed (on a monthly basis or after very strong rain).
- Use BlueWave™ in closed bodies of water only. Never apply it to flowing or open streams and systems.
- If you have any questions about our BlueWave™ product please contact us at [info@osorno.ca](mailto:info@osorno.ca).

Osorno provides scientific advice and affordable environmental solutions for a cleaner and safer world.

*With questions please contact:*

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