FLURIDONE CHEMICAL FACT SHEET

Formulations

Fluridone is an aquatic herbicide that was initially registered with the U.S. EPA in 1986. It is currently being evaluated for reregistration. An interim registration review decision was released in 2018. The active ingredient is 1-methyl-3-phenyl-5-3-(trifluoromethyl)phenyl|-4(1H)-pyridinone. Both liquid and granular formulations are available. It is labeled for control of submerged, emergent and floating-leaf vegetation using surface, subsurface or direct foliar application. Commercial formulations approved for aquatic use in Wisconsin include Avast!® SC, WipeOut™, Spritflo™ and Sonar®.*

Aquatic Use and Considerations

Fluridone is a systemic herbicide (i.e., it moves throughout the plant tissue). It is a WSSA Group 12 herbicide, meaning that its mechanism of action is by inhibiting phytoene desaturase (PDS), an enzyme that protects a plant from sun damage. As a result of treatment with fluridone, the plant's chlorophyll is broken down by sunlight. Treated plants will turn white or pink at the growing tips after a week and will begin to decompose one to two months after treatment. Fluridone is only effective if plants are growing at the time of treatment.

It is important to note that repeated use of herbicides in the same WSSA group (i.e., with the same mechanism of action) can lead to herbicide-resistant plants, even in aquatic environments. In order to reduce the risk of developing resistant genotypes, avoid using the same type of herbicides year after year, and utilize effective integrated pest management strategies as part of any long-term control program.

Effective use of fluridone requires low, sustained concentrations and a relatively long contact exposure time (CET; 45 to 90 days). Due to this requirement, fluridone is usually applied to an entire waterbody or basin. If fluridone concentrations fall below effective levels before the plants die, they will regain the ability to produce chlorophyll and grow.

Some success has been demonstrated when additional follow-up 'bump' treatments are used to maintain the low concentrations over a long enough period to produce control. Fluridone has also been applied to flowing water using a drip system to maintain adequate CET.

Because fluridone treatments are often applied at a lake wide scale and many plant species are susceptible to fluridone, careful consideration should be given to potential non-target impacts and changes in water quality in response to treatment.

Fluridone is labeled to control invasive species such as Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*)†. Fluridone is also labeled to control native species such as coontail (*Ceratophyllum demersum*), common waterweed (*Elodea canadensis*), pondweeds (*Potamogeton* spp.), native watermilfoils (*Myriophyllum* spp.), naiads (*Najas* spp.), bladderworts (*Utricularia* spp.), duckweeds (*Lemna* spp.), wild celery (*Vallisneria americana*), waterlilies (*Nuphar* spp. and *Nymphaea* spp.) and watershield (*Brasenia schreberi*).†

* Product names are provided solely for your reference and should not be considered exhaustive nor endorsements.

† May vary by formulation, application rate, and/or product. Every product label must be carefully reviewed and followed by the user.

Post-Treatment Water Use Restrictions

There are no post-treatment restrictions on water use for swimming, fishing, or pet/livestock drinking water. Fluridone should not be applied at rates greater than 20 parts per billion (ppb) within one-fourth of a mile of a functioning potable water intake. Depending on the type of waterbody treated and the type of plant being watered, irrigation restrictions may apply for up to 30 days. Plants within the Solanaceae family, such as tomatoes and peppers, and newly seeded lawn should not be watered with treated water until the concentration is less than 5 ppb.[†]

Herbicide Degradation, Persistence and Trace Contaminants

The half-life of fluridone (the time it takes for half of the active ingredient to degrade) ranges from a week to over a month depending on environmental conditions. Following treatment, the amount of fluridone in the water is reduced through dilution due to water movement, uptake by plants, adsorption to the sediments, and via breakdown caused by light (photolysis) and microbes. There are two major degradation products from fluridone: n-methyl formamide (NMF) and 3-trifluoromethyl benzoic acid. NMF has not been detected in studies of field conditions, including those at the maximum label rate.

Fluridone is primarily degraded through photolysis and degradation rates can be influenced by water depth, water clarity and seasonal timing of treatment. Fluridone half-life has been shown to be only slightly dependent on fluridone concentration, oxygen concentration and pH. Degradation may also be affected by method of application (e.g., surface or sub-surface application).

The persistence of herbicide in the sediment has been reported to be much longer than in the overlying water column, with studies showing persistence ranges from three months to a year in sediments. Fluridone concentrations measured in sediments reach a maximum in one to four weeks after treatment, depending on environmental conditions. Adsorption to the sediments is reversible; fluridone gradually dissipates back into the water where it is subject to chemical breakdown. Fluridone adsorbs to sediments with high organic matter, especially in pellet form, and can reduce the concentration of fluridone in the water. As such, pellet formulations may be more effective in sandy areas, while aqueous suspension formulations may be more appropriate for areas with high amounts of clay or organic matter.

Impacts on Fish and Other Aquatic Organisms

Fluridone is slightly to moderately toxic to freshwater fish and invertebrates. However, fluridone does not appear to have short- or long-term effects on fish at approved application rates. Although fluridone is absorbed by fish tissue, it has demonstrated very low potential for bioconcentration (the process by which chemicals are absorbed by a plant or animal to levels higher than the surrounding environment); fluridone concentrations in fish tissues decrease as the herbicide degrades in the water.

Fluridone has not been shown to pose a short- or long-term exposure risk to birds or small mammals.

Human Health

Short-term exposure risk is primarily limited to chemical applicators. Concentrated fluridone may cause some eye or skin irritation and may be harmful if inhaled. Follow label directions and wear appropriate personal protective equipment when mixing, loading and/or applying fluridone.

Fluridone does not show evidence of causing birth defects, reproductive toxicity, or genetic mutations in mammals. It is not considered to be carcinogenic, nor does it impair immune or endocrine function.

There is some evidence that the fluridone degradation product NMF causes birth defects. However, NMF has only been detected in the lab and not following actual fluridone treatments in the field, including those at maximum label rate. Therefore, the manufacturer and U.S. EPA have indicated that fluridone use should not result in NMF

concentrations that would adversely affect the health of water users. In the re-registration assessment that is currently underway for fluridone, the U.S. EPA has requested additional studies on both NMF and 3-trifluoromethyl benzoic acid.

For Additional Information

U.S. Environmental Protection Agency (EPA)
Office of Pesticide Programs
epa.gov/pesticides

Wisconsin Department of Agriculture, Trade, and Consumer Protection
datcp.wi.gov/Pages/Programs_Services/ACMOverview.aspx

Wisconsin Department of Natural Resources
608-266-2621
dnr.wi.gov/lakes/plants

Wisconsin Department of Health Services
dhs.wisconsin.gov

National Pesticide Information Center
1-800-858-7378
npic.orst.edu