Piscamycin™ • Product Background

History

- Antimycin (the natural product compound in Piscamycin) was discovered in 1945 by the Department of Plant Pathology at the University of Wisconsin.
- UW Dept. of Biochemistry purified it and defined its chemical properties.
- Because might be useful in treating crop diseases it was turned over to the Wisconsin Alumni Research Foundation (WARF).
- In 1963 the foundation noted it was very toxic to fish because minute amounts killed goldfish but was harmless to other animals. At this point the new Fish Control Laboratory at La Crosse, WI began extensive experimentation against fish and other aquatic animals.
- WARF licensed Antimycin to Ayerst Laboratories, New York, a division of American Home Products Corporation to produce and market Antimycin under the trade name Fintrol. Fintrol is no longer in production.
- ISC licensed the technology from the USGS in 2023, renamed Piscamycin.

What is Piscamycin?

- Derived from a fermentation product from *Streptomyces melanogenes*, the biochemical, Antimycin A, is applied directly to water to manage fish populations and restore native fish habitats in lakes, ponds, reservoirs, rivers, streams, and in aquaculture.
- Antimycin A is absorbed into the gills of fish, and it kills by interfering with the respiration of body cells. Its action is irreversible and once a fish has had brief exposure it is doomed. Can achieve selectivity to species based on dose.

What Fish Does it Kill?

- Carp, pumpkinseeds, and green sunfish are among the more susceptible fish, and they succumb to such extremely small quantities as 1 to 5 parts of the antibiotic in a billion parts of water (1 part of substance per billion parts of water is equivalent to 1 ounce of chocolate syrup in 10 million gallons of milk).
- Gars, bowfin, goldfish and bullheads are a little less susceptible to the chemical than carp, which is an advantage, because certain concentrations of Antimycin can be selected to kill some species in a body of water without harming others.
- For example, large populations of carp and green sunfish were eradicated in a Nebraska pond with an amount that allowed large northern pike and largemouth bass to survive.

Nontarget Affects

- In studies conducted by EPA, Antimycin A degraded relatively rapidly under static conditions. Treatment concentrations of 25 ppb would exceed acute risk levels of concern to aquatic nontarget organisms.
- It degrades in lakes and streams in 1 to 14 days but usually takes place between 4 and 7 days. Its degradation can be accelerated by adding potassium permanganate.
- It has very little effect on fish-food animals thus leaving the food supply intact, which allows reclaimed waters to be restocked soon with fish. The usual time lag between a reclamation and the beginning of good fishing can therefore be reduced.
- Fish-killing concentrations of Antimycin are harmless to mallards, ringneck pheasants, pigeons, chickens, quail, mice, rats, rabbits, guinea pigs, dogs and lambs. There is a great margin of safety between fish-killing concentrations and concentrations that might endanger other animals. This margin is increased by the rapid disappearance of the chemical in water. Thus, minute quantities of Antimycin are considered to be selectively toxic to fish.
- A question concerning the edibility of Antimycin-killed fish is raised often. It is possible that the fish may be used safely as a food by humans and animals, or as fish fertilizer for crops and gardens, but it is not accepted as fact. ISC will work to get this use added to the EPA label.
- In summary, Piscamycin is more effective and has lower nontarget and human risk than the only other fish toxicant, Rotenone.

How is it Used?

- Treatment concentrations up to 25 parts per billion (ppb) by a drip-feed device which is part of a drip station or by backpack sprayer, boat bailer, or other hand-held sprayers. Drip stations are typically used in streams and rivers inaccessible to boat traffic.
- Deeper water bodies may require the use of a pump mechanism (to ensure adequate mixing throughout the water column) where antimycin A is dispensed.
- In aquaculture (catfish production), antimycin A can be applied at concentrations up to 25 ppb to achieve a “complete kill” or at concentrations up to 10 ppb to achieve “selective kill.”

Current Status

- Invasive Species Corporation (ISC) has exclusive license to the technology/product from the USGS.
- ISC has a CRADA with the USGS to re-commercialize the product and develop carp specific baits.
- ISC is currently conducting the required studies to re-submit to the EPA for registration.
- Quantities will be available soon for testing and later in the year for emergency uses.

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