

PEGGY GREB (K10338-1)

New Algicide To Help Keep Catfish Tasting Good



Fingerling catfish, about 1 year old.

Blue-green algae give catfish farmers the blues.

Certain types of blue-green algae, or cyanobacteria, produce off-flavor compounds that can give catfish a muddy or earthy taste, which keeps them from being marketable. Affected fish are held in ponds for costly weeks until the compounds leave their bodies.

Currently, catfish farmers choose between two chemical solutions for fighting the algal menace. Copper sulfate is the only algicide approved by the U.S. Environmental Protection Agency for such use on a permanent basis. Diuron, an herbicide containing chlorine, is used with government permission that must be renewed yearly.

These chemicals control the cyanobacteria, but can be toxic to most phytoplankton, including green algae. Green algae do not cause off-flavors, and they play a significant role as a base for aquatic food chains and as oxygenators for pond water.

Better help may be on the horizon for many catfish farmers in the form of a natural-based algicide that kills blue-green algae but is much safer for other pond life.

The new algicide, the subject of a patent application, uses a product derivative based on the natural compound anthraquinone, found in rye grass

(*Lolium perenne*). It was discovered by scientists at ARS' Natural Products Utilization Research Unit in Oxford, Mississippi, in collaboration with biochemist Dhammika Nanayakkara at the University of Mississippi's National Center for Natural Products Research.

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Microbiologist Kevin Schrader examines a culture of green algae (*Selenastrum capricornutum*) used in a rapid bioassay to screen natural compounds for selective algicidal activity.

According to ARS microbiologist Kevin Schrader, the project's lead scientist, the algicide is ready for additional testing in catfish-filled ponds. It has shown great potential against its target in laboratory tests using microplates and in large fiberglass enclosures known as limnocorrals placed in catfish ponds. Also, catfish exposed to it in aquarium tests stayed healthy, Schrader says.

ARS is seeking a commercial partner to fully develop and commercialize the technology.

The algicide targets *Oscillatoria perornata*, a species of cyanobacteria prevalent in Mississippi. (That state is home to half of the nation's catfish farms.) *O. perornata* produces the musty compound 2-methylisoborneol, which in turn gives catfish the muddy type of off-flavor.

Pond testing against *O. perornata* will continue to take place in four quarter-acre ponds in Stoneville, Mississippi, at the Thad Cochran National Warmwater Aquaculture Center, in collaboration with fisheries biologist Craig Tucker of Mississippi State University's Delta Research and Extension Center.

In laboratory tests, the algicide, which if approved may be available in 2 to 3 years, was 40 times less lethal to green algae than diuron. Also, it rapidly dissipated from the pond water after application, whereas diuron can be detected for days or weeks after application.

Off-flavor problems cause the \$2-billion-a-year catfish farming industry as much as \$50 million in losses annually. See the March 2003 issue of *Agricultural Research* magazine for studies on another approach to controlling off-flavors.—By **Luis Pons**, ARS.

This research is part of Aquaculture, an ARS National Program (#106) described on the World Wide Web at www.nps.ars.usda.gov.

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