

Generation of Toxic Microparticles for Control of Invasive Species

Market and Background

The Great Lakes are among the most robust freshwater ecosystems for both the United States and Canada, with an annual economy of \$7 billion in sport-fishing alone. One growing threat to the Great Lakes, in particular Lake Michigan and Lake Erie, are Asian carp (silver and bighead carp), invasive species that entered the Mississippi River watershed in the southern US and threaten to move further north. As they enter into American freshwater, Asian carp deprive native fish of plankton, an essential food resource. In addition, Asian carp, which can grow up to 100 pounds, are known to leap and can injure people participating in angling, boating, waterskiing, or other water sports. One proposed solution to reduce the Asian carp populations has been to selectively deliver toxicants, or control agents, to kill the carp. However, one challenge is delivering these toxicants.

Research and Development Status

University of Wisconsin-Platteville researchers have developed a technology to reliably deliver microparticle-bound control agents to Asian carp. Their device mixes a carrier, such as wax, with a toxicant and atomizes this mixture to produce <150 micron spherical microparticles that would be toxic to the carp when ingested. While many spray atomization devices suffer from nozzle clogging, incomplete melting/solidification, and poor particle separation, this new technology uses a combination of strategic heating and cooling systems, as well as inert gasses to enhance nozzle flow, melting, and particle separation. This microparticle generator has the potential to decrease Asian carp populations and ultimately contribute to saving the Great Lakes' natural resources from this harmful invasive species. This technology could be readily adapted for use on other invasive species, as well as for other markets with interests in microparticles and specialized coatings.

A prototype has been developed for this technology with funding from the US Geological Survey. The prototype can produce up to a kilogram of wax-based microparticles, which are the desired size and are currently being field-tested for control of Asian carp. Further optimization would reflect the needs of a commercial or environmental partner and its customers. WiSys is seeking a strategic partner for further optimization of the design for efficiency and manufacturing, followed by marketing, sales, and distribution.

Applications and Key Benefits

- Creation of toxicant-bound microparticles that are easily ingested by Asian carp; Reduces populations of invasive species in North American freshwater ecosystems
- Lake and pond management and restoration
- Effective spray atomization and creation of microparticles enabled by enhanced nozzle flow, melting, and particle separation; Compact design gives the device relatively small footprint; System connects quickly, has automatic controls, and allows for operational flexibility
- Technique can be adapted for other uses: Target different invasive species; Other industries that may have a use for microparticles, such as pharmaceuticals (medicine solubility), cosmetics (fine particle production), confections and food (flavorings), and fish hatcheries (stock feed production)

Intellectual Property

A U.S. Provisional Patent Application is pending for this technology. For more information, please contact Jennifer Cook at jennifer@wisys.org or by phone at 608-316-4131.