Biomass Absorbs Phosphates and Phosphate-Containing Pesticides (Organophosphates)

Technology #20170174

Removes Pesticides and Phosphate Contamination from Water

A new absorbent technology simultaneously sorbs phosphate and phosphate-containing pesticides (organophosphates, such as glyphosate in Roundup® herbicide) present in low concentrations typically found in agricultural runoff water. The technology is formed through hydrothermal carbonization of agricultural residues (e.g., corn stover), which results in a biomass-based hydrochar that simultaneously sorbs potassium and glyphosate from water in a single, simultaneous and non-competitive step. Removing pesticides and phosphate contamination from water has far reaching environmental and public health applications (i.e., preventing algal blooms in agricultural run-off and preventing toxicity associated with exposure to even low levels of pesticides).

Water Contamination and Algal Bloom

Organophosphate pesticides can contaminate groundwater and ultimately drinking water even at low concentrations. Phosphorous can migrate to lakes and streams resulting in algal growth and eutrophication. Currently, no commercial product exists to remove glyphosate from agricultural runoff waters. This new absorbent technology simultaneously sorbs phosphate and phosphate-containing pesticides present in low concentrations (2ppm and < 1ppm, respectively). Products based on this technology could serve as a filter medium for agricultural run-off water in drain tiles.

BENEFITS AND FEATURES:

Learn about more groundbreaking discoveries at www.research.umn.edu/techcomm
Simultaneously sorbs phosphate and phosphate-containing pesticides.
Effective on organophosphates, such as glyphosate in Roundup herbicide.
Absorbs low concentrations (e.g., as typically found in agricultural runoff water).
Economical manufacturing process: hydrothermal carbonization of agricultural residues results in a hydrochar.
Potential to remediate algal blooms in agricultural run-off.
Potential to remediate toxicity associated with exposure to low levels of pesticides.

APPLICATIONS:

- Filter medium for agricultural run-off water.
- Biomedical applications (e.g., therapeutic agent or medical device to detoxify patients exposed to organophosphate).
- Environmental applications (i.e., preventing algal blooms in agricultural run-off).
- Public health applications (i.e., preventing toxicity associated with exposure to even low levels of pesticides).

Phase of Development - Working prototype

<table>
<thead>
<tr>
<th>Interested in Licensing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The University relies on industry partners to scale up technologies to large enough production capacity for commercial purposes. The license is available for this technology and would be for the sale, manufacture or use of products claimed by the issued patents. Please contact Larry Micek to share your business needs and technical interest in this technology and if you are interested in licensing the technology for further research and development.</td>
</tr>
</tbody>
</table>

Inventors

Kenneth J. Valentas, PhD
Adjunct Professor, Biotechnology Institute

Learn about more groundbreaking discoveries at www.research.umn.edu/techcomm
Scott Plewka
Research Specialist, Biotechnology Institute

Zachary Pursell
Research Specialist, Biotechnology Institute

IP: UM Docket 20170174

For additional information, contact

Larry Micek
Technology Licensing Officer
exprlic@umn.edu
612-624-9568

Learn about more groundbreaking discoveries at www.research.umn.edu/techcomm