<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Water treatment with starch based ionic flocculants</th>
</tr>
</thead>
</table>

**Purpose / Goal** *(300 characters)*

Water treatment plants apply cationic and anionic polymers. A Hungarian micro enterprise developed and produces starch based ionic flocculants. These flocculants are useful in drinking water treatment. These polymers are environmentally degradable after use. Neither the polymer nor its degradation products are toxic. The company is looking for research institutes and companies to test new applications and partners interested in using the technology.

**Target groups**

Operators of water treatment facilities

**Industry sectors** *(Please tick)*

- Agriculture
- Biotechnology
- Chemical
- Clean-Air Technology
- Cleanup Technology
- Construction
- Drinking Water
- Electronics
- Food
- Information Technology
- Metal
- Mining
- Motor Vehicles
- Noise Reduction
- Power Engineering
- Print
- Pulp and Paper
- Sewage Technology
- Stones and Soils
- Surface Engineering
- Telecommunication
- Textile and Clothing
- Transport
- Waste Technology
- Wood and Furniture
- Others:

**Description / Special features** *(1500 characters)*

Commonly used water treatment technologies apply cationic or anionic polymers as well as inorganic salts. These organic compounds are synthesized from oil compounds, and contain some kerosene. These products are widely used in water and wastewater treatment.

Flocculants enhance the sedimentation and filtration of colloid size particles in aqueous suspensions by agglomerating them by charge neutralization and bridge forming. Depending on whether the surface of the particles have a negative or positive charge, anionic or cationic flocculants may be used.

A Hungarian micro enterprise developed and produces starch based anionic and cationic flocculants. These starch based polymers use renewable raw materials and are environmentally degradable after usage. Such flocculants are useful in drinking water treatment plants. They may also be combined with inorganic salts (for example poly-aluminium- chloride). These compounds are also recommended for use in...
the food and pharmaceutical industry and biotechnology industry. An environmentally friendly, waste free „dry method” was developed for the chemical modification of starch. A pilot-scale reactor suitable for solid phase reactions was planned and built. A pilot plant was also built to realize the „dry method” at an industrial scale.

<table>
<thead>
<tr>
<th>Supporting tools (300 characters)</th>
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<tbody>
<tr>
<td>Keywords</td>
<td>Protecting man and environment; Environment; Water Pollution/Treatment</td>
</tr>
<tr>
<td>Innovative aspects including: environmental, social, economic (800 characters)</td>
<td>The raw material is native, renewable starch, which is environmentally degradable after use, and the production process is also environmentally friendly. Neither the polymer nor its degradation products are toxic.</td>
</tr>
<tr>
<td>Advantages (300 characters)</td>
<td>Neither the polymer nor its degradation products are toxic. The feeder technology is the same as in case of the synthetic polymers.</td>
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<td>Disadvantages (300 characters)</td>
<td>The costs are higher than those of commonly used polymers.</td>
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<tr>
<td>Cost / Funding source</td>
<td></td>
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<tr>
<td>Application examples (400 Characters)</td>
<td></td>
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<tr>
<td>National Contact Point</td>
<td></td>
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Please tick:

<table>
<thead>
<tr>
<th>Current stage of development</th>
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<tbody>
<tr>
<td>☐ Development phase – laboratory tested</td>
<td>☑ Already on the market</td>
</tr>
<tr>
<td>☐ Available for demonstration – field tested</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Intellectual Property Rights

| ☐ Patent applied for | ☑ Patents granted |
| ☐ Copyright protected | ☑ Exclusive rights |
| ☐ Secret know-how | ☑ Other (registered design, plant variety right, etc)* |

Comments:

- Greenfloc is a registered trademark for natural starch based flocculants by the Hungarian Patent Office under catalogue number 137 191.
- Greenfloc 213A anionic flocculant
- Greenfloc 310 anionic flocculant
- Greenfloc 120 cationic flocculant
- Greenphos L scale inhibitor

**Organisation / company submitting technology / tool**

Name of the Company: **HYDRA 2002 Kft**

Size of company: Micro enterprise

Type:

- [x] Industry
- [x] Technical Centre / Technology transfer centre
- [ ] Research institute /University
- [ ] Services
- [ ] Other: please specify

Contact details: +36 88 422 104, hydra2002@hydra2002.hu

**Comments**
The company is looking for partners interested in using the technology, and research institutes and companies to test new applications.