

## Licensable Technologies

# Controlled Release of Biocide Using Polymer Hydrogels

### Applications:

- Oral antiseptic in dental resins and coatings
- Food processing and packaging materials
- Medical device packaging
- Water treatment
- Homeland security / decontamination

### Benefits:

- CPC is nontoxic and biocompatible.
- High-level (up to 35 wt%) CPC loading is possible.
- Release rates and times can be controlled to last up to 2 weeks.
- Gels can be tailored to provide a high initial release followed by a steady release
- Gel can be recharged with CPC and reused.
- Substance can be modified for controlled absorption in addition to release.

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*LANL's HEMA-based hydrogels are non-toxic and biocompatible and can achieve up to 35 wt % loading with CPC, an FDA-approved biocide.*

### Summary:

Cetylpyridinium chloride (CPC) has been used for over 40 years as an antiseptic agent in oral care. Interest in CPC as a biocide has recently increased with reports showing its effectiveness against food-borne pathogens and, potentially, against bioterror agents.

In the past, CPC has been incorporated into polymer matrices that allow release of the biocide over 6–7 hours. Used as patches, these polymer matrices have been used to treat plaque, gingivitis and other oral infections. However, the short release time of the biocidal agent limited the usefulness of these patches in other application areas.

Scientists at Los Alamos National Laboratory (LANL) have recently developed a method for achieving controlled, sustained release of CPC from polymer hydrogels over a period of up to two weeks. This method, using 2-Hydroxyethyl methacrylate (HEMA)-based hydrogels, is also nontoxic and biocompatible, making it applicable to many areas, including coatings for medical and dental implants, food and medical device packaging, and water decontamination.

The HEMA-based hydrogels can achieve high levels (up to 35 wt%) of CPC loading and can be tailored for sustained release, or initial burst release followed by a controlled release over long periods. In addition, the hydrogels can absorb, as well as release, CPC, making them rechargeable and reusable. LANL's intellectual property in this area enables far greater application of CPC, which is already FDA-approved, as a biocidal agent.

### Development Stage:

Proof-of-concept experiments have been conducted and a patent application submitted. The Laboratory is looking for a partner to further develop the technology.

### Patent Status:

Patent pending

### Licensing Status:

This technology is available for exclusive or non-exclusive licensing.

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