"Supercritical Fluid Processed Polysaccharide Based Hemostatic and Wound Care Materials" VCU #12-032

Applications

- Superabsorbent device to stop major blood loss either in civilian or battlefield traumas
- Composed of naturally occurring biopolymers, chitosan and alginate, which promotes wound healing due to hemostatic properties

Advantages

- Biocompatible and hemostatic agents are bioresorbable
- High surface area and porous composition result in superabsorbent properties
- Absorbs higher percentage of ionized water as compared to DI water
- Predictable absorption rate due to selective crosslinking

Inventors

Mark A. McHugh, Ph.D.
Kevin R. Ward, M.D.
Rajendar R. Mallepally, Ph.D.

Contact

Afsar Mir
Licensing Associate
miraq@vcu.edu
Direct 804-827-2213

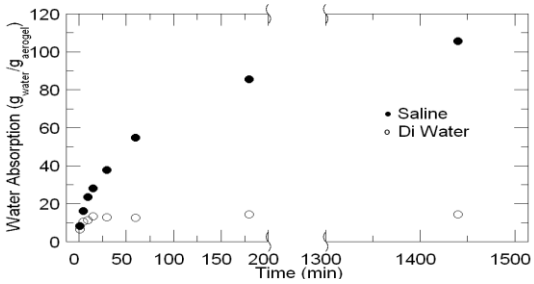
Market Need

Although mortality rates due to penetrating injuries have decreased, blood loss is still the major cause of death in both civilian and battlefield traumas. To limit blood loss, there is a need for a device that can both be superabsorbent and result in wound healing by releasing hemostatic agents. The problem with devices that are currently on the market is that these materials lack the highly porous structure that is needed to absorb physiological fluid at a high rate. Therefore, the ultimate goal in regulating and treating traumas is to have a device that is superabsorbent which has an ideal absorption rate, as well as the embedded benefit of releasing hemostatic agents into the site to promote wound healing.

Technology Summary

This material improves on current synthetic or biopolymer based products by its ability to super-absorb ionized water. Due to its superabsorbent nature for ionized water, a correlation can be made suggesting that the material can absorb physiological fluid better than products that have not been processed through similar techniques. This method allows for more absorption by increasing the surface area of the device and producing a more porous structure. Both Chitosan and Alginate were used as biopolymers for creating this material due to their gel characteristics contributing to the aerogel structure and natural hemostatic properties to promote blood clotting. In addition to its high absorption qualities, this material can be tailored to a specific absorption rate based on the crosslinking density of the polymer network.

The figure to the right displays the water absorption for both saline and DI water corresponding to the Alginate aerogel. This increased absorption for saline solution can ultimately be linked to performance of the device with physiological fluids.



Technology Status

This technology has been prototyped and analyzed with in vitro tests.
Patent pending: U.S. and Foreign Rights available.
This technology is available for licensing to industry for further development and commercialization.