



Hemostatic Agents Comparison Chart

	ActCel	Celox-A	Hemcon	QuikClot*	CombatGauze*
Type of Product	Collagen-like cellulose in a fabric-like sheet	Granules (also comes in gauze)	4x4 Bandage (also comes in a gel form)	*General Public; Granules	*QuikClot professional line; Gauze Bandage 3"x4yrd
Made From	ActCel is a collagen-like substance from chemically treated cellulose.	Chitosan (a biodegradable, nontoxic, complex carbohydrate of chitin, is found in the exoskeletons of shellfish.)	Chitosan (a biodegradable, nontoxic, complex carbohydrate of chitin, is found in the exoskeletons of shellfish.)	Zeolite, a granular substance derived from lava rocks.	Gauze impregnated with kaolin clay
Works By	On exposure to blood, ActCel expands to 3-4 times its size and converts to a gel that dissolves into glucose and saline over 1-2 weeks. Hypo-allergenic. Because of its purity and how it simply degrades to glucose and saline, it does not cause delayed healing as do other hemostatic materials. Effectively cuts down on clotting time, help stabilize new clots by accelerating the formation of fibrin cross-linkages, and increase whole blood viscosity.	Celox granules are actually high surface area flakes. When they come in contact with blood, Celox swells, gels, and sticks together to make a gel-like clot. Chitosan is broken down by lysozyme, a human enzyme, to leave glucosamine (C ₆ H ₁₃ NO ₅), an amino sugar which is found in the body.	Becomes extremely adherent when in contact with blood. This adhesive-like action seals the wound and controls bleeding. Because chitosan has a positive charge, it attracts red blood cells, which have a negative charge. Chitosan is broken down by lysozyme, a human enzyme, to leave glucosamine (C ₆ H ₁₃ NO ₅), an amino sugar which is found in the body.	Absorbs the water molecules in the blood and creates a high platelet concentration to promote.	Kaolin is a natural clay that is highly absorbent and effective in creating hemostasis in trauma situations. The Combat Gauze comes in a generous size, making it ideal for major trauma applications.
Pros	Long shelf life, cost effective, completely absorbs into the body eventually as saline and glucose, doesn't interfere with later treatment, quick clotting time, has bacteriostatic effect on wound.	Effective clotting agent, absorbable material, bacteriostatic effect on wound.	Effective clotting agent, absorbable material, bacteriostatic effect on wound, supported by U.S. Army.	Long shelf life, low cost, effective clotting agent.	Moderate shelf life, low cost, effective clotting agent.
Cons	New trauma-sized application just emerging onto market, not as many years in use.	Competitors report potential allergic reaction for those with fish or shellfish allergies.	High cost, short shelf life, competitors report potential allergic reaction for those with fish or shellfish allergies.	Nonabsorbable; distorts anatomy of wound. Exothermic and can cause second-degree burns if applied incorrectly, contraindicated for internal bleeding or deep tissue wounds. Can cause significant tissue necrosis, impeding healing and new tissue formation.	Once kaolin has settled in a wound, it must be completely removed before surgical treatment. Kaolin initiates the clotting cascade and can possibly start clotting away from the wound site.
Results from Trauma Trial *	Maintained hemostasis in 9 out of 10 90%	Maintained hemostasis in 6 out of 10 60%	Maintained hemostasis in 10 out of 10 100%	n/a	Maintained hemostasis in 8 out of 10 80%
Shelf Life	4 years	3 years	2 years	2 years	3 years
Cost	\$35 per 4x4 bandage	\$32 per 35g packet	\$200 per 4x4 bandage	\$20 per 4x4 bandage	\$55 per 3" by 4 yard bandage
My Personal Pick for Smaller Wounds, Cuts and Lacerations	✓	x	x	x	x

About PRG's Process:

We evaluate gear in the field for a minimum of a year, and we do not accept money for our evaluation process. See our website for more information, or follow us on Facebook for the latest updates. As new materials and designs come on the market, stay tuned: PRG will keep evaluating and keep you informed.

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Product Research Gear, LLC

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NOTE: This comparison was done in April 2013 to reflect current information available. The field of hemostatic agents is a dynamic arena with new products emerging frequently and new trials revealing updated results. As products and technologies emerge, we will continue to test and review.

Data & Sources:

The Navy Medical Technology Watch:

Hemostatic Dressing Products for the Battlefield, 2006

<http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA477487>

*American Surgeon, 2011 Feb;77(2):162-5.

<http://www.ncbi.nlm.nih.gov/pubmed/21496135>

Hemostatic dressings reduce tourniquet time while maintaining hemorrhage control.

Excerpt from study: ["A tourniquet was placed proximally in 50 forelimb-injured swine after 30 seconds of hemorrhage with cessation of hemorrhage in all cases. Hemcon, ActCel, Quikclot, Celox, or standard gauze was then placed over the wound with direct pressure for three minutes. The tourniquet was then removed. Success was determined if no bleeding was identified."]

Comparison of Hemostatic Efficacy of ChitoGauze and Combat Gauze in a Lethal Femoral Arterial Injury in Swine Model

http://www.narescue.com/media/NAR/ChitoGauze/ChitoGauze_eBrochure.pdf

ActCel

<http://www.actcel.com/EMS/index.html>

Celox

<http://www.celoxmedical.com/>

HemCom

<http://www.hemcon.com/>

Quikclot (Retail)

<http://www.quikclot.com/>

QuikClot Combat Gauze

<http://www.z-medica.com/healthcare/Products/QuikClot-Combat-Gauze.aspx>