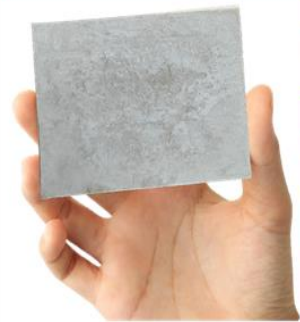


Antibacterial Hemostatic Dressing- Stop Bleeding & Prevent Bacterial Infection

Blend of Nano-Biomaterials



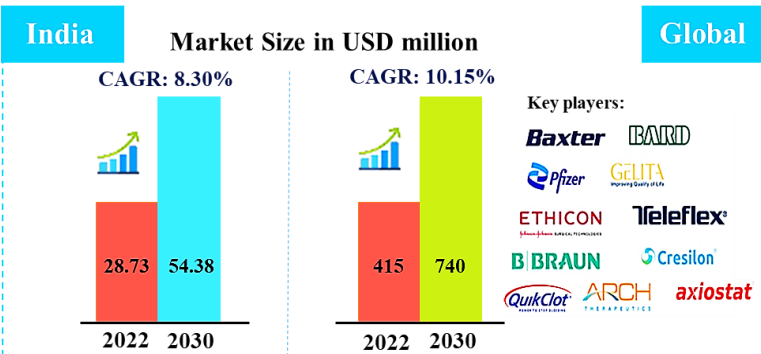
- ✓ Stops bleeding within few minutes
- ✓ High blood absorption capacity
- ✓ Cyto & Hemo compatible
- ✓ Prevents bacterial infection
- ✓ Non-irritating & Non-immunogenic
- ✓ Easy to apply & atraumatic removal

Technology Readiness Level (TRL): 4

Market Size of Hemostatic Dressing and Opportunity

Hemostatic Wound Dressing market was USD 415 million in 2022, and expected reach up to USD 740 million by 2030. Growing demand for emergency medical care, the indigenously developed patented nanocomposite hemostatic dressing has substantial opportunity for market penetration.

Hemostatic Wound Dressing Market Analysis



Technology

Nanotechnology-based patented formulation ([Indian Patent App. No 201711044089](#), [Indian Patent No 346127](#))

- ❖ **Hemostatic product** is designed for rapid bleeding arrest, prevents bacterial infection and reduce the cytotoxicity and immunogenic response.
- ❖ **Features:** High fluid absorption capacity, Faster clotting efficiency, High mechanical strength, Exhibit broad-spectrum antibacterial properties, Non-irritant and compatibility with the body's natural process, minimizing adverse reactions.
- ❖ **Mechanism:** Large fluid uptake capacity and adhesion of RBCs due to charge-based interaction.

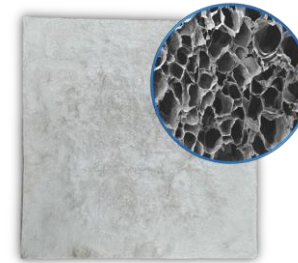
Regulatory clearance

Preclinical biocompatibility studies (ISO 10993) under GLP is ongoing

End-user

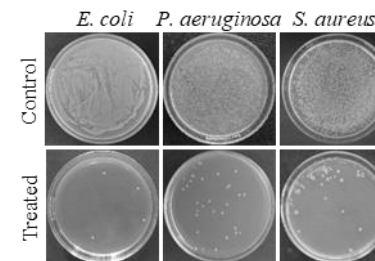
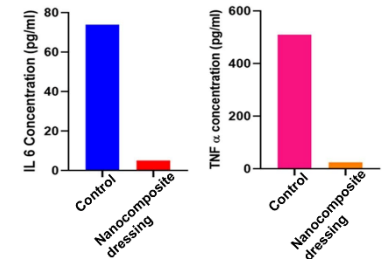
Hospitals, Emergency response units, Military medical services.

Efficacy study



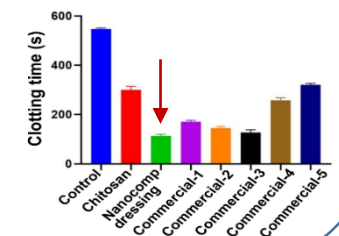
The microporous structure helps to absorb large amount of blood and plasma

Doesn't elicit inflammatory cytokines level



Kills 99.99% broad spectrum microorganisms through contact killing mode

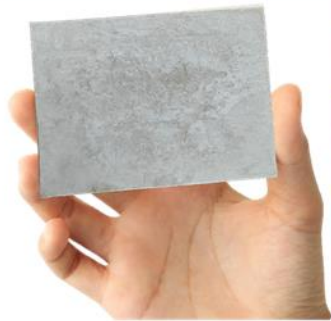
Stops bleeding within a few minutes



Antibacterial Hemostatic Dressing

Stop Bleeding & Prevent Bacterial Infection

Blend of Nano-Biomaterials



- ✓ Stops bleeding within few minutes
- ✓ High blood absorption capacity
- ✓ Cyto & Hemo compatible
- ✓ Prevents bacterial infection
- ✓ Non-irritating & Non-immunogenic
- ✓ Easy to apply & atraumatic removal

Technology Readiness Level (TRL): 4

Regulatory clearance

Preclinical biocompatibility studies under GLP is ongoing

Versatile Application

Bleeding control in

- Lacerations
- Punctures
- Abrasions
- Surgical wounds (operative, postoperative, dermatological)
- Traumatic injuries



- ❖ **Nanotechnology** based proprietary blend ([Indian Patent App. No 201711044089](#), [Indian Patent No 346127](#)) of biocompatible chitosan and graphene nanocomposite material with inherent hemostatic properties.
- ❖ **New generation hemostatic dressing** is designed for rapid bleeding arrest, and prevents bacterial infection. It is a single-use hemostatic wound dressing applied externally with mechanical compression to stop bleeding.
- ❖ **Features:** High fluid absorption capacity, Faster clotting efficiency, High mechanical strength, Soft & flexible, Exhibit broad-spectrum antibacterial properties, Non-irritant & compatible with body's natural process, Minimizing adverse reactions, Easy application.

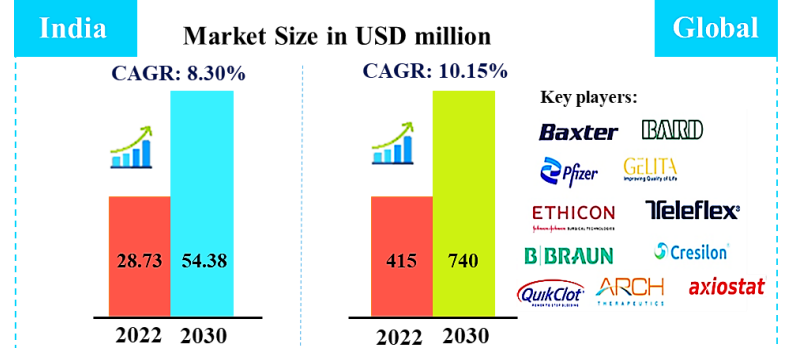
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End-user

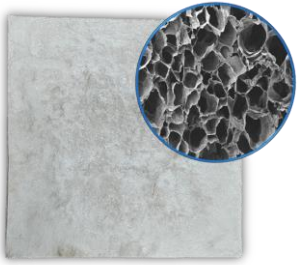
Home & Family
Sports & Outdoor Activities
Medical & Healthcare
Tactical & Defense

Hemostatic Wound Dressing Market Analysis





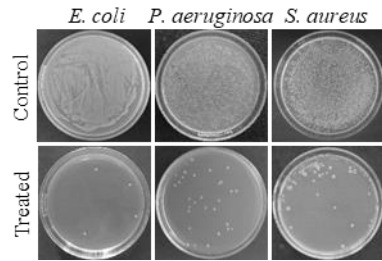
High absorbency



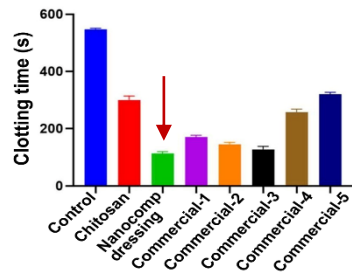
The microporous structure helps to absorb large amount of blood and plasma

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Antibacterial Effect



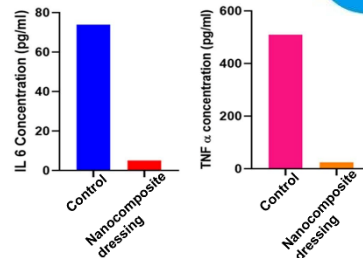
Rapid Hemostasis



Stops bleeding within a few minutes

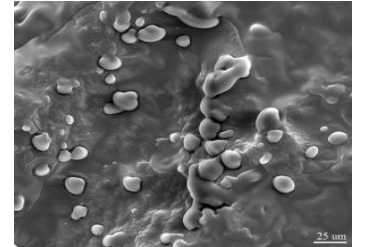
Inflammatory cytokines (IL-6 and TNF- α) level in the control and nanocomposite dressing treated macrophage cells

Anti-inflammatory activity



Blood Clotting Mechanism

- Compression and vasoconstriction
- Charge based interaction
- Plasma absorption
- Platelet aggregation and activation
- Clotting cascade amplification



The underlying mechanisms of rapid hemostatic properties include compression, charge based interaction with red blood cells, activation of platelets, amplification of the intrinsic and extrinsic coagulation cascade, and fibrin clot formation. Chitosan and graphene nanocomposite material contribute synergistically to accelerate the blood clotting at the bleeding surface.

Preclinical Biosafety (ISO 10993)* & Efficacy studies

- ✓ Cytotoxicity study completed
- ✓ Hemocompatibility study completed
- ✓ Acute and Sub-acute toxicity study completed
- ✓ Skin irritation study completed
- ✓ Biodegradation study completed
- ✓ In-vivo hemostatic efficacy conducted on Wister rat and Rabbit

*Non GLP studies