

The Hemo-halt bandage can reduce blood loss before treatment

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In news– The Hemo-halt bandage, containing chitosan (a natural polymer that halts bleeding) and agonist (a substance that improves clotting) nanoparticles **can rapidly minimize blood loss from wounds.**

About the bandage-

- The Hemo-halt bandage can reduce blood loss before treatment, save lives, and reduce disabilities on the battlefield.
- It can also contribute to the reduction in hospitalization costs.
- Worldwide, uncontrolled hemorrhage is the leading cause of traumatic death during accidents or injuries among the military and civilian populations.
- Severe bleeding triggers trauma due to shock, hypothermia, coagulopathy, tissue damage, and organ failure that often causes mortality.
- Therefore, efforts for early hemorrhage control are important to prevent disability or death during severe blood loss.
- Though critical care guidelines recommend topical hemostatic agents in the form of pads, patches, bandages, or gel applications for early control of bleeding, most of these are inadequate in halting heavy blood loss.
- **Conventional physical hemostatic agents like bone wax and gelatin foam**, biological agents such as bovine thrombin, and fibrin sealants, and synthetic agents including cyanoacrylates and glutaraldehyde, **cause**

inflammation, viral infection, and tissue toxicity.

- Considering these limitations, the development of effective and safe dressing for hemorrhage control occupies high significance for both civilian and battlefield populations.
- **MACS-Agharkar Research Institute, an autonomous institute of the Department of Science and Technology (DST), has developed a hemostatic bandage that incorporates chitosan (a natural glucosamine-containing polymer) and of agonist** (a substance that improves clotting) nanoparticles for rapid hemostasis.
- **Chitosan, which can control bleeding due to its cationic nature and hydrogel-forming ability** that leads to the concentration of erythrocytes and platelets in the injury site.
- Commercial chitosan preparations like Celox, a lightweight chitosan foam powder produced by bubbling, and Hem-Con, chitosan-coated bandages, are approved by FDA and are in use for hemorrhage control by the US army.
- However, these wound dressings show variable performances due to a lack of stabilization of blood clots, mechanical strength, lack of porosity, and a tendency for adherence to wound surface.
- **In the newly developed homeostatic bandage, the synergistic effects of combining chitosan and agonist nanoparticles resulted in the highly efficient blood clotting ability.**
- **The hemostatic gauze has the added advantage of the ease of removal from the injury site.** The
- The indigenous bandage will be an import substitute to foreign brands like Celox, Hem-Con, Chitoclot, etc., promoting the make-in-India effort.
- Hemostatic soft gels are also being developed that can be applied to soft tissues and organs.