Food scientists have developed antibacterial gel bandages using the discarded husks of the popular fruit of durian.

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Known as the “King of Fruits” in Southeast Asia, the durian has a thick husk with spiky thorns which is discarded while sweet flesh inside is consumed. Scientists have extracted high-quality cellulose from the durian husks and combined it with glycerol, a waste product from the soap and biodiesel industry to form a soft gel similar to silicon sheets.

Then scientists added the organic molecules produced from baker’s yeast making the bandage deadly to bacteria. Usually, wounds from surgery are covered with conventional hydrogel patches to prevent the formation of excessive scar tissue, resulting in flatter scars. The patch keeps the skin hydrated instead of drying up that as seen with conventional gauze bandages.

Conventional hydrogel patches are made from synthetic polymers like polymethacrylate and polyvinylpyrrolidine, with metallic compounds such as silver or copper ions to have antimicrobial properties.

With the growing threat of antibiotic-resistant germs, the world will need multiple alternative ways to prevent infections. This is especially important for diabetic patients suffering from chronic wounds. By using waste products that are currently discarded in large quantities, durian husks and glycerol, we could turn waste into a valuable biomedical resource that can enhance the speedy recovery of wounds and fewer infections.

Additionally, 60% of durian is discarded as husk, posing an environmental issue. This innovative and unique part of converting it into bio gel is helpful as thorns of durian can hurt but materials from its rind can heal.

The clinical application of new hydrogel is that the natural yeast phenolics embedded in it will help to prevent the growth of gram-positive and gram-negative bacteria. As proof of the concept, the durian hydrogels were tested as a wound dressing on animal skin and showed good antimicrobial effects for up to 48 hours.

Organic hydrogels are also useful for wearable, flexible and stretchable electronics. Wearable electronics consist of small sensors used to detect heart rate and physical activities. They help health workers to monitor the health of the elderly in remote areas.

A prototype hydrogel used in flexible electronics was made with cellulose from Okara, the waste leftover from soybean pulp during the making of soy milk.

By adopting a waste to resource approach through using durian husk in preparing organic hydrogel, scientists have shown that it is possible to reduce consumption of Earth’s natural resources, reuse and recycle them into valuable products useful for mankind.

The study was published inACS Sustainable Chemistry and Engineering.