G - Glove: An Environmentally Friendly and Cost Effective Alternative to Present Day Surgical Gloves

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Present day surgical gloves are designed to provide a protective barrier, prevent the transmission of diseases, and the breakthrough of hazardous chemicals that could otherwise permeate onto your skin. However, structural integrity of surgical gloves can be compromised when mechanical tension is applied, resulting in a perforation, and ultimately increasing the susceptibility of the user or patient contracting a surgical site infection (SSI). The WHO states that surgical gloves are a single - use item. Nonetheless, many developing nations are forced to reuse their surgical gloves due to high costs. SEM imaging demonstrated the effects of autoclaving on conventional rubber gloves; results indicate that a significant deformation in standard surgical gloves will decrease the overall quality of the glove. The objective of this research is to design and develop an environmentally friendly and cost effective alternative to modern surgical gloves, through infusion of graphene into guayule rubber (G – Glove). G – Glove yields greater results than conventional gloves regarding resistance to growth of Listeria monoctyogene. Furthermore, the G - Glove had lower permeation rates and mass composition differences after exposure to Nitric Acid, Sulphuric Acid, Phosphoric Acid, and Sodium Hydroxide, at various concentrations and time lengths. Moreover, the G – Glove proved superior in terms of durability and flexibility. Such features emanate from advanced mechanical strength and structural elongation. Correspondingly, G – Glove's ability to be reused multiple times as concluded in the Sterilization test, bears a more sustainable approach to ensuring proper health care is safe and affordable all over the world.

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