Research for Super-Absorbent Polymer Materials From Tapioca Starch and Applications for Producing Fire-Resistant Hydrogel Products

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The high occurrence of fires and explosions worldwide makes fire prevention a top priority to protect people and property. Common fire-fighting materials include water, CO2 gas, fire fighting powder, and fire fighting foam, but lesser-known flame-retardant gels have also proven effective. However, research on flame retardant gels and their potential is limited. To explore this potential, our study focused on creating a flame-retardant gel by synthesizing a biodegradable superabsorbent polymer material from tapioca starch using graft copolymerization with acrylic acid, 2-acrylamido-2-methyl-1-propanesulfonic acid, and ammonium polyphosphate. This aimed to examine the possibilities of this new technology while making it more environmentally-friendly. The resulting hydrogel product was tested for its fire-resistant properties and found to be effective in preventing combustion. Therefore, the study highlights the potential of using biodegradable superabsorbent polymer materials as an effective and eco-friendly fire retardant.

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