

Title: Biocidal Polyurethane Polymer and Catheter

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KEYWORDS: Polyurethane Polymer, Biocide, Nitrofurantoin, Silver, Catheter

DOMAIN: Life Science

SUMMARY:

Polyurethane (PU) polymer is primarily used to make catheters and biomedical devices due to its excellent mechanical strength, biodegradability, and biocompatibility. However, prolonged usage often leads to biofilm formation, while the biofilm triggers the immune responses and blocks the active functional groups of the coating. Hence, described here is an optimized method, involving a series of simple reactions to create a functionalized polyurethane that integrates biocidal agents such as Nitrofurantoin and elemental silver to prepare a biocidal polyurethane polymer. The resulting biocidal polyurethane polymer exhibits excellent antimicrobial activity, inhibiting bacterial adhesion and biofilm formation on the surface. The developed polymer is then utilized to prepare a catheter.

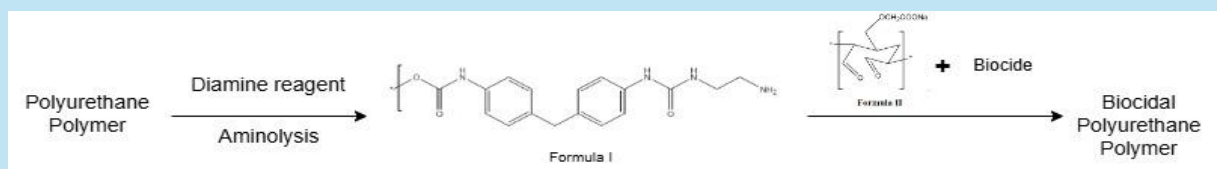


Figure 1: Method to prepare Biocidal Polyurethane Polymer

ADVANTAGES:

1. Protects biomedical devices from a wide range of microbes (gram-positive bacteria, gram-negative bacteria)
2. The surface shows antimicrobial activity for a prolonged period.
3. Simple and inexpensive preparation method.
4. Functionalized PU polymeric surface allows the binding of a vast variety of biocides.
5. Polyurethane catheters hold great potential due to their limited availability in the market.

APPLICATION: Surface coating on the PU-based biomedical device to create a biocidal surface.

SCALE OF DEVELOPMENT: The method and the catheter are developed and tested at a lab scale.

TECHNOLOGY READINESS LEVEL: TRL 4

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