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**Biopolymer-based waste for biomaterials thin film in piezoelectric application**

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**Abstract**
The abundance of biopolymer-based biomass waste generated from various sector including agriculture, aquaculture, forestry, industry and municipal waste is an opportunity to use it as the sustainable feedstock of piezoelectric biomaterials. Rather than disposing these biomass wastes into the landfill or incinerators, these wastes can be converted into value-added product by fabricating it into piezoelectric thin film. The biomass waste is predominantly composed of biomaterials, including polysaccharides and polypeptides, that are polymeric in nature and has the capacity to exhibit piezoelectric effect depending on its crystal structure. Biomaterials that exist in abundance, such as cellulose, chitin and chitosan, can be extracted from biomass waste and can potentially be reutilized as thin film for piezoelectric application. These biomaterials have been reported to possess piezoelectric coefficient of 2-30 pC/N. The reutilization of biomaterials for piezoelectric is significant, as the use of natural polymers from biomaterials will allow the fabrication of biocompatible, biodegradable and flexible thin film that can be used as electronic devices, due to the intrinsic nature of the natural polymers. This study aims to review the potential use of biomaterial thin film in various piezoelectric application, which includes as nanogenerator, biosensors, and biomedical devices. 

**Author Keywords**
Bionanomaterial; Cellulose; Chitin; Chitosan; Collagen; Lignocellulosic biomass; Piezoelectric; Polypeptide; Polysaccharide; Thin film

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