

Keratin extraction from poultry feathers and production of keratin-based biomaterials

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The valorization of poultry feathers wastes is very important to reduce the environmental pollution deriving from their disposal¹. This waste biomass is composed by 90% of keratin, protein with high sulfur content and peculiar properties that make it suitable to produce useful materials in various application fields²⁻⁴. In this work, we developed eco-friendly keratin extraction process which allows to obtain keratin with different molecular weights suitable for different applications. Using directly the raw extracted soluble keratin with low molecular weight (about 10 kDa), mixed with gelatin and 3-(Glycidyloxypropyl)trimethoxysilane (GPTMS) as cross-linker, it is possible obtain keratin-based electrospun mats by electrospinning process which could be used in the packaging field and as filtering/purifying membranes. Instead, the insoluble keratin was used as filler of polylactic acid matrix to obtain bioplastic material for 3D printing applications, without adding additional compatibilizers or plasticizers. Thermal, mechanical, morphological and barrier properties of these different keratin-based bioplastics were investigated, and the results highlighted that the properties can be modulated by changing keratin and GPTMS concentration.

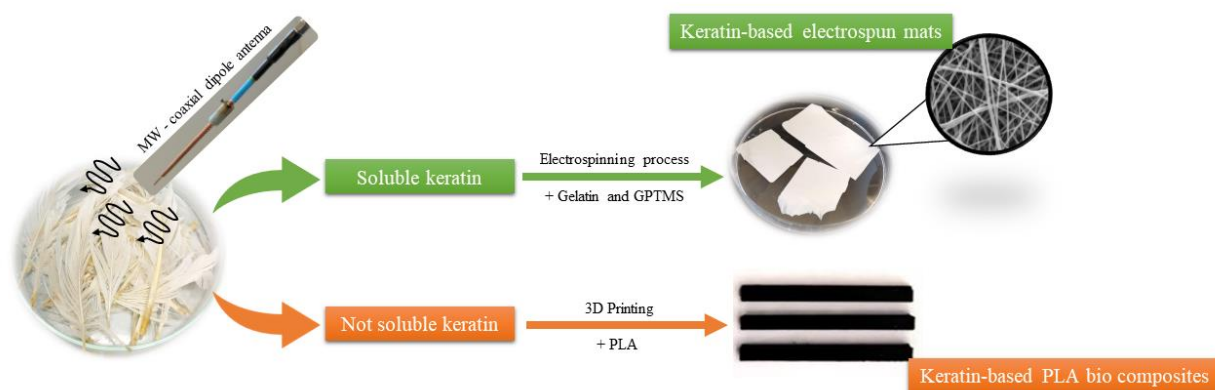


Figure 1. Schematized process that summarizes the main steps to obtain keratin-based materials from poultry feathers.

References

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