

Optimized Nanomilling of Biomaterials by Wet-Stirred Media Milling for Efficient Preparation of Nanoparticles †

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Abstract: Nanomilling technique has been a growing interest in the field of nanotechnology for the effective and efficient production of nanoparticles. It has been advantageous over other chemical and physical methods due to toxicity, chemical retainability, and structural composition. Especially in biomaterials, where many natural bio-products are poorly water-soluble, nano milling has been proved to be a validated process for reducing the particle size. This study has focussed on wet-stirred media milling, a top-down approach for preparing nanoparticles of two natural bio-based polymers, which are used extensively in the research world - starch and cellulose. Different parameters have been optimized for the production of smallest-sized nanoparticles, and a comparative study has been discussed to understand the process of grinding particles. Particle Size Analyser has been used to check the trend of change in size at different milling-time. The size and morphology of the particles were confirmed by microscopy tests, with chemical and structural changes of materials examined from FTIR and XRD techniques. The nanoparticles for respective biomaterials were prepared successfully from this method, and a detailed comparative investigation has been presented in this study.

Keywords: nano milling; stirred media milling; nanosuspensions; biomaterials.

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Conflicts of Interest

The authors declare no conflict of interest.