



Biomass refers to renewable organic materials, including agricultural products and agricultural wastes, wood and its wastes, animal wastes, urban wastes, aquatic plants, and so on [1]. Lignocellulosic materials are the most abundant renewable organic biomass on Earth, being constantly generated through photosynthesis and existing in large



whiskers formed only by the crystalline regions are obtained. The successful nanofibrils extraction from orange peel was performed by its hydrolysis "in natura" using both cost-efficient enzymes from *Xanthomonas axonopodis* pv. citri (*Xac*) and commercial enzymes [10,22]. The nanocellulose isolated from the enzymatically treated solid residues have an average aspect ratio of  $47 \pm 18$  nm, which is considered