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Comparative study of enzymatic and chemical denaturation of wheat gluten and their cellulosic nanocomposites

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Nano celluloses derived from agricultural wastes have promises to improve the mechanical and barrier properties of nanocomposites that can be further improved by addition of inorganic filler which impart antimicrobial activity beside enhanced mechanical properties to the nanocomposites. In this work, enzymatic denaturation of wheat gluten was performed using Alcalase enzyme to improve the solubility and processibility of wheat gluten. The variables used in this step are enzyme dose (0.5, 1, 2%) based on wheat gluten and time (2, 4, 6, 8, 24 hours). No significant difference in protein solubility was observed under these conditions, so 0.5% enzyme dose was used for the preparation of the studied films. The denatured wheat gluten was filled with nanofibrillated cellulose (NFC) and TiO₂. The resultant films were tested in terms of tensile strength and contact angle measurements. Also, the morphology of the tested films was studied. The mechanical testing showed relatively low results when compared to chemically denatured films. Water resistance of the nano composites expressed in contact angle measurements as a non-destructive method was deteriorated.

Biography

Nahla A El-Wakil has completed her PhD from Chemistry department, Faculty of Science, Cairo University and Postdoctoral studies from National Research Centre, Cairo, Egypt. She has published 27 papers in reputed journals and has been Principle Investigator and Member Investigator of many projects.

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