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TiO_2 Nanocomposites: Preperation, Characterization, Mechanical and Biological Properties

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Abstract— Some novel nanocomposites, which contain different concentrations of TiO_2 nanopowders, were firstly prepared by using marble dust with convenient chemical components. Their nano structures characterized and distributions of the nano-aggregations related with internal structural content of the samples have been determined by X-ray Scattering Methods (SAXS and WAXS) and mechanical properties were determined by using strain-stress measurements to increase their potential usage possibility as building materials in health and research centers. In the last and important part of the study, *Candida albicans* and *Aspergillus niger* which are a significant risk to medical patients were used to investigate originally prepared nanostructured samples' photocatalyst effect. During the last part of the study, effect of UV and visible light on photocatalyst nanocomposites were also researched. Heterogeneous photocatalysts can carry out advanced oxidation processes used for an antimicrobial effect on microorganisms. TiO_2 nanoparticles as one of heterogeneous photocatalysts have been shown to exhibit strong cytotoxicity when exposed to UV and visible light.

Keywords : Antimicrobial, Photocatalyst, Titanium dioxide, SAXS,WAXS

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Highlights

- TiO_2 nanocomposites show antimicrobial effect on fungi which are a significant risk to medical patients.
- Synthesize nanostructured materials from waste materials which have technological importance.
- Potential nano composite - building material for health and research centers