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### The prominence of titanate nanotubes' functionalization on their physicochemical properties and biological applications as drug delivery system

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Ceramic materials such as titania are hydrophilic by nature due to the existence of hydroxyl groups, which limits their applications. Therefore, the hydrophobization process is needed in order to improve their permeability and other physicochemical properties besides decreasing their toxicity [1].

In the previous stage of the study composites of TNT with atenolol (ATN) and hydrochlorothiazide (HCT) were formed using various solvents [2]. The physicochemical properties of the samples were investigated by using TEM (FEI, OR, USA) and SEM (Hitachi, Japan) imaging to analyze the texture, an optical contact angle tester (DataPhysics, Germany) to determine the surface free energy, a FT-IR spectrometer (Thermo Fisher Scientific Ltd., MA, USA), and a DSC/TG apparatus (Mettler-Toledo Ltd, Hungary) to detect the interaction between drugs and TNTs. According to the results, the appropriate choice of the solvent leads to a better quality of the formed composite, which results in improved dissolution properties. However, the composite was found to be unable to be absorbed as drug delivery system. Therefore, TNTs were functionalized by using trichlorooctylsilane, trichlorooctadecylsilane and Mg stearate in order to improve their permeability and decrease toxicity.

The characterization of functionalized TNTs was assessed by using TGA, OCA, CHNS elemental analyser and FT-IR. Toxicity was studied with MTT assays while the result of the permeability study was evaluated with an X-ray fluorescent analyser.

#### References

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