BOOK OF ABSTRACTS

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Evaluation of Mechanical Properties, Color Stability and Surface Roughness of Pit and Fissure Sealants Reinforced with Organomodified Clay Nanoparticles

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Abstract: Occlusal pit and fissures frequently occurred in children and adolescents' teeth may be susceptible to cariogenic bacteria attacks, due to their specific morphological characteristics, resulting in dental caries. Pit and fissure sealants can ensure a physical barrier against microbial invasions. The perspective of exploiting nanoclay fillers could promote the ultimate properties of pit and fissure sealants. In the present study, new pit and fissure sealants were synthesized and characterized by incorporating variant organically modified clay nanoparticles into the polymer matrix. The morphological characteristics of the obtained sealant nanocomposites were investigated by means of X-ray Diffraction Spectroscopy (XRD) and Scanning Electron Microscopy (SEM). Flexural modulus, flexural strength and compression strength parameters of the synthesized sealants were estimated using a dynamometer, while Vickers microhardness measurements were carried out with a microhardness tester. Color changes after aging in black tea were calculated based on spectra records taken with a UV-Vis spectrometer. The surface roughness comparisons were determined by means of a 3D optical profilometer. It was found that the specific type of nanoclay modifier may have a significant impact on the final mechanical and optical properties of the produced sealants. Especially, the presence of vinyl-groups in the chemical structure of the clay organomodifier contributed to a better overall performance of the sealants maybe due to their high affinity with monomers, which in turn can lead to a possible involvement of the clay nanoparticles in the polymerization process.