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Use of pseudoboehmite nanoparticles treated with sodium polyacrylate for metformin release.

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Nanoparticles are thermodynamically unstable and have a natural tendency to aggregate. In this way, it becomes a great challenge to prepare stable nanomaterials to avoid particle agglomeration. Pseudoboehmite is a synthetic ceramic material obtained by the sol-gel process consisting of a network of inorganic oxides with high porosity and purity that can be used for drug release systems [1,2]. Sodium polyacrylate is a polymer widely used as a dispersant [3], capable of modifying the particle's surface, promoting hysterical impediment and, in some cases generating electrical charges that determine repulsive forces. The Zeta potential can evaluate this effect caused by the formation of charges at the interface. Pseudoboehmite solutions were prepared by adding different levels of sodium polyacrylate to these solutions. The aliquots were analyzed using the Dynamic Light Scattering technique (DLS) to evaluate the particle size and the suspensions' stability by measuring the Zeta potential. This work studied the interaction between Metformin (Metformin Hydrochloride) and pseudoboehmite treated with sodium polyacrylate to use this ceramic material in the controlled drug release. The in vitro metformin release assay was evaluated using UV-Vis spectrophotometry. X-ray diffraction data show that only the pseudoboehmite phase is present in the sample.

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[2] PERES, R.M., SOUSA, J.M.L., DE OLIVEIRA, M.O, ROSSI, M.V., OLIVEIRA, R.R., LIMA, N.B., BERNUSSI, A., WARZYWODA, J., SARMENTO, B. & MUNHOZ JR, A.H.. Pseudoboehmite as a drug delivery system for acyclovir. **Sci Rep** 11, 15448 (2021). <https://doi.org/10.1038/s41598-021-94325-y>

[3] MATHIEU, Yannick; Séverinne Rigolet, Valentin Valtchev, and Bénédicte Lebeau. Investigations of a Sodium–Polyacrylate-Containing System Yielding Nanosized Boehmite

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