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Evaluation of the microbiologic properties of bentonite submitted to ionic trade with treated silver nitrate in various acid environments

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The various types of bentonite existent in nature present many application possibilities in industry. A significant number of industries, from the ceramic sector to the cosmetics, the market for the bentonite is of thousands of tons. In this context, the practice of study in the attempt to amplify its scope of application may present possibilities of application in new products or in new industrial sectors. One of the possibilities to achieve that is to endow this clay with bactericide properties, allowing it to be applied as a bactericide additive in whatever product that requires those particular properties. Antimicrobial materials are compounds which possess the ability to inhibit growth or kill determined microorganisms. The scope of application for this class of materials is quite broad. For centuries biocide agents have been used for this control, especially for the preservation of water purity (use of copper and silver jars). Food products, development of antimicrobial materials destined to the manufacture of products applied in special environments as well as many others.

According to the application of the antimicrobial materials specific production methods involving the most appropriate antimicrobial agent are utilized. Many of the antimicrobial materials are developed employing compounds as additives, of which silver salts stand out for their high bactericide efficiency. In this particular work the possibility of incorporating bactericide properties in bentonite was evaluated. After its characterization, the bentonite was submitted to treatments with different acid solutions with different times of immersion. The following were used as acid solutions: chloric acid, sulfuric acid and nitric acid. Once the acid treatments were completed the bentonite was immersed in distilled water for 24 h and then dried in a greenhouse at 110°C for 18 h. The bentonite was grinded and submitted to ionic trade with silver nitrate in an environment at 430°C, after that it was prepared for the proper microbiologic essays. Standard Agar-Diffusion microbiologic tests were applied for microbiologic characterization. The bacteria used in the microbiologic tests were the *Escherichia coli* (gram negative) and *Staphylococcus aureus* (gram positive). The microbiologic results showed it is possible to incorporate the bactericide active principle into the bentonite and that the bactericide effect is dependant of the acid solution employed in the acid treatment.

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