Title: **Study of the phosphorus adsorption capacity of natural basaluminite using a fixed-bed column.**

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The current situation of water resources in the world is highly conditioned by the concurrence of various factors such as excessive demands for water or its contamination with different types of substances. In this case, we focus on aqueous phosphorous increase in natural waters, these phosphate ions have increased the eutrophication of water and as a consequence, the decrease or depletion of oxygen in natural waters occurs, causing the death of its biodiversity.

In the recent years, different technologies have been investigated to remove excess phosphorous from wastewater. Conventional biological and chemical precipitation removal of wastewater treatment plants (WWTP) cannot reduce phosphorus concentrations to ultra-low levels (below 0.1 mg / l). Diverse studies indicate that aluminium oxides are used as phosphate adsorbents in batch and column experiments which can provide effluents with P at ultra-low levels. In this case, natural basaluminite mineral ($Al_4SO_4(OH)_{10} \cdot 5H_2O$) has been chosen as an adsorbent for a column experiment, which comes from the residue of a passive treatment of acid mine drainage (AMD).

A fixed bed column experiment with continuous flow of aqueous phosphate solution has been conducted. The pore volume and its porosity have been calculated through a tracer test. The P sorption in the column has been studied with the breakthrough curve experiment, finding its breakpoint and saturation point. The amount of solute per gram of adsorbent at the breakpoint has been calculated, with a value of 43.12 mg P / g basaluminite and its maximum sorption capacity, with a value of 40.46 mg P / g basaluminite. The results show that basaluminite could be used as an adsorbent for the removal of phosphorous from water, because it has a higher adsorption capacity than the vast majority of other studied adsorbents, and it has a lower cost than most adsorbents.

Keywords: Phosphate, Basaluminite, WWTP, column experiments, acid mine drainage, breakthrough curve, sorption capacity