

E2-51: Removal of phosphate from polluted water

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Scientists have realized many ways by which phosphate compounds affect the quality of the environment, and consequently, phosphate determination has grown rapidly in environmental analysis. Phosphorous itself is non-toxic; however, it is essential that phosphate and related substances be removed from industrial effluents and from polluted water to prevent eutrophication of the receiving surface water bodies. Further, high levels of phosphates in water result in phosphorous rich water/soil in agricultural areas.

Dolomite shows the highest efficiency for removal of phosphate among many natural substances: rice-husk, saw-dust, burnt brick pieces, kaolinite, ball clay and neem seeds. The efficiency of the removal process heavily depends on experimental parameters such as amount of dolomite, pH of medium, flow rate, length of packing, etc. The predominant form of the phosphate ion depends on the pH of the medium, and the pH at which the maximum removal is observed is 6.4 under both static and dynamic conditions. Although the other parameters show the expected trend for the extent of phosphate removal, the compromise between the removal efficiency and the amount of the adsorbent dictates that the amount of dolomite, flow rate and packing length be kept at 100.0g, $10 \text{ cm}^3 \text{ min}^{-1}$, and 25 cm, respectively, for studies under dynamic conditions. Although the percent removal, under optimized conditions, is 84% for laboratory prepared solutions (of 10.0 mg dm^{-3} phosphate), a removal of 50-60% was encountered for polluted water samples.

Financial assistance by the Post-graduate Institute of Science (Grant PGIS/RG/2/97) is acknowledged.