Phosphorus recoveries from membrane concentrate by an electrokinetic process

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Phosphorus (P) is an essential nutrient for all life forms, being the most limiting nutrient in both terrestrial and aquatic environments. However, the static lifetime of primary phosphate reserves, defined as minable deposits divided by the actual annual consumption, are estimated to last only about one century.

P can cause algal blooms and water quality problems in estuaries, lakes and rivers. When site conditions are propitious these algal blooms occur and toxic cyanobacteria are developed in a quick way, being hazardous to human health. Therefore it is essential to use adequate separation techniques to constrict these toxins.

If cyanobacteria blooms occurred in water reservoirs used for drinking water supplies, water treatment technologies, like membranes, can be used to guarantee safe levels of contaminants in water (e.g. toxins). The membrane acts as a physical barrier, allowing water to pass while retaining the suspended solids and even dissolved materials, depending on its type.

It is then necessary to treat concentrated waste streams in order to create an integrated and safe treatment sequence for Water Treatment Plants while recovering P in the process. Electrokinetics should work as a P recovery method and, at the same time, contaminant removal. The electrodialytic process is a remediation technique for removal of contaminants but can also be applied as a nutrient recovery technique. The method uses a low-level direct current, combining the electrokinetic movement of ions in the matrix with the principle of electrodialysis.

This work aims to present the preliminary results on phosphorus recovery using the electrodialytic process applied to membrane concentrate.

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