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A SUSTAINABLE ECONOMY  
WHITE PAPER FROM  
SPECTRO ANALYTICAL INSTRUMENTS

# Effluent Phosphate Recovery & Recycling: The Latest Analytical Solutions

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## Introduction

The world faces two problems due to the longstanding practice of using phosphorus-containing materials as fertilizer: finite supply and growing pollution. Both are concerns for individuals, corporations, and other organizations focusing on environmental, social, and governance (ESG) factors to ensure a sustainable future.

This report will outline the contours of the phosphorus problem, and some possible solutions, for the benefit of managers of incineration plants and other facilities processing sewage sludge.

It will highlight a key solution set: recovery and recycling of phosphate from sewage, as well as from other effluents such as biogas fermentation residues. It will then focus on analytical technologies such as *energy dispersive X-ray fluorescence (ED-XRF)* and *inductively coupled plasma optical emission spectrometry (ICP-OES)* analyzers.

The most advanced models utilizing these techniques can provide easy, efficient measurement — of concentrations of phosphorus, heavy metals, and other elements — at crucial points in the phosphorus recovery/recycling process.

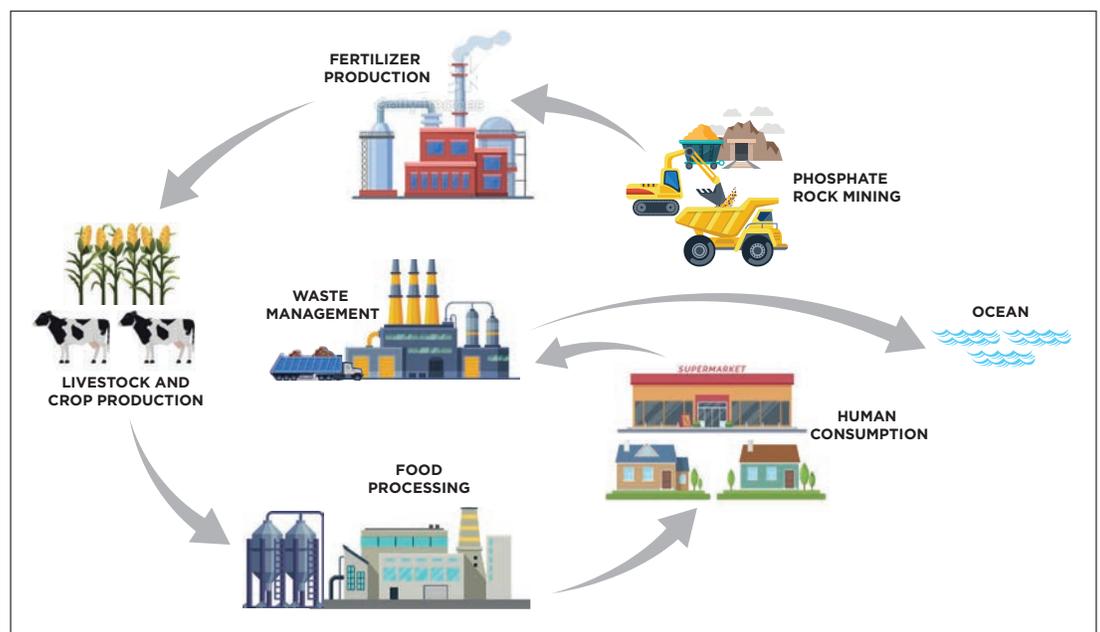




### The Phosphorus Problem

The element phosphorus (P) provides nutrients essential to the health — indeed, the life — of both plants and animals. In humans, it’s critical to the development, structure, and functioning of components such as our bones and teeth, as well as our muscles, cell membranes, RNA, DNA, and more.

Grasping the phosphorus problem depends on understanding the current phosphorus use cycle (see graphic).



*The Phosphorus Cycle*

*Mined from phosphate mineral, phosphorus is added as a key component to fertilizers, which are used to grow crops for consumption by humans and livestock. Via both agricultural runoffs and human and animal wastes (as well as runoffs from mining and even natural erosion), this valuable resource is eventually lost to the sea.*