

Title: **Development and optimization of water analysis methods.**

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Water analysis methods for industrial equipment are important as keeping a plant clean hugely reduces costs and time. From boilers to osmosis, the equipment needs to be as efficient as possible. Furthermore, microbiological activity must be detected and cut out to keep surroundings people safe. For these reasons not only the water impurities are analysed, but the chemical products remainder to keep in control the whole facility.

One of the main analytical techniques is inductively coupled plasma (ICP). ICP coupled to an optical emission spectroscopy (OES) detector instrument allows the analysis of a wide range of elements. Although every installation has its needs, ICP-OES allows the multielement analysis to control various parameters using only one method.

Knowing the limits of the technique is important to be conscious of the veracity of the results obtained. At the same time limits are used as a control of how the instrument is getting older. As much performance an industrial plant have, much is the need to find little impurities which would lower its efficiency.

Analysis limits of the existing method are located. A new method for high pressure boilers is created and validated with lower detection and quantification limits.

A digestion method to improve total phosphorous recovery is designed. The previous recoveries were from 50 to 70%, depending on the compound. The new method allows the full recovery of total phosphorous analysed with ICP-OES.

Keywords: industrial facilities, water analysis, inductively coupled plasma optical emission spectroscopy (ICP-OES), detection and quantification limits, total phosphorous recovery.