THE USE OF TRIETHANOLAMINE AS A BUFFER IN ACID DIGESTS FOR THE DETERMINATION OF P IN PLANT TISSUES

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The problem

In our lab we use a mixture of HNO_3 and $HClO_4$ (2:1) to digest plant tissues in open vessels. The method is fast and very efficient for metals determined by FAAS. However, when it comes to the determination of P in a UV spectrophotometer certain problems arise:

We use the ammonium molybdate method and measure P concentrations at 660 nm wavelength. As we all know the color (blue color) development depends on the pH of the solution under consideration.

Although the dilution of the digest extracts is 1:100, the pH is still very low (<1).

Moreover, the amount of $HClO_4$ left after digestion in each vessel varies, so it is not possible to match standards and samples according to the matrix.

By trial and error we tried several bases. We found that the use of triethanolamine has some advantages.

We made a solution of 1:5 triethanolamine to water. Then in each 100 mL flask we put 10 mL of that solution and made up to 100 mL. We measured the pH of the solution and was found approximately 7.

We determined P concentrations in a maple reference sample the value of which was known (1.43 mg/kg).

The results found were:

With buffer	Without buffer
Average: 1.65 mg/kg	1.24 mg/kg
CV: 3.2%	19%

Conclusions

The use of the buffer improved the precision of analysis but not the accuracy. However, with the use of the reference material we can create an algorithm with which the real value can be found.

THANK YOU FOR YOUR ATTENTION