

# A PROPOSAL TO GUARANTEE METROLOGICAL TRACEABILITY IN THE DETERMINATION OF HEAVY METALS CONTENT IN CORK STOPPERS BY ICP-MS



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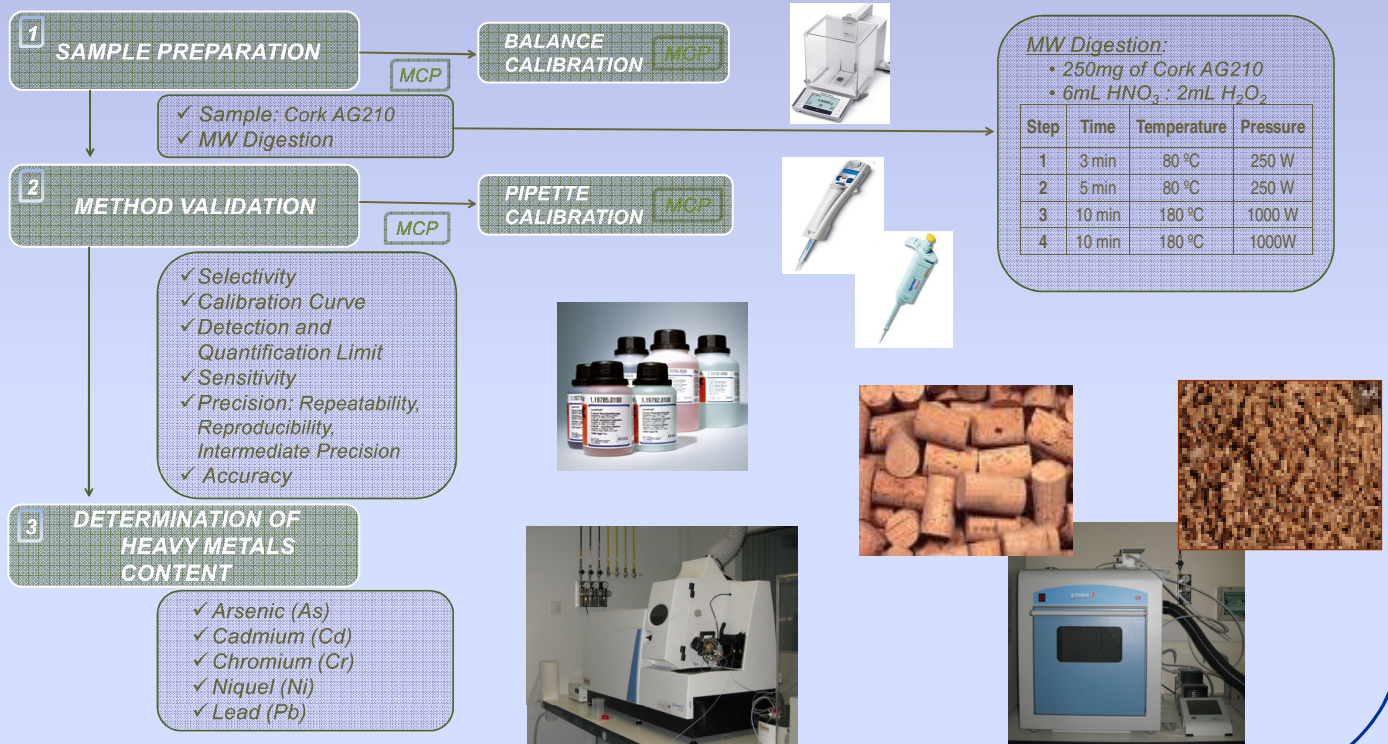
## INTRODUCTION

The compliance of heavy metals content in cork with European Legislation for materials in contact with food and beverages is an important requirement of safety and quality of cork stoppers. However there are few specific regulations for cork. Therefore metrological strategies to assure reliability of analytical measurement results are crucial to ensure that the quantification of chemical contaminants is effectively in line with limits established in law.

In this work a general approach is described for the implementation of metrological traceability covering all analytical procedure for determination of Arsenic (As), Cadmium (Cd), Chromium (Cr), Nickel (Ni) and Lead (Pb) contents in cork stoppers with the potential to migrate to beverages.

## MATERIALS AND METHODS

A flowchart diagram to identify the critical points of the experimental procedure that need to be under metrological conditions is described. The experimental procedure encompasses the test conditions to simulate migrations for beverages, digestion procedure and determination of heavy metals content by ICP-MS.



## RESULTS AND DISCUSSION

**Table 1** – Identification of the several Metrological Critical Points (MCP)

Metrological Control Points (MCP)	Metrological Justification
Volume of solutions	Traceable to National Standard
Weighing	Traceable to National Standard
Accuracy	Recovery of the spikes
Purity of Internal Standard	Manufacturer's information

**Table 2** – Calculated values for the determination of inorganic contaminants

	Concentration (µg/kg)				
	As	Cd	Cr	Ni	Pb
Ag210 (1)	317	22	317	293	131
Ag210 (2)	321	20	321	269	118
Repeatability (%)	31.7	6.7	0.9	6	7.4
Recovery (%)	98	71	107	127	111
LoQ (µg/kg)	6.4	2.4	7.3	2.3	2.3

## CONCLUSIONS

This metrological approach ensured the traceability of assigned values of inorganic contaminants in cork stoppers and demonstrate concordance of test conditions with ISO/IEC 17025 requirements.

## References

U. Voellkopf, M. Paul, E. R. Denoyer: Analysis of solid samples by ICP-mass spectrometry, Fresenius J Anal Chem (1992) 342:917-923

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