

# Two fundamental tools to prevent Cobalt misuse: control and education

Patricia I. Porto<sup>1,¥</sup>

Marina I. Malo<sup>1</sup>

Teresita Zambruno<sup>2</sup>

Cecilia Barbara<sup>1</sup>

Alberto Costa<sup>2</sup>



*In 2019, the technique for cobalt in equine urine samples by ICPE-OES was validated. 101 samples out-of-competition from different zones of Argentina and 1130 samples post-race of San Isidro racecourse. Surprisingly, 5.94% of OOC samples and 4.42% of post-race samples were over the international threshold of 100ng/mL.*

*As the major natural intake of cobalt comes from food, that number of irregular samples was not expected and could be related to the extended misuse of cobalt nutritional supplements and B12 vitamin.*



## MATERIALS AND METHODS

Cobalt analysis was performed by diluting each urine sample 1/10 with Nitric acid 1% (Suprapur® Merck, Germany) and measured in a coupled plasma emission spectrometer, ICPE-9820, Shimadzu Corporation. The analytical parameters are summarized in table 1.

Analytical Parameter	
RF Power (W)	1200
Carrier Gas (L/min)	0.7
Plasma (L/min)	10
Exposure Time (s)	30
Direction	Axial
Wavelength (nm)	238.892

**Table 1:** ICPE-OES Analytical Parameters

With each group of samples, a calibration curve and a QC of 100ng/mL were analysed (Curve: negatives urine added at 0-1000ng/mL with cobalt solution 1000ug/mL Chem-Lab, Belgium). The cobalt concentration of samples and QC was determined by interpolation on the calibration curve.

The validated method to analyse cobalt in equine urine by ICPE-OES, has a repeatability within days and between days of 1.86% and 3.53%, bias of 6.5ng/mL, LoD 4.0ng/mL and LoQ 39.9ng/mL, linearity (0-1000ng/mL) with R<sup>2</sup> ≥0.99.

## RESULTS AND DISCUSSION

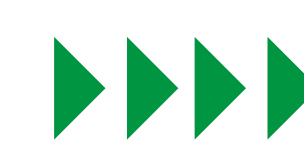
Routine cobalt determination in post-race samples at San Isidro racecourse began in August 2021. In two months, 695 post-race samples were analysed, 9 cases were positive (1.29%). The control of cobalt misuse through detection and punishment meant a significant improvement, however, they proved to not be enough.

An awareness campaign began in October 2021. Two seminars were held in October 2021 and May 2022, for veterinarians and trainers. The topics included the scientific origin of cobalt threshold, as well as its natural sources, the real need for the element and its application routes.

After the first seminar the percentage of positive cases decreased to 0.78% (16/2056) and later in the second one the drop reached to 0.29% (7/2402).

In 2023 San Isidro racecourse had a 0.44% of positive cases (9/2026), 3 of them were from the same trainer. At the same time another racecourse in the country had a 1.14% of positive cases (16/1406).

## CONCLUSIONS



As it has been observed, the percentage of positive cases has indicated the extended misuse of cobalt. It was through the awareness campaign that trainers managed to comprehend the importance of not misapplying cobalt.

In our case the communication strategy included information in an appropriate language to the audience, with a first instance of face-to-face and virtual seminars focused on trainers and veterinarians in general and a second instance of emphasize the information for some individual case.

To change deeply rooted habits, control and punishment are not enough. In this instance, education is an indispensable tool.