

# Proficiency Testing Activities; Experience of a Laboratory for Food Quality Control

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## INTRODUCTION

The Institute of Public Health is the first public health institution in the FYROM that has established Quality Management System according to ISO/IEC 17025. The accreditation has been granted by the National Institute for Accreditation in December 2006. Since the first accreditation, our laboratory participated in 15 PT schemes, organized by different providers, such as: Muva Kempten Quality Management & Laboratory Services; FAPAS; DRRR Deutsches Referenzbüro für Lebensmittel-Ringversuche und Referenzmaterialien; LGC; Asia Pacific laboratory Accreditation Cooperation etc.

The matrixes analyzed were: coffee cream, cream, powdered milk, yoghurt butter; cheese; oily dressing, cola drink, cabbage puree, fresh cheese, orange juice, potable water, water real sample, animal feed cereal based, fish oil, maize flour, corn flakes, graham flour, synthetic food of vegetable and animal origin, homogenized canned fruit, powdered rice, dietetic product etc.

The parameters that were analyzed were: fat content, dry matter, water content, benzoic acid, nitrate content, caffeine, saccharine, K – acesulfame, protein content, pH, citric acid, fructose, glucose, sucrose, total sugars etc.

## RESULTS AND DISCUSSION

The total number of tested parameters was 60. 47 (78.3 %) of the results obtained were with satisfactory z score ( $z \geq 2$ ); 2 (3.3 %) of tested parameters had doubtful z score ( $2 < z < 3$ ) and 11 (18.3 %) of tested parameters had unsatisfactory z score ( $z \geq 3$ ).

The highest percentage of unsatisfactory z scores (38.5 %) and the highest unsatisfactory value for z score (15.7) was obtained for the determination of the fat content in fatty food matrices. This is due to the systematic errors made during analysis performance as: improper homogenization of the matrix, shorter duration of

**Table 1.** The values for z score obtained in PT schemes with fatty food matrices

Parameter	Number of results	z-score		
		$ z  \leq 2$	$2 <  z  < 3$	$ z  \geq 3$
Dry matter	10	8	0	2
Fat content	13	7	1	5
Free fatty acids	1	1	0	0
Iodine value	2	2	0	0
Peroxide value	2	2	0	0
Protein content	5	5	0	0
Saponification value	1	1	0	0
Unsaponifiable matter	1	1	0	0
Water content	2	1	0	1
Ash	1	1	0	0
<b>Total</b>	<b>38</b>	<b>29</b>	<b>1</b>	<b>8</b>

\* An absolute z-score

**Table 2.** The values for z score obtained in PT schemes with soft drinks and cabbage puree

Parameter	Number of results	z-score		
		$ z  \leq 2$	$2 <  z  < 3$	$ z  \geq 3$
Acesulfame Potassium	2	2	0	0
Benzoic acid	1	1	0	0
Sorbic acid	1	1	0	0
Caffeine	1	1	0	0
Saccharin	2	1	1	0
Artificial colours: Allura red Carmoisine Sunset yellow Erythrosine	4	2	0	2
Nitrate content	1	1	0	0
Brix	2	2	0	0
pH	2	2	0	0
Citric acid	2	1	0	1
Fructose	1	1	0	0
Glucose	1	1	0	0
Sucrose	1	1	0	0
Total sugars	1	1	0	0
<b>Total</b>	<b>22</b>	<b>18</b>	<b>1</b>	<b>3</b>

\* An absolute z-score

Soxhlet extraction and errors made during drying and cooling of glassware to constant temperature.

The highest percentage of unsatisfactory z scores in analysis of in soft drinks and cabbage puree (50 %) were obtained for the analysis of artificial colors (Sunset yellow and Erythrosine) in soft drinks. The principal problems associated with the determination of colour additives in beverages are the mixtures of colours and the diversity of potential interferences present. The results demonstrated the need to improve the existing HPLC method in order to achieve better selectivity and separation, especially for analysis of sunset yellow and erythrosine.

**Key words:** Proficiency Testing Schemes; Food Quality Control; ISO/IEC 17025

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