ARTICLE

EVALUATION OF A NEW REAGENT FOR THE DETERMINATION OF THE MILK FAT ACIDITY USING THE BDI METHOD (ACCORDING TO THE ISO/TS 22113|IDF/RM 204 STANDARD)

January 4, 2021 marked the end of the authorization for use, under the REACH regulation, of Triton X-100 (surfactant composed of polyethylene glycol ether and octylphenol) which had been added to Annex XIV of the regulation REACH on July 3, 2017.

This reagent is an integral part of the extraction reagent used for the determination of the milk fat acidity according to standard ISO/TS 22113| IDF/RM 204 (70 g of sodium hexaphosphate; 30 g of Triton X-100 qsp 1000ml; pH 6.6).

Thus, in order to overcome this interdiction of use, investigations were carried out within the framework of the IDF/ISO permanent committee "Analytical methods for composition" to find a substitute for this product in the context of the determination of milk fat acidity according to the BDI method. A surfactant already used in other methods on milk and dairy products: Tergitol™ 15-S-9 has been identified as a potential reactive substitute.

Comparative tests were carried out in September and October 2021 in 2 test laboratories. They consisted of analyzing several milk samples at different levels of fat acidity using 2 extraction reagents, one containing Triton X-100 and the other Tergitol™ 15-S- 9 (Acros organics: Ref 464250010 or Sigma-Aldrich; Ref: 15S9-1L) at equivalent concentration (30 g qs 1000 ml).

1. Repeatability study

The repeatability was evaluated on the 2 extraction reagents tested (with Triton X-100 or with Tergitol™ 15-S-9) on 10 milk samples at different levels of fat acidity.
The results are presented in the table below:

	N	Min	Max	M	Sr	Sr %	R
Triton X-100	10	0.350	1.075	0.692	0.011	1.59%	0.031
Tergitol™ 15-S-9	10	0.368	1.121	0.721	0.004	0.55%	0.011

Table 1: results obtained in mmol/100g of fat

The repeatability values obtained show that the performances of the 2 extraction reagents tested are equivalent. The values obtained are below the limit r of the ISO/TS 22113| IDF/RM 204 standard of 0.072 mmol/100g of fat.

2. Comparison study

A comparison of the results obtained between the 2 extraction reagents tested (with Triton X-100 or with Tergitol™ 15-S-9) was carried out on 20 milk samples at different levels of fat acidity.
The results are presented in the figure below.

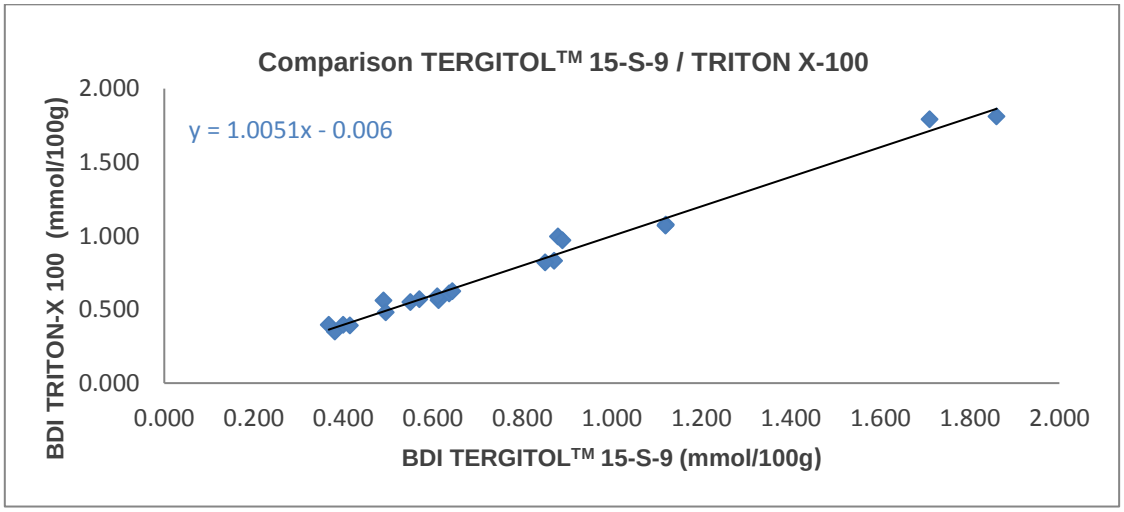

Figure 2: comparison results obtained in mmol/100g of fat

The regression slope obtained between the two series of results is close to 1.00 and the mean deviation obtained between the BDI Tergitol™ 15-S-9 reagent and the BDI Triton X-100 reagent is close to zero (-0.27%) . We can therefore conclude that the results obtained with the 2 extraction reagents tested are equivalent.

3. Conclusion

These results were presented to the ISO/IDF permanent committee in charge of the analytical methods for milk and dairy products. It validated the performance equivalence between the 2 extraction reagents tested and the replacement of Triton X-100 by Tergitol™ 15-S-9 in the ISO/TS 22113| IDF/RM 204 method (the revision of this method is currently in progress).

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