

Strip test for the detection of bovine rennet whey in milk and milk powder

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Introduction

Bovine rennet whey (BRW) is a waste product obtained during cheese production and can be used to adulterate high-priced milk products. Addition of BRW can be detected by the presence of casein glycomacropeptide (c-GMP), a compound specific to rennet whey. The first on-site screening test for BRW is developed: the rapid, easy to use, one-step Stick c-GMP.

Method



Results

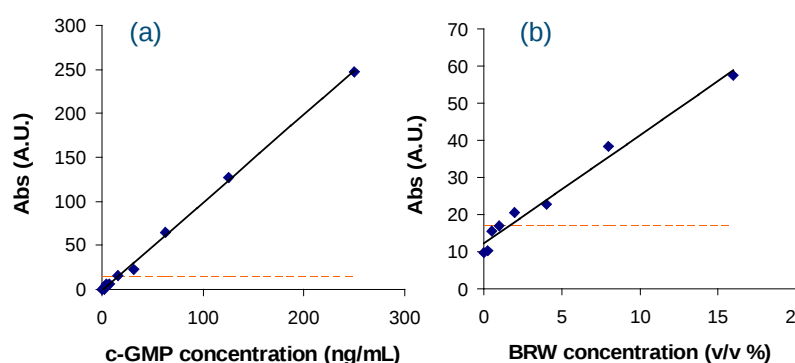


Figure 1. Calibration curves constructed by analyzing (a) standard solutions of c-GMP in buffer and (b) extracts of milk with different BRW content. -- the visual detection limit

Table 1. Visual readings of different types of milk with BRW content between 0% and 16%

% Whey	SMP	Raw	Pasteurized	UHT
0	-	-	-	-
1	±	±	δ	±
2	+	+	+	+
4	++	+	+	++
16	+++	+++	+++	+++

SMP: Skimmed Milk Powder, UHT: Ultra-High Temperature

- negative, δ very weak positive, ± weak positive, + positive, ++ strong positive, +++ very strong positive

Calibration (Fig. 1.)

Good correlation between absorbance and c-GMP and BRW content

Visual detection limits: 15 ng/mL c-GMP, 1% (v/v) BRW

Concentration c-GMP blank milks: ca. 10 µg/mL, i.e. < vLOD (dilution 1000X)

Performance (Table 1.)

Good correlation between intensity bands and BRW content

BRW content > 1% (v/v) is positive

Applicability

60 milk samples (Regional Laboratory of Brazil)

Analysed with c-GMP Stick, GPC-HPLC and sialic acid method (official Brazilian methods)

Methods compare very well at BRW content >2%

BRW content >2% (v/v) is relevant for economical or technological impact

BRW content ≤ ca. 2% (v/v) gives false negative results for strip test and sialic method (dilution factor sample extract can be adjusted)

LOD depends on c-GMP content of the wheys used

Conclusion

The developed strip test is suitable for on-site screening of different milks for the presence of rennet whey at a relevant detection level.

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