A 1 e - Water of Crystallization

GEA NIRO® Method No. A 1 e

Revised: January 2024

1. Definition

The water of crystallization (%) of a powder is the difference between total moisture and free moisture.

2. Scope

This method may be used for any kind of dried milk products containing crystallized lactose (α-lactose-monohydrate), e.g. whey powder.

3. Principle

Sample total moisture (determined by Karl Fisher titration) and free moisture (determined by oven drying 87°C/6h) is measured. The water of crystallization is calculated.

4. Apparatus

4.1 As given in GEA Niro Method № A 1 c.

4.2 As given in GEA Niro Method № A 1 d.

5. Reagents

As specified in GEA Niro Method № A 1 d.

6. Procedure

6.1 Determine the free moisture content as described in GEA Niro Method № A 1 c.

6.2 Determine the total moisture content as described in GEA Niro Method № A 1 d.

7. Calculation

Water of crystallization = % total moisture - % free moisture

8. Reproducibility

± 0.2%

9. Remarks

The water of crystallization of whey powders provides a good indication of the 'Degree of Crystallization' of the lactose content.

$$= \frac{\%\ \text{water of crystallization} \times 19}{\%L} \times 100\%$$

Degree of Crystallization

%L = the content of lactose in whey powder (%), expressed as anhydride. For rapid routine test of sweet whey, the %L ≈ 74%.

10. Literature

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