

Australian Standard®

Methods of chemical and physical testing for the dairying industry

Method 4.7: Dried milk and dried milk products—Determination of the heat stability of skim milk powder

PREFACE

This Standard was prepared by the Standards Australia Committee on Chemical Analysis of Dairy Products to supersede AS 1629.3.4—1978, *Methods for the analysis of dried milk and whey—Physical examination—Determination of the heat stability of skim milk powder*. It is technically identical with the method in AS 1629.3.4—1978.

FOREWORD

The heat stability of recombined evaporated milk during the sterilization process is determined principally by the heat stability of the component skim milk powder. Small amounts of the sodium salts of phosphoric acid may also be used to achieve optimum heat stability.

Heat stability in skim milk powder is achieved by applying sufficient heat to the skim milk, prior to concentration and drying, to denature the majority of the whey protein content. Such skim milk powder is classified as ‘high heat’ and would have undenatured whey protein nitrogen (UDWPN) less than 1.5 mg/g.

An indication of the suitability of ‘high heat’ skim milk powder for recombined evaporated milk manufacture, including the amount of phosphate stabilizers that may be required, can be obtained using the method described in this Standard.

A minimum heat stability in the order of 18 minutes would normally be required by manufacturers of recombined evaporated milk. A combination of heat treatment and phosphate stabilizer addition is likely to be required early in the milk season to obtain this value, with heating alone probably becoming sufficient as the season progresses.

METHOD

1 SCOPE This Standard sets out a method for determining the heat stability of skim milk powder intended for reconstitution as evaporated milk and provides an indication of the suitability of the powder for this purpose.

2 REFERENCED DOCUMENTS The following document is referred to in this Standard:

AS	
2300	Methods of chemical and physical testing for the dairying industry

AS

2300.4.1 Method 4.1: Dried milk and dried milk products—General information and preparation of samples

3 PRINCIPLE The time taken for coagulation of the reconstituted dried skim milk, with and without the addition of phosphate stabilizers, is determined under standard heating conditions.

NOTE: The time taken is a measure of the heat stability of skim milk powder intended for reconstitution as evaporated milk and provides an indication of the suitability of the powder for this purpose.

4 REAGENTS

4.1 Buffer solution A Dissolve 37.5 g of disodium hydrogen phosphate, $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$, in water and make up to 1000 mL.

4.2 Buffer solution B Dissolve 75.0 g of disodium hydrogen phosphate, $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$, in water and make up to 1000 mL.

4.3 Buffer solution C Dissolve 18.75 g of sodium dihydrogen phosphate, $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$, in water and make up to 1000 mL.

4.4 Buffer solution D Dissolve 37.50 g of sodium dihydrogen phosphate, $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$, in water and make up to 1000 mL.

5 APPARATUS

5.1 Laboratory stirrer—variable speed.

5.2 Sealable glass containers—30 mL capacity, free from imperfections and chemically clean.

NOTE: McCartney bottles, with narrow necks, fitted with metal screw caps with threads in good condition, are suitable.

5.3 Boiling water bath

5.4 Heating bath—controlled so that a temperature of $120 \pm 1^\circ\text{C}$ is maintained.

5.5 Safety shield

5.6 Interval timer

6 TEST SAMPLES Test samples shall be prepared in accordance with AS 2300.4.1.

7 PROCEDURE The procedure shall be as follows:

- (a) Weigh 117.0 ± 0.1 g of water at 40°C to 45°C into a 250 mL beaker and commence stirring with the laboratory stirrer.
- (b) Adjust the stirrer speed so as to create a vortex and add 30.0 ± 0.1 g of the test sample at a rate at which no lumping occurs. Stir for 3 min to 5 min, then stand for 30 min to ensure complete hydration.
- (c) Prepare a set of 5 glass containers as follows:
 - To container No. 1, add 0.5 ± 0.01 mL of water.
 - To container No. 2, add 0.5 ± 0.01 mL of buffer solution A (see Clause 4.1).
 - To container No. 3, add 0.5 ± 0.01 mL of buffer solution B (see Clause 4.2).
 - To container No. 4, add 0.5 ± 0.01 mL of buffer solution C (see Clause 4.3).
 - To container No. 5, add 0.5 ± 0.01 mL of buffer solution D (see Clause 4.4).