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DEVELOPMENT OF NEW RSCM PROCESSES

A THESIS PRESENTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTERS OF TECHNOLOGY IN FOOD TECHNOLOGY
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ABSTRACT

All concentrated milks thicken with storage time and the degree of thickening is highly dependent on the storage temperature. The aim of the current research project was to investigate this phenomenon in reconstituted concentrated milk (RCM) and recombined sweetened condensed milk (RSCM) and to investigate a method for overcoming the quality defect. RCM was initially investigated as this system had been extensively documented by previous works at Massey University, New Zealand. The RCM system was chosen to provide an opportunity of learning all about time dependent rheology. It was observed that reshearing of age thickened RCM samples destroyed the ability to age thicken again in subsequent storage. RSCM was then investigated to assess the effect of shear and temperature on age thickening during storage. Two shear levels of 900 and 31,000s⁻¹ were applied during the recombination stage in the process of producing RSCM. Samples of RSCM produced using both shear rates were then stored at temperatures of 30, 40 and 50°C for a period of 12 weeks. Triplicate samples from each storage temperature were analysed weekly for apparent viscosity, particle size distribution and colour. The RSCM samples stored at 50°C gelled by the 7th week while RSCM samples stored at 30 and 40°C did not gel even by the 12th week. The results of particle size distribution were consistent with the age thickening results. The particle sizes of samples stored at 30 and 40°C almost did not change with storage time but the particle sizes of samples stored at 50°C increased with storage time until they gelled. The colour of RSCM became darker with increased storage temperature and time. This was particularly noticeable at 50°C.

The study showed that the commonly observed quality defect in RSCM could be overcome for samples stored below 40°C for at least 12 weeks by the application of shear rates in excess of 900s⁻¹ during the manufacture of the product.

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TABLE OF CONTENTS

	<u>PAGE</u>
ABSTRACT	i
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	viii
LIST OF TABLES	xiii
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 LITERATURE REVIEW	3
2.1 General background to RSCM literature.....	3
2.1.1 Definition.....	3
2.1.2 Advantages and uses of RSCM.....	5
2.1.3 History.....	6
2.1.4 Standards.....	7
2.2 Selection of RSCM ingredients.....	8
2.2.1 Milk powders.....	8
2.2.2 Fat.....	9
2.2.3 Sugar.....	10
2.2.4 Water.....	11
2.2.5 Lactose.....	12
2.2.6 Emulsifier.....	12
2.3 Processing of RSCM.....	12
2.3.1 Recombination of powder.....	14
(1) Recombination temperature.....	14

	<u>PAGE</u>
(2) Air incorporation.....	15
(3) Shear during RSCM recombination.....	15
(4) Sugar addition.....	16
2.3.2 Homogenisation.....	16
2.3.3 Pasteurisation.....	17
2.3.4 Seeding lactose.....	17
2.4 Rheological properties of RCM and RSCM.....	18
2.4.1 Rheology.....	19
2.4.2 Viscosity.....	19
2.4.3 Age thickening.....	21
2.4.4 Methods of viscosity measurement.....	24
2.4.5 Factors affecting viscosity and age thickening of RSCM.....	27
(1) Processing factors.....	27
Homogenisation.....	27
Pasteurisation.....	27
(2) Ingredient factors.....	28
Milk powder effects.....	28
- Heat treatment during the manufacture of the milk powder.....	28
- Seasonal and location effects.....	29
Stabilisers.....	30
(3) Composition factors.....	30
Total solids (%TS).....	30
Protein content.....	31
(4) Product handling factors.....	31
Storage temperature.....	31
Storage time.....	32
2.5 Defects.....	32
2.5.1 Sandy texture or sandy mouthfeel.....	32
2.5.2 Sedimentation of lactose.....	33
2.5.3 Buttons.....	33
2.5.4 Rancid flavour.....	34

	<u>PAGE</u>
2.5.5 Thickening.....	34
2.5.6 Maillard browning.....	34
2.5.7 Microorganisms.....	35
(1) Bacteria.....	35
(2) Fungi.....	35
(3) Yeast.....	36
 CHAPTER 3 MATERIALS AND METHODS	 37
3.1 Materials.....	37
3.1.1 RCM.....	37
(1) Medium heat skim milk powder (MH-SMP).....	37
(2) Whole milk powder (WMP).....	37
3.1.2 RSCM.....	38
(1) WMP.....	38
(2) Fresh frozen milk fat for recombining (FFMR).....	38
(3) Sugar.....	38
(4) Lactose powder.....	38
(5) Cans and lids.....	39
(6) Plastic containers.....	39
3.2 Equipment.....	39
3.2.1 Production equipment.....	39
(1) Recombination rig.....	39
(2) Homogeniser.....	40
(3) High shear mixer.....	41
(4) Plate heat exchanger (PHE).....	41
(5) Can seamer.....	41
3.2.2 Analytical equipment.....	42
(1) Viscosity.....	42
(2) Particle size.....	42
(3) Colour.....	42
3.3 Experimental methods.....	43
3.3.1 Recombination rig operation.....	43

	<u>PAGE</u>
3.3.2 Procedure for RCM experiment.....	44
3.3.3 Procedure for RSCM experiment.....	47
(1) Familiarisation with RSCM manufacture	47
First modification of RSCM process (<i>run C1</i>).....	47
Process modification for optimum sugar dissolution (<i>runs C2, C3</i>).....	49
Development of final protocol for RSCM preparation (<i>run C4</i>).....	51
(2) RSCM storage trials.....	52
RSCM storage trial 1 (ST1).....	53
RSCM storage trial 2 (ST2).....	53
3.4 Analytical methods.....	54
3.4.1 Measurement of physical properties.....	54
(1) Viscosity.....	54
(2) Particle size.....	55
(3) Colour.....	55
3.4.2 Compositional analysis.....	56
(1) Total solids content (TS).....	56
(2) Fat content.....	57
 CHAPTER 4 RESULTS AND DISCUSSIONS	 59
4.1 Reconstituted Concentrated Milk (RCM).....	59
4.1.1 Behaviour of RCM during storage.....	59
4.1.2 Reshearing investigation.....	70
4.2 Recombined Sweetened Condensed Milk (RSCM).....	72
4.2.1 Development of an RSCM manufacturing process.....	73
4.2.2 Storage trials.....	74
(1) Rheology of RSCM.....	75
(2) Particle size distribution (PSD) of RSCM.....	85
(3) Colour development.....	88

	<u>PAGE</u>
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS	94
REFERENCES	97
ABBREVIATIONS	108
NOMENCLATURE	110
 APPENDICES	
Appendix 1.....	111
Appendix 2.....	113
Appendix 3.....	114
Appendix 4.....	116
Appendix 5.....	119

LIST OF FIGURES

	<u>PAGE</u>
▪ Figure 2.1 Flowchart of RSCM process (Adapted from Choat 1979).....	13
▪ Figure 2.2 The relationship of the temperature and insolubility index (A) compared with the relationship of rice grains (undissolved powder formed) weight (B) at the same temperature, 0-80°C (Clarke 1990).....	15
▪ Figure 2.3 Curves for flow behaviour of fluids (Steffe 1996).....	19
▪ Figure 2.4 Relationship between total solids (% TS) and the viscosity of RSCM (Muller and Kieseker 1965).....	31
▪ Figure 3.1 Diagram of the recombination rig (Trinh <i>et al.</i> 2002b).....	40
▪ Figure 3.2 Schematic of the PHE system used to heat/cool the sample.....	41
▪ Figure 3.3 Flowchart of RCM experiments.....	46
▪ Figure 3.4 Plan of RSCM process <i>run C1</i> adapted from Choat (1979).....	48
▪ Figure 3.5 Plans for <i>runs C2 and C3</i>	50
▪ Figure 3.6 Final protocol for RSCM preparation (<i>run C4</i>).....	51
▪ Figure 4.1 Flow curve at the onset measurement of RCWM sample made and stored at 35°C.....	59
▪ Figure 4.2 Flow curves at the onset measurement of RSCM sample made at 35°C and stored at (a) 50°C and (b) 75°C.....	60

PAGE

- Figure 4.3 Effect of storage time at 50°C on the flow curves of 45% TS
RCSM for (a) 0 hour (b) 2 hours and (c) 5.25 hours.....61
- Figure 4.4 Effect of storage time at 50°C on apparent viscosity of
45%TS RCSM selected from the up leg and a shear stress of 100.7Pa.....62
- Figure 4.5 Comparison of experimental data of 45%TS RCSM at 50°C,
time zero and shear up leg with the predicted curve generated using the
Herschel-Bulkley calculation.....63
- Figure 4.6 Yield stress (τ_y) and the consistency index (K) of a 45%TS
RCSM stored at 50°C with time calculated from the shear up leg.....63
- Figure 4.7 Flow behaviour index (n) of 45%TS RCSM stored at 50°C
with time calculated from the shear up leg.....64
- Figure 4.8 Normalised Hysteresis Loop Area (HLA) of 45%TS
RCSM stored at 50°C.....65
- Figure 4.9 Effect of storage temperature on the apparent viscosity at
100.7Pa of RCM converted to the same basis of 35°C.....67
- Figure 4.10 Effect of storage temperature of 35, 50 and 75°C on the
normalised HLA of RCM.....67
- Figure 4.11 Particle size distribution of 45%TS RCSM stored
at 50°C up to 11.5 hours.....68
- Figure 4.12 Schematic of (a) area A (size < 2 μm) and (b) area B
(size \geq 2 μm) of a 45%TS RCSM stored at 50°C for 11.5 hours.....69

PAGE

- Figure 4.13 Particle size distribution of 45%TS RSCM stored at 75°C up to 1.75 hours.....70
- Figure 4.14 Double shearing of 50%TS RCWM sample produced and stored at 35°C with two replicated runs.71
- Figure 4.15 Particle size distribution of the double shearing experiment of 50%TS RCWM processed and stored at 35°C (a) the first day experiment (b) the second experiment (with reshearing).....72
- Figure 4.16 Flow curve at time zero of (a) sugar added first (b) WMP added first.....74
- Figure 4.17 Flow curves of RSCM manufactured at high shear rate at 30°C and time zero.75
- Figure 4.18 Changes of apparent viscosity of RSCM at 201.29Pa measured at storage temperature (30, 40 and 50°C) against storage time (a) high-shear and (b) low-shear manufacture. SD of these points are shown in Appendix 5.....76
- Figure 4.19 Changes of apparent viscosity of RSCM at 201.29Pa measured at storage temperature (30, 40 and 50°C) then converted to 20°C over storage time (a) high-shear and (b) low-shear manufacture.....78
- Figure 4.20 Comparison of experiment data of high-shear RSCM stored at 50°C week 5 and shear up leg with Herschel-Bulkley calculation.....79
- Figure 4.21 Herschel-Bulkley parameters of high-shear and low-shear RSCM stored at (a) 30°C and (b) 40°C where K is the consistency index and n is the flow behaviour index. SD of these points are shown in Appendix 5.....81

PAGE

- Figure 4.22 Herschel-Bulkley parameters of high-shear and low-shear RSCM stored at 50°C where K is the consistency index, n is the flow behaviour index and τ_y is the yield stress. SD of these points are shown in Appendix 5.....82
- Figure 4.23 Example of the noise at the measurement points for the normalised HLA of high-shear RSCM stored at 30°C.....83
- Figure 4.24 Normalised HLA of (a) high-shear and (b) low-shear samples of RSCM stored at 30, 40 and 50°C up to 12 weeks or until it gelled. SD of these points are shown in Appendix 5.....84
- Figure 4.25 Apparent viscosities at 201.29Pa of high-shear RSCM trial 1 at storage temperatures 30, 40 and 50°C.....85
- Figure 4.26 Particle size distribution of high-shear RSCM stored at 30°C for 12 weeks.....85
- Figure 4.27 Changes of the particle size distribution of high-shear RSCM stored at 50°C for 10 weeks.....86
- Figure 4.28 Area B (particle sizes larger than 2 μm) of high- shear and low-shear RSCM stored at three temperatures: 30, 40 and 50°C. The full line represents high-shear RSCM and the dashed line represents low-shear RSCM.....86
- Figure 4.29 Area B (particles larger than 2 μm) of high-shear RSCM trial 1 stored at three temperatures: 30, 40 and 50°C.....87
- Figure 4.30 Visual appearances of high-shear and low-shear RSCM stored at three temperatures of 30, 40 and 50°C.....88

	<u>PAGE</u>
▪ Figure 4.31 Changes of L value (brightness) of high-shear and low-shear RSCM stored at three temperatures: 30, 40 and 50°C. The full line represents high-shear RSCM and the dashed line represents low-shear RSCM. SD of these points are shown in Appendix 5.....	89
▪ Figure 4.32 Changes of a value (red chroma) of high-shear and low-shear RSCM stored at three temperatures: 30, 40 and 50°C. The full line represents high-shear RSCM and the dashed line represents low-shear RSCM. SD of these points are shown in Appendix 5.....	90
▪ Figure 4.33 Changes of b value (yellow chroma) of high-shear and low-shear RSCM stored at three temperatures: 30, 40 and 50°C. The full line represents high-shear RSCM and the dashed line represents low-shear RSCM. SD of these points are shown in Appendix 5.....	90
▪ Figure 4.34 Comparison of our high-shear RSCM data converted to 4.61s ⁻¹ at 20°C presented in full lines with the initial viscosity of Samel and Muers (1962b) presented in dashed lines.....	93
▪ Figure 4.35 Comparison of our low-shear RSCM data converted to 4.61s ⁻¹ at 20°C presented in full lines with the initial viscosity of Samel and Muers (1962b) presented in dashed lines.....	93
▪ Figure A4.1 Plot of ln μ at time zero and $\frac{1}{T}$ to obtain B and C value.....	117

LIST OF TABLES

	<u>PAGE</u>
▪ Table 2.1 Differences between SCM and RSCM.....	4
▪ Table 2.2 SCM and RSCM compositions (adapted from Jensen and Nielsen 1982).....	4
▪ Table 2.3 Reviews of the methods of RSCM viscosity measurement.....	25
▪ Table 3.1 Specifications of spindle design Z2.1 and Z3.....	42
▪ Table 3.2 Shear rate applied in the recombination rig.....	44
▪ Table 3.3 Summary of runs in ST2 trial.....	54
▪ Table A2.1 Summary of RCM experimental runs.....	113
▪ Table A2.2 Summary of RSCM experimental runs.....	113
▪ Table A3.1 Data from the rheometer.....	115
▪ Table A3.2 Manipulated data.....	115
▪ Table A4.1. Data of the high shear RSCM ST2 sample stored at 30, 40 and 50°C at time zero.....	117
▪ Table A5.1 SD of apparent viscosities of RSCM ST 2 stored at 30°C.....	119
▪ Table A5.2 SD of apparent viscosities of RSCM ST 2 stored at 40°C.....	120

	<u>PAGE</u>
▪ Table A5.3 SD of apparent viscosities of RSCM ST 2 stored at 50°C.....	120
▪ Table A5.4 SD of HLA of RSCM ST 2 stored at 30°C.....	121
▪ Table A5.5 SD of HLA of RSCM ST 2 stored at 40°C.....	121
▪ Table A5.6 SD of HLA of RSCM ST 2 stored at 50°C.....	122
▪ Table A5.7 SD of colour parameters (L, a and b) of RSCM ST 2 stored at 30°C.....	123
▪ Table A5.8 SD of colour parameters (L, a and b) of RSCM ST 2 stored at 40°C.....	124
▪ Table A5.9 SD of colour parameters (L, a and b) of RSCM ST 2 stored at 50°C.....	125