ND Pharma & Biotech

DAIRY MADE RIGHT
with
AUGMENTAID™
DAIRY

READY-MADE TRANSGLUTAMINASE-BASED FORMULA
FOR CHEESE, YOGUR AND DAIRY PRODUCTS

AUGMENTAID™ es una formulación funcional basada en la enzima Transglutaminasa especialmente diseñada para mejorar la textura, el rendimiento final y rendimiento en quesos y yogures así como en otros productos derivados de la leche.

La Transglutaminasa actçua sobre los sustratos de leche a lo largo de un mecanismo de ligando-ampliación de las cadenas de proteínas del suero y su anclaje a la caseína. AUGMENTAID™ se puede aplicar en todo tipo de queso de cuajo (fresco, semi-suave, firme, semi-firme, duro y semiduro), del tipo de queso quark, kéfir y demás lácteos elaborados y derivados con toda su grasa, semi-desnatados y/o desnatados incluyendo yogures y preparados de base láctea..

Yogur

Aumenta la textura de "gel", lo que facilita el mallado de proteínas.
Estructura homogénea - Reduce la sinéresis + mayor viscosidad.
Ayuda a reducir la adición de sólidos y estabilizadores como leche en polvo, proteínas reduciendo los costes finales. Utilizará de menos proteínas para mantener una buena textura.
Aumenta la cremosidad ayudando a reducir el contenido de grasa.
No hay actividad residual en el producto final.
Ningún efecto negativo en el sabor y / o textura.
Reduce la necesidad de evaporación.
Eficaz para eliminar las gomas y gelificantes.
Eficaz para aumentar la cremosidad y textura en los productos con un bajo contenido de grasa.
Aumenta la percepción de la calidad (expresado como la satisfacción del cliente).

Queso (general)

Aumenta la producción de queso final de hasta un 20%.
Estructura homogénea - Reduce la sinéresis + viscosidad más alta aumenta y mejora la textura y la sensación en boca.
Reducción y / o eliminación de la adición de proteínas, elementos de normalización, por lo tanto reduciendo significativamente el costo del producto final.
Aumenta la percepción de la calidad (expresado como la satisfacción del cliente).
Aplicable a una gran variedad de quesos. Sin impacto en la calidad de suero de leche.

Tipos Específicos de Queso

Aumenta la producción de queso final de hasta un 20%.
Estructura homogénea - Reduce la sinéresis + mayor viscosidad.
Aumenta y mejora la textura, sensación en la boca y-comportamiento cortar.
Reduce la adición de elementos de normalización de la leche en polvo y hasta el momento la reducción del coste del producto final.
Aumenta la percepción de la calidad (expresado como la satisfacción del cliente).

La TRANSGLUTAMINASA es un elemento ubicuo en la naturaleza, y está presente en la gran mayoría de los tejidos animales y fluidos corporales, así como en una variedad de plantas. Involucrada en una variedad de procesos biológicos, esta enzima actúa sólo sobre las proteínas en la catálisis de reacciones tanto como en la formación de enlaces covalentes entre un grupo carboxilamida de la cadena lateral en un residuo glutaminasa (Gln) y un grupo amino de la cadena lateral de una lisina (Lys). Estas ligazones se pueden formar entre las proteínas de distintos tipos y origen, tales como: caseína, miosina, globulinas de soja, gluten, actina, etc.

AUGMENTAID™ es ofrecido por ND Pharma y Biotech tanto una como ingrediente o en una fórmula cerrada (personalizado) para ciertas aplicaciones a los procesadores industriales de alimentos.

Packaging 5, 10 and 25 Kg Pack. Full Pallet (1.000 Kg).

AUGMENTAID™ Pure formula
99% Transglutaminase.

AUGMENTAID™ Dairy
Transglutaminase, Sodium Caseinate, Maltodextrine, Glycine.

ND Pharma & Biotech

Transglutaminase activity on milk protein and its effect on acid milk gel strength. Importance of Heat Treatment.

Karsten Bruun Qvist, Zhiwei Zhou, Jeanette Otte & Merete Færgemand

Introduction

Transglutaminase (Tgase, EC 2.3.2.13) is an enzyme capable of forming inter- and intramolecular cross-links in many proteins. The enzyme catalyses an acyl transfer reaction between γ-carboxamide groups of peptide-bound glutamine residues as acyl donors and primary amines as acceptors, releasing one molecule of ammonia per cross-link formed. This cross-link occurs naturally in a number of foods, e.g. raw and processed meat and fish, bread, and processed cheese.

We have previously shown that action of transglutaminase on skim milk before acidification can increase the gel stiffness (modulus) about 5-fold, and decrease the permeability coefficient of the gel 2-3-fold (Færgemand & Qvist, 1997). We have also tested use of transglutaminase in the manufacture of yoghurt with normal and reduced fat content. Sensory profiles of low fat yoghurt without protein enrichment could be made to mimic very closely the profile of products with normal fat content and protein enrichment by optimising the amount of transglutaminase used (Færgemand et al., 1999).

The purpose of the present work was to explore the effect of the heat treatment applied to the milk before cross-linking with transglutaminase on the extent of cross-linking and the stiffness of gels formed subsequently by acidification.

Materials and Methods

Reconstituted skim milk (RSM) was prepared by dissolving ultra-low heat skimmilk powder (made by freeze-drying) in distilled water to 11% (w/w). The milk was stored at 5°C overnight for protein rehydration, and then heated with magnetic stirring in a waterbath at 70 - 90°C for 10 - 25 min. Thermally induced association of whey protein with casein micelles was studied by capillary electrophoresis of the micellar fraction, obtained as the sediment after centrifugation at 78,000 G for 1 h. A Ca^{2+}-dependent microbial TGase from *Phytophtora cactorum* was kindly supplied by Novo Nordisk A/S (Bagsværd, Denmark) and used at an enzyme:substrate ratio of 0.4% (w/w). Incubation was at 40°C for 1 h, and then the reaction was terminated by addition of NH_4Cl to 10 mM. The extent of cross-linking after 1 h was determined by analysing for ammonia content. After treatment with heat and Tgase the milk was acidified with 2% (w/w) glucono-δ-lactone (GDL) at 40°C in a Bohlin VOR rheometer system. Final storage modulus, G', was recorded after 3 h as a measure of gel stiffness.

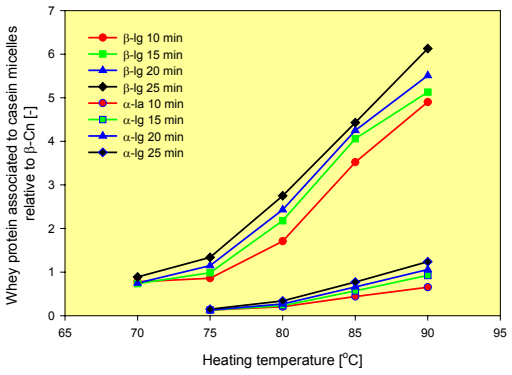

Figure 1. Effect of milk heating on association of whey proteins with casein micelles. Heating time indicated.

Results and Discussion

Increasing amounts of β-lactoglobulin (β-lg) and α-lactalbumin (α-la) were associated with the casein micelles with increasing intensity of heat treatment (Figure 1). The previous finding that Tgase action on heated milk increases the modulus of acid milk gels made from it is confirmed in Figure 2. However, this figure also demonstrates that the effect of Tgase treatment on acid gel modulus is highly dependent on the level of heat treatment and that it is virtually absent in unheated milk.

Figure 3 shows that the extent of cross-linking as measured by liberation of ammonia increases significantly with increasing heat treatment of the milk, meaning that relatively little cross-linking takes place in milk that has not been heat treated.

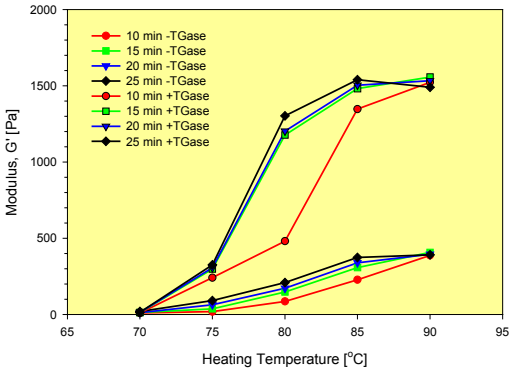

Figure 2. Effect of milk heating and TGase on stiffness of acid milk gel after incubation with 2% GDL for 3 h. Time for heating of milk indicated.

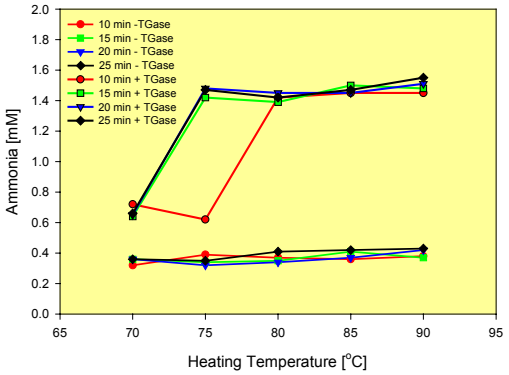

Figure 3. Ammonia content in milk samples after incubation with or without Tgase for 60 min at 40°C. Time for heating of milk indicated.

Since denatured β-lg is known to be a much better substrate for Tgase than native β-lg, a possible explanation is that a large part of the Tgase induced cross-linking happening in heated milk involves denatured β-lg located at the micellar surface.

Conclusion

Cross-linking of milk protein in milk by TGase increases strongly with increasing association of whey protein to casein micelles, as does the stiffness of acid milk gels made from such milk. This effect, which has potential applications in the production of fermented milk products, appears to involve cross-linking of denatured whey proteins at the surface of casein micelles.

References

Færgemand, M. & Qvist K.B. (1997) Transglutaminase: effect on rheological properties, microstructure and permeability of set style acid skim milk gel. Food Hydrocoll. 11, 287-292.

Færgemand, M., Sørensen, M. V., Jørgensen, U., Budolfsen, G. & Qvist, K.B. (1999) Transglutaminase: effect on instrumental and sensory texture of set style yoghurt. Milchwissenschaft 54, 563-566.

Department of Dairy and Food Science,
The Royal Veterinary and Agricultural University,
Rolighedsvej 30, DK-1958 Frederiksberg C, Denmark

CENTRE FOR ADVANCED FOOD STUDIES

ND Pharma & Biotech Co.
Church Street, Great Bookham
Surrey, England
United Kingdom
KT23 3PB

www.ndpharmabiotech.com

info@ndpharmabiotech.com

Tel#: (+44)(0)7045-758-894
Tel#: (+44)(0)7822-153-641
Fax#:(+44)(0)8435-643-106

ND Pharma & Biotech is a biopharmaceutical company that discovers, develops and commercializes innovative products and therapeutics in areas of unmet medical, food, nutritional, agro, industrial and many other needs. The company mission is to advance the care of people suffering from certain diseases, worldwide and to make life better promoting green chemistry issues and removing certain chemical toxics from our daily lives. Company also acts as a chemical supplier and molecular provider including certain rare molecules and hard-to find compounds, API's Intermediates, Reactives, etc. Headquartered in Surrey, England, UK, ND Pharma & Biotech Company has operations worldwide thru a network of commercial and industrial partners, both companies and/or corporations.

For product information, territorial availability, terms and conditions and/or any other relevant information please visit us at *www.ndpharmabiotech.com* or alternatively write us an e-mail to: *info@ndpharmabiotech.com,* referencing and stating clearly the purpose of your communication.