



Fromase[®] and Maxiren[®] Coagulants that meet the highest standards

Today's cheese manufacturers face multiple challenges, with continually increasing quality requirements, pressure to optimize whey value, taste, texture and sliceability, and a need to produce in an efficient and sustainable way. In addition, consumers are increasingly looking for vegetarian, convenient and great-tasting products, adding to the challenges cheese manufacturers must surmount. Using the right vegetarian rennet allows manufacturers to meet all these needs, addressing consumer demands and at the same time delivering a well-controlled proteolysis that meets the highest industrial standards in efficacy, taste and texture. DSM's broad Fromase and Maxiren range provides the proven performance to answer these needs. And working with DSM Experts allows manufacturers to precisely calculate the optimal degree of coagulation required for individual products. This means they have access to tailored solutions to optimize processes, reduce cost and carbon footprint and maintain and indeed improve cheese quality.

Key Benefits

Complete benzoate-free range,
vegetarian, Kosher and Halal

Highest thermolability
for optimal whey value

Highest specificity
for improved texture and sliceability

Highest specificity
for reduced carbon food print

A complete benzoate-free range, vegetarian, Kosher and Halal

Fromase[®] is a microbial coagulant (endopeptidase) preparation derived from a selected strain of *Rhizomucor miehei*. The portfolio includes products with different levels of thermolability, different levels of milk clotting activity and is available in both liquid and granulate versions.

Maxiren[®] is a FPC (Fermented Produced Chymosin), a chymosin preparation derived from a selected strain of the dairy yeast *Kluyveromyces lactis*. The portfolio includes products with different levels of milk clotting activity and is available in both liquid and granulated versions.

The full product range has Kosher and Halal status and is vegetarian and benzoate-free



Highest thermolability for optimal whey value

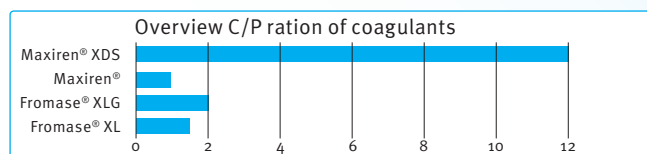
Maxiren® and Fromase® have the highest thermolability of all commercial coagulants available and require a lower pasteurization value, which gives the whey a high value.

Coagulant	Thermolability
Fromase® XL and XLG	68° Celsius
Maxiren® (XDS)	70° Celsius



Highest specificity for improved texture and sliceability

Minimizing the primary proteolysis is essential to bringing the texture you want to the marketplace. This results in a firmer texture, easy slicing, and extended shelf life for finished products.



The C/P ratio represents the relationship between the relative clotting activity (C) and the relative proteolytic activity (P) and is outlined in the figure above. A high C/P value reflects low proteolytic activity during ripening and the best texture. Maxiren® XDS is the newest coagulant with the highest protein specificity of all commercially available coagulants.

Highest specificity for reduced carbon footprint

Maxiren®'s specificity towards kappa-casein results in a more effective coagulation at lower dosage, lower losses in the whey, more intact whey proteins, and less dependency on process conditions. The economic benefits and reduced carbon footprint with Maxiren® XDS are significant.

Peter de Jong (Professor of Dairy Process Technology, Van Hall Larenstein Leeuwarden/Velp and Principal Scientist at NIZO food research) broke down the chain into various process parts and calculated that the overall footprint is estimated at 8.8 kg CO₂ equivalents per kilogram of cheese. With Maxiren® XDS, due to the improved specificity, this can be decreased by up to 12 %¹.

¹ New possibilities for improving sustainability of cheese production, Peter de Jong, IDM Technology/IT, 24 4-5-2017

Coagulants portfolio

Fromase® XL	Fromase® XLG
Further improvement on the heat sensitivity of the rennet.	Similar heat sensitivity as Fromase® XL but further purified by chromatography to take out unwanted side activities for whey processing.
Maxiren®	Maxiren® XDS
Similar heat sensitivity as bovine chymosin but less unwanted side activities for whey processing and cheese ripening.	Similar heat sensitivity as bovine chymosin but further decreased side activities. The most specific coagulant and lowest proteolytic chymosin rennet available.

Other enzyme solutions for cheese in our portfolio are Suparen®, Accelerzyme®, Maxiren® Premium P, and a broad lipase portfolio.

DSM Food Specialties - Enabling Better Food for Everyone

At DSM Food Specialties, Enabling Better Food for Everyone is our purpose. We provide ingredients and solutions that enable our customers to make healthier and more sustainable consumer food and beverage products. We are driven to partner with our customers to create food choices that people around the world can truly enjoy without compromises.

info.food@dsm.com | www.dsm.com/food

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