

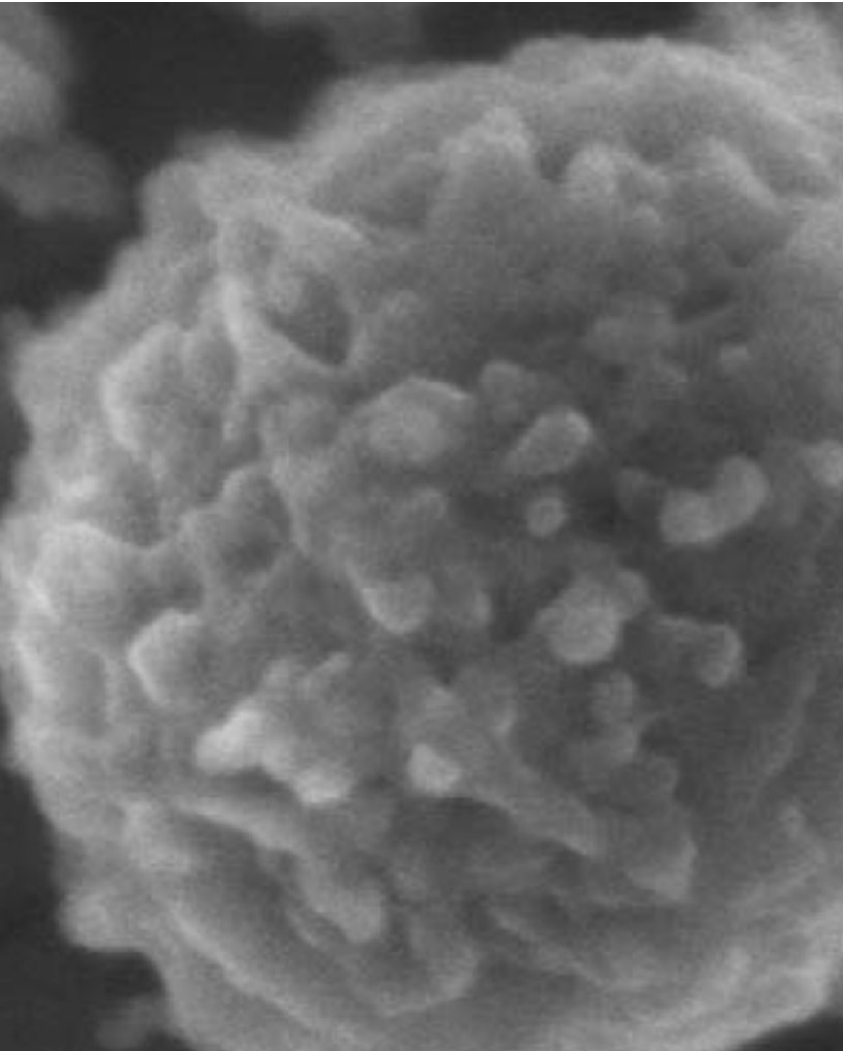
# MICELLAR CASEIN ISOLATES AND THE OPPORTUNITIES AHEAD

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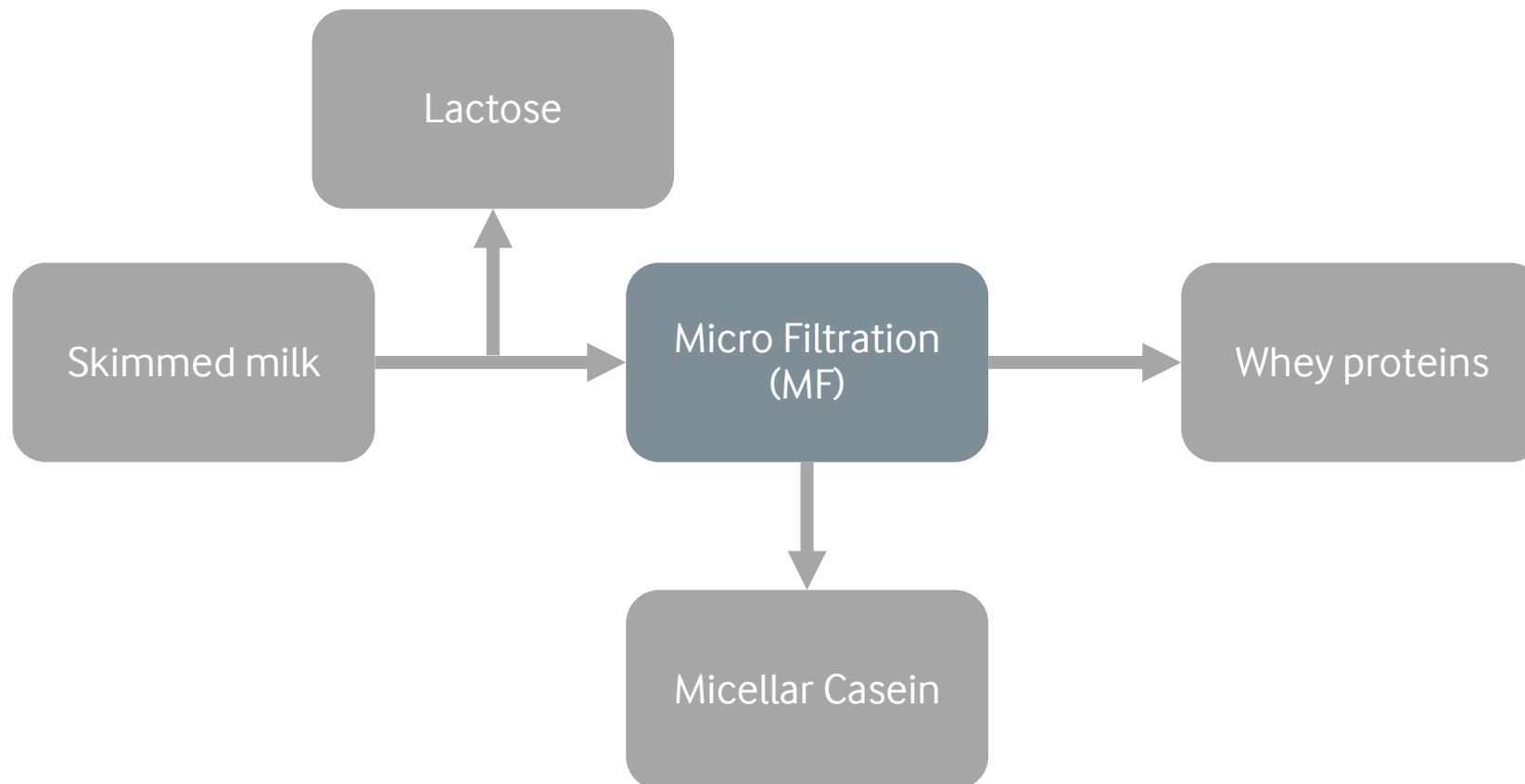


## **AGENDA**

1. Process and composition
2. Functionalities and benefits
3. Potential applications

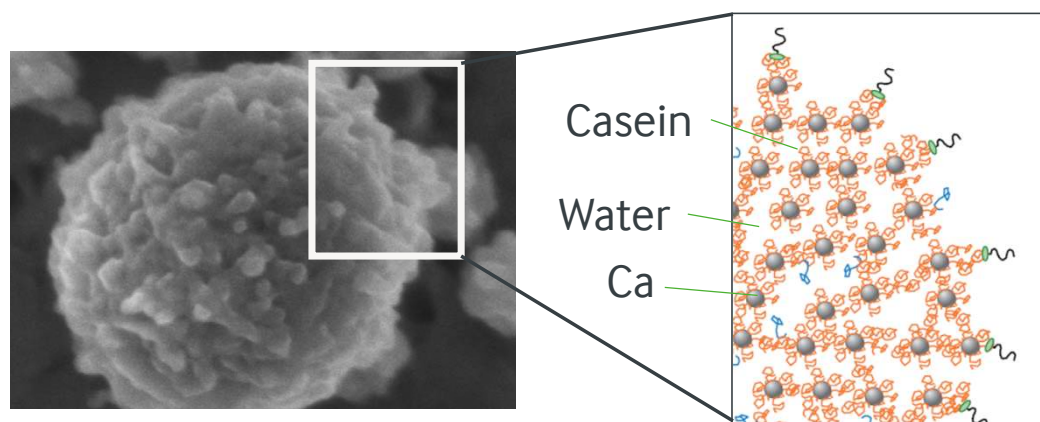
# THE PROCESS

Micellar Casein Isolate as an outcome of Protein filtration



# COMPOSITION

Micellar Casein and its composition opens the door to new opportunities within dairy processing and product development



- Calcium
- Stability
- Functionality

Casein micelle

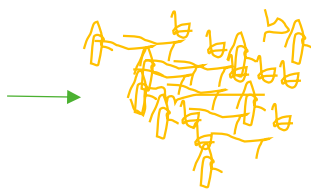


Acid precipitation



Washing and  
neutralization

Caseinate = single casein



MCI Nutrition in short

High in protein  
High in Calcium & Phosphorus  
High in B12  
Low in lactose  
Low in Whey protein

## FUNCTIONALITY

- Low viscosity
- Heat stable
- Low browning
- Natural to light milk taste
- Clean color



# POTENTIAL APPLICATIONS

Product area	Application setup	Labelling
Gels/desserts	MCI or MCC dependent on production site setup	MCI can be used as "dairy ingredient" in dairy products as cheese and dairy based beverage / dairy drink where content of whey protein is not regulated. Can be sold "as is" for instance as sports nutrition
MBB	MCI or MCC dependent on production site setup	
Cheese	Unless greenfield opportunity, most setup requires larger CAPEX and changes to current production setup	
Processed cheese	MCI incorporated into existing setup	MCI cannot be labeled as milk or milk-drink due to change in protein content
General		

# APPLICATION: GELS/DESSERTS

Potential

Opens possibilities for new flavor combinations, cleaner label and better appearance

Opportunities

High protein products for sports  
High protein/nutritious products for elderly  
Healthier protein snacks – low fat/salt

Example

Delicious smooth and shiny appearance  
No dry taste although high in protein



MCI based pudding



# APPLICATION: MBB

Potential

Opens possibilities for new flavor combinations, cleaner label and better appearance

Opportunities

Long life non browning dairy drinks  
Low carbohydrate drinks  
Lactose free long life no browning  
Meal replacements

Example

Maillard reaction (browning and flavour changes) is a major hurdle for long life (lactose free) UHT and sterilized products

MCI is not lactose free – it is low in lactose  
Enables lactose free products to travel



Lactose hydrolysed milk

MCI

Retort test, 121 °C/20 min



# APPLICATION: CHEESE

## Potential

- Increase capacity - Low viscosity and high protein
- Improved heat stability— prolonged shelf life of fresh cheese types
- Casein standardization – less seasonal variations
- Increased cheese yield – Casein vs. protein standardization
- Decreased need for rennet and calcium addition
- Less fines, better fat retention
- Lower bitterness due to less bitter peptides
- Lower foaming when using vegetable oils in cheese production
- Firmer texture
- Avoid spore filtration
- Renneting ability maintained through intact casein micelle

## Opportunities

- Cast cheese processes eased
- Leaner YC production setup – increased capacity
- Pasta filata
- Low fat better tasting YC
- UF White cheese – lower DM
- Boost cheese yield by addition of MCI

# APPLICATION: CHEESE

Example

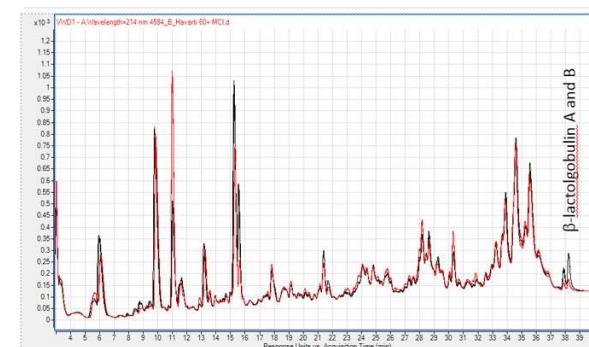
30% reduction in DM for UF white cheese based on MCC  
Addition of MCI to boost yield 10-20%

Pasta filata:  
Harder in texture - easier shredding  
Slower in maturation - longer shelf life

Improved functionality - decreasing whey proteins and protein bound Ca

Lactose free mozzarella

Yellow cheese – same taste – optimized production setup



Overlay chromatogram of Havarti 60+ from cheese milk or MCI.

# APPLICATION: PROCESSED CHEESE

Potential

- Clean label ingredient with a stabilising effect
- Valid texture (shininess and spreadability)
- Mild taste (fresh cheese/ milky)

Opportunities

- High quality low sodium spreads

Example

- The amount of traditional cheese can be reduced by at least 60%

- The amount of emulsifying salt can be reduced by 30-50%



# APPLICATION: GENERAL

Potential

Clean label possibilities - Stability without stabilisers

Opportunities

Cold soups  
Savory shakes

Example

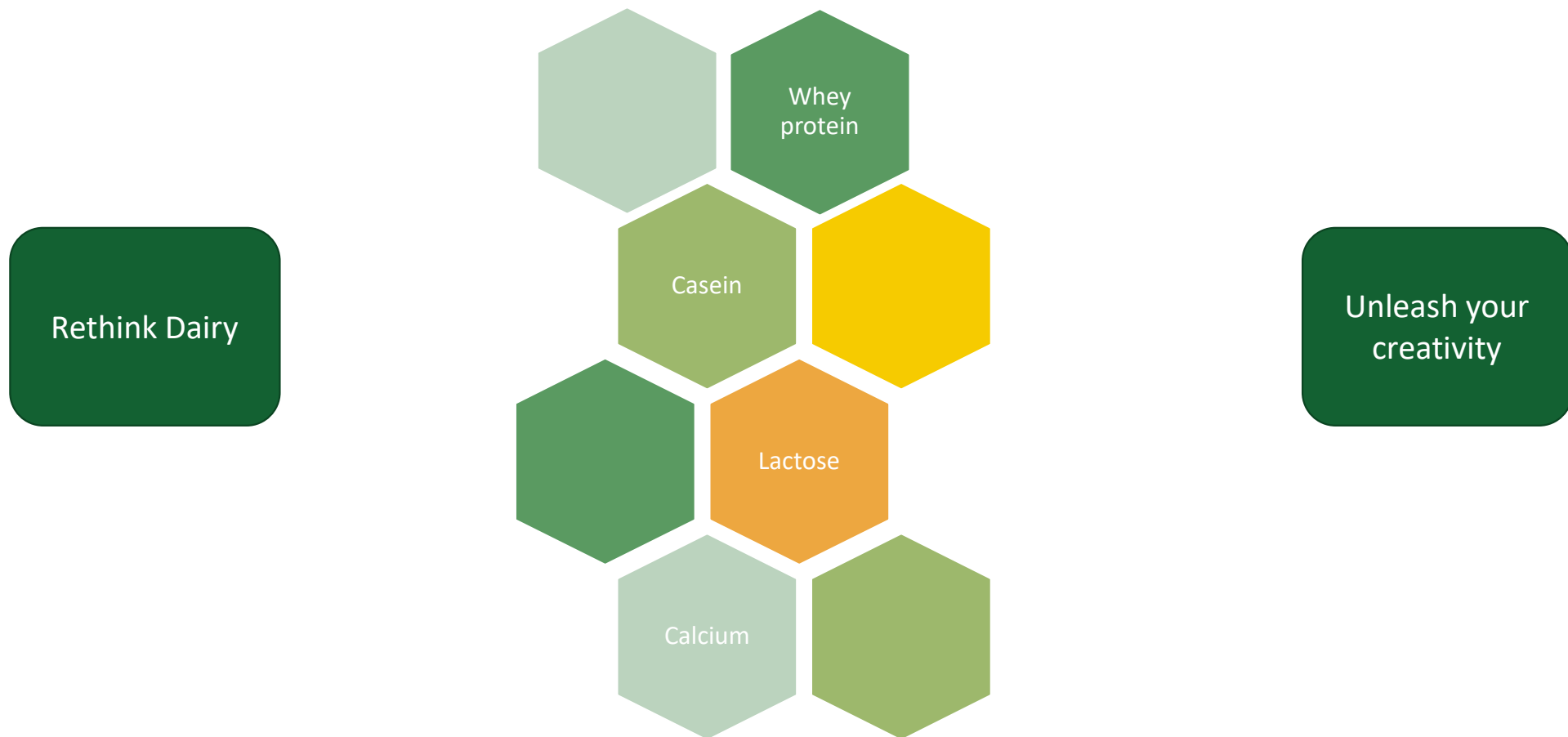
6.7% protein  
High in fiber  
No stabilisers

Red beans & Beetroot



# PROTEIN FILTRATION AS A GENERAL PROCESS ALLOWS FOR A TARGETED FILTRATION TO MEET YOUR NEEDS FOR COMPOSITION AND FUNCTIONALITY

Design your needed milk composition through MF, UF and NF



# **MCI IS JUST ONE OPTION**

## **- GO EXPLORE!**

