MICRO FORMULA™ Application Data - Cheddar Cheese

Neutral 60

Recommended amount
GEA Filtration recommends the following amounts of admixture of MICRO FORMULA™ Neutral 60 to normal Cheddar Cheese types (on liquid form):

10+ cheese: 5-8% of cheese milk volume
20+ cheese: 4-5% of cheese milk volume
35+ cheese: 2-4% of cheese milk volume
45+ cheese: 1-3% of cheese milk volume

No information about the maximum allowable amount of MICRO FORMULA™ Neutral 60 for each specific cheese type is available yet.

Required adjustments
GEA Filtration recommends the following cheese-making process to optimize the quality of the final cheese:

1) Add MICRO FORMULA™ Neutral 60 to the cheese milk.

2) Pasteurize the cheese milk with added MICRO FORMULA™ Neutral 60 at 72 °C for 15 sec.

3) Furthermore, the following adjustments must be made during the cheese-making process:

3a) Increase the final temperature of the cheese milk after addition of hot water by 1-2 °C

3b) Prolong the final stirring time before whey drainage by 2-5 minutes

The combination of 3a) and 3b) must be optimized for each individual cheese process.

If the temperature of the final cheese milk is above 40 °C, it may be necessary to switch over to a thermophilic starter culture.

Expected yield increase
Experience has shown that it is possible to achieve a yield increase of 15% in Cheddar Cheese production when adding MICRO FORMULA™ Neutral 60 powder to the cheese milk.

Industrial experience
Subsequent to the above described minor adjustments of the conventional cheese-making process, our customers have obtained very positive results with MICRO FORMULA™ Neutral 60.

Hence, no bitter off-taste has occurred after 4 months' storage of a normal Cheddar Cheese 45+ with addition of 2.5% MICRO FORMULA™ Neutral 60 (16.6% DM – 10% protein).

Besides, no negative impact on the firm texture and mouth feel of normal Cheddar Cheeses has been observed as a result of addition of MICRO FORMULA™ Neutral 60. This also goes for the crumbly texture of traditional Farmhouse Cheddar Cheese types.

MICRO FORMULA™

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Process Description

MICRO FORMULA™ Unit

GEA Filtration has developed a new simple unit for microparticulation of whey proteins. The unit, named MICRO FORMULA™, now makes it possible to utilize the bi-product, whey, to increase product yield and replace fat. The microparticulation process forms particles similar to milk fat particles. Microparticulated whey can be used in a number of dairy products.

The products, where fat can be replaced, include:

- Most cheese types (also yield increase)
- Ice cream
- Yoghurt and milk desserts
- Dressing and sauces
- Mayonnaise and fat emulsions
- Other fat-containing food products

Advantages in operation and investment costs

Compared to existing microparticulation technologies in the market, MICRO FORMULA™ presents a number of advantages for our customers. The process is simple - and the unit is easy and inexpensive to maintain and it comes in standardized modules. In addition to this the MICRO FORMULA™ has the following advances:

- No scraped surface heat exchangers (SSHE)
- No homogenizer
- No tubular heat exchangers (THE)
- No heat transfer surfaces > denaturation temperature
- Ordinary plate heat exchangers (PHE)
- Ordinary flow components
- Low maintenance costs
- No scraps from scraper blades or stator in the final product
- Yield increase – protein and water binding effect
- Long production time between CIP – 18-20 hours
- Payback calculation < 1 year
- A true "Money Printing MICRO FORMULA™ Unit"

Side benefits

Furthermore, microparticulated whey proteins, utilizing cheese whey otherwise dumped as a damaging waste product and replacing fat in a lot of dairy products, have a direct positive impact on the environment and public health.

Product characteristics

The microparticulated particles have the following characteristics:

- Viscosity as cream
- Creamy
- Whitish
- Particle size 1-10 µm

Technological features

The process is generally profitable for customers generating more than 80,000 litres of whey per day.

GEA Filtration offers the MICRO FORMULA™ unit in the following five sizes:

MICRO FORMULA™ unit	MP500	MP1000	MP1500	MP2000	MP3000
Capacity [kg/h]	500	1.000	1.500	2.000	3.000
Whey utilized [l/h]	8,500-9,000	17,500-18,000	25,500-27,000	35,000-36,000	51,000-54,000
UF system	2 loops	2 loops	3 loops	4 loops	5 loops

GEA Filtration has supplied reference units running 18 hours a day with only one CIP (cleaning-in-place) each day.