

# Buttermilk – eXact®

## Direct fermentation recipe

Type of technology	Buttermilk by direct fermentation
Source of milk	High quality milk is used
Culture	eXact® range
Enzyme	-
Description	Traditional buttermilk is the liquid that is released during churning of cream in the butter making process. However, severe problems with development of an oxidized off-flavor, due to the relatively high content of Cu++ and phosphorus lipids, have resulted in changes in production procedures. Therefore, the majority of buttermilk marketed today is a cultured buttermilk product, produced by fermentation of low-fat milk with a mesophilic culture.

Table 1: F-DVS recommendations

Product	Product characteristics	eXact® culture
Traditional buttermilk	Buttermilk with high mesophilic flavor	CHN-22; CHN-13; CH-BAN-1* XT-302; XT-303; XT-304
Classic buttermilk	Buttermilk with high mesophilic flavor and high texture	XT-312; XT-313; XT-314; XT-315 DSG-6000-10; 20; 30
Modern buttermilk	Buttermilk with mesophilic flavor and very high texture and fast acidification	XPL-1; XPL-2**
Mild buttermilk	Buttermilk with mild flavor and no CO <sub>2</sub> production during fermentation or distribution	MO-1; MO-2, MO-3, MO-4 NG Flavor+
	Buttermilk with mild flavor and high texture, fast acidification and no CO <sub>2</sub> production during fermentation or distribution	XPL-30; XPL-40; XPL-50** NG Flavor+

\*: CH-BAN-1 contains *Bifidobacterium* BB-12

\*\* The XPL cultures contain texturing *Streptococcus thermophilus* and require a fermentation temperature between 30-35°C to obtain optimal texture properties

Table 2: FD-DVS recommendations

Product	Product characteristics	eXact® culture
Traditional buttermilk	Buttermilk with high mesophilic flavor	CHN-22, XO-1
Modern buttermilk	Buttermilk with mesophilic flavor and very high texture and fast acidification	XPL-1; XPL-2
Mild buttermilk	Buttermilk with mild flavor and high texture, fast acidification and no CO <sub>2</sub> production during fermentation or distribution	XPL-30; XPL-40



## Milk

The milk should be of high quality and not contain any inhibitory agents, e.g. antibiotics. The fat and solids non-fat(SNF) is standardized to the desired level.

## Hydration

If milk powders are used, hydration should be considered, e.g. 6-8° C (43-46°F) for 1-3 hours or as advised by the powder supplier.

## De-aeration

It is recommended to de-aerate in order to lower the oxygen content. This might improve the quality and shorten the fermentation time.

## Homogenization

Homogenization is normally carried out at 60-70°C (140-158°F) at a pressure of 100-200 bar (1450-2900 psi).

## Heat treatment

The milk is heated to 90°C (194°C) for 5 min or 95°C (203°F) for 3 min, or if batch pasteurization is used 85°C (185°F)/30 min, and cooled to incubation temperature, i.e. 20-26°C (68-79°F) or 30-35°C (86-95°F).

## Culture

The choice of culture influences the characteristics of the final product such as flavor, acidity, texture (Exopolysaccharides) and appearance. The main characteristics of the eXact® cultures are described in the eXact® brochure.

## Inoculation

Amount of milk to be inoculated	250 l/ 66 gal	1000 l/ 264 gal	2500 l/ 660 gal	5000 l/ 1320 gal	10000 l/ 2640 gal
Amount of DVS™ culture	50 U	200 U	500 U	1000 U	2000 U

The culture is taken out from the freeze just prior to use. The package is disinfected prior to opening. After opening the culture is poured into the milk. The mixture is agitated slowly for 10-15 minutes to distribute the culture evenly.

## Fermentation

Fermentation until an end pH of 4.65-4.55 is recommended. Flavor, aroma, texture, fermentation time and gas formation can be optimized by changing the incubation temperature. The optimal temperature depends on the selected culture as well as the requested product profile.

## Post treatment

When the final pH is reached, the product is stirred until it has obtained a smooth texture and finally cooled to 14-20°C (57-68°F) before filling. To reduce the post-acidification, it is recommended that the cooling time is max 30 min, preferably by using a plate cooler. In order to keep the high flavor profile a fast cooling to 5-6°C (41-43°C) is recommended. However this will lower the end viscosity of the buttermilk.

## Storage

The product is packed and kept at 2-5°C (36-41°F). The shelf life of the cultured buttermilk is approx. 2-3 weeks.



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