

8 Whey and whey products

Whey (French. *sérum*, German *Molke*, Italian *siero di latte*, Spanish *suero de la leche*) is the serum of milk, which is obtained during the manufacture of cheese or casein after separating cheese resp. casein. On an annual global basis, more than 100 Mio tons of whey are produced (SCHIER). Whey is a translucent green-yellowish, low-calorie and low-salt residual liquid with a high percentage of lactose and water-soluble vitamins as well as low content of valuable protein (whey protein). The yellowish colour of non-acidified whey is caused by Riboflavin (= vitamin B₂), which can be found at a level of ~1.7 mg/l. Above-mentioned percentage of nutrients is still ~50% of milk. Earlier, whey was a by-product, which was either used as feed material (preferably for pigs) or was disposed of as a waste product in wastewater (rennet whey 42 g BOD/l, acid whey ~35 g BOD/l)*. Whey and whey products have achieved a large economical significance (WIETBRAUK and HAHN), and are increasingly applied and utilised in the food industry due to its excellent nutritional and functional properties. The image of whey could be significantly improved (HERBERTZ 1996).

* BOD = amount of oxygen in mg O₂/l, which microorganisms consume within 5 days in oxygen-containing waste water when converting organic matter in untreated, settled or filtered waste water at 20 °C.

8.1 Terms and types of whey

For whey, there are different terms, and subject to the way it is obtained, there are different varieties and compositions. Whey is obtained by rennet- or acid precipitation of milk (skim milk), resulting in corresponding types of whey (Fig. 8.1).

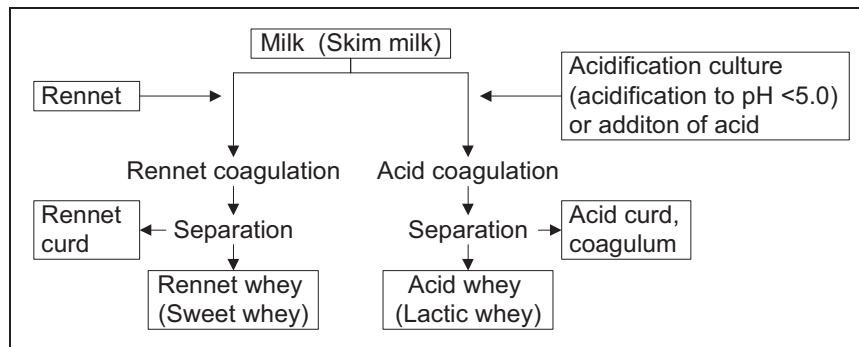


Fig. 8.1 Schema – types of whey in function of protein precipitation

8.1.1 “Whey” and other descriptions

Whey (German “*Molke*”, in some areas also “*Molken*”), is a West Germanic name – Middle High German as well as Old Saxon and Old Frisian “*molken*”, Old English “*molcen*” – and is derived from the German verb “*melken*”. It means “what has been milked”. During the Middle High German times, this word was used in the old sense of “from milk resp. prepared from milk (e.g., butter, cheese)”. In this context, the 19th century German word of “*Molkerei*”(dairy) should be mentioned. Whey is also known as “*cheese water*” (German “*Käsewasser*”) and “*Sirte*”. Latter term has been introduced in Switzerland, specifically in Emmental cheese dairies for low-fat whey, which is separating initially during cheese manufacture from rennet gel. Subsequent whey with a fat level of ~0.3...0.6% is called “*Fettsirte*” (fat sirte). After decreaming, it becomes a “*Magersirte*” (lean sirte). After separation of whey proteins (see 2.3.1.1.1 and 2.3.2.2.4a) it is called “*Schotte*”. This term is derived from the Italian