

## 2 Rennet cheese (Cow's milk cheese)

Cheese is manufactured from coagulated milk. In case rennet is used for coagulation, then the term “**rennet cheese**” would be appropriate. The term “*rennet cheese*” – in a stricter sense – includes only those kinds of cheese, being manufactured from coagulated milk. In case rennet is used for coagulation, then the term “rennet cheese” would be appropriate. An acidification always supports rennet effects, but until coagulation occurs, there is no significant acid development. In contrast, acidification is the key processing principle for certain types of fresh cheese (lactic cheese). Coagulum is being acidified simultaneously with rennet effects to a pH of ~4.7. This is sufficient reason not to include fresh cheese into the class of rennet cheese.

With increasing acidification, calcium content decreases in the fat-free and salt-free cheese dry mass. According to PROKOPEK all types of cheese with a Ca-content of > 1% (and therefore produced with 30% rennet effect) are included in rennet cheese types (see 1.5.2.3, Fig. 1.5). “Classic” rennet cheese with a high Ca-content is part of the extreme hard rennet cheese types (*Parmigiano Reggiano*, *Grana Padano*, *Sbrinz* a.o.) and hard cheese (*Emmental*, *Cheddar* a.o.); further Butterkäse (*buttercheese*), a semi-soft cheese with an unusual low acidification. In soft-cheese types, acidification is more manifest; coagulation of milk is mainly caused by added rennet.

Reference: PROKOPEK, D. (1991) *Milchwirtschaftliche Technologie in Fragen und Antworten*, 4. Auflage; VV- GmbH Volkswirtschaftlicher Verlag, München

### 2.1 Milk – raw milk

**Milk** is a secretion from the milk glands of female mammals during lactation. Unless further specified or named, in most countries it is understood that it is cow's milk. **Raw milk** is milking from one or more cows in an untreated form, which has not been heated above milking temperature.

#### 2.1.1 Raw milk

Milk is the basic ingredient for a cheese dairy. Milk formation – lactogenesis – (being a continuous process in the udder of the cow) is controlled by neuroendocrine (influenced by milking) hormones and by metabolic processes (feed and distribution of nutrients). Milk synthesis takes place in the alveoli cells of the glands in the udder.

##### 2.1.1.1 Milk components and their synthetisation in the udder

Milk, being a poly-disperse mix of dry matter components and water, contains natural ingredients, subdivided into major and minor nutrients; as in all other forms of food, there are some traces of foreign substances (pollutants). (Fig. 2.1 page 46)

Milk components have varying particle sizes and different forms of aggregates, and their respective concentration is more or less variable (see Tab. 2.2, next page). In function of their degree of dispersion, their particle size varies (Tab.2.1).

**Tab.2.1** Degree of dispersibility of milk dry matter compounds and their change of particle size (SCHLIMME)

| Milk ingredients | Degree of dispersibility   | Particle size   | Change           |
|------------------|----------------------------|-----------------|------------------|
| Fat              | Finely dispersed           | ∅ 0.1 ... 15 µm | Large variations |
| <b>Protein</b>   |                            |                 |                  |
| Casein           | Colloidal dispersed        | ∅ 20 ... 500 nm |                  |
| Whey protein     | Molecular dispersed        | ∅ 5 ... 20 nm   |                  |
| Lactose, salt    | Molecular or ion-dispersed | ∅ <1 nm         | Least variations |