1.6.1 Components and energy content

In cheese all the key nutritional components of milk are found again in rennet cheese carbohydrates are missing. The percentage of individual nutritional components and their calorific value in kilocalories (kcal), depends on the type of cheese and its corresponding dry matter and fat content.

Tab. 1.11 *Average composition and energy content of some types of cheese at various fat content levels*

Types of cheese	fdm %	Water %	Fat %	Protein %	Carbo-hydrate %	Cal-cium %	Phos-phorous %	KJ/100g	kcal/100g
Food quarg	Low-fat	80	<2	16	3.0	0.1	0.2	327	78
Quarg	20	76	5	15	2.0	0.1	0.2	486	116
Quarg	40	72	11	13	2.0	0.1	0.2	683	163
Quarg	60	67	20	10	1.0	0.1	0.2	967	231
Camembert	30	60	13	22	---	0.6	0.4	883	211
Camembert	50	51	25	19	---	0.5	0.3	1298	310
Edam	30	50	15	25	---	0.9	0.6	1009	241
Edam	45	44	26	23	---	0.8	0.5	1407	336
Tilsit	30	49	16	27	---	0.8	0.6	1089	260
Tilsit	45	43	26	26	---	0.7	0.5	1457	348
Emmental	45	36	30	30	---	1.0	0.6	1687	403

1.6.1.1 Protein

Proteins – of a large molecular size, natural components of a highly complex structure, which contain amino acids as one of their basic compounds – are essential for the development of body tissue during growth and development as well as for maintenance and renewal of body tissue. Milk proteins change by proteolysis during cheese ripening. Various cheese proteins originate from starter cultures too. Supply of essential amino acids is assured by consumption of rennet cheese. Compared to other types of food, it shows very high protein content.

Tab. 1.12 *Protein content in 100 g of food*

Food	Protein in g
Quarg	10...16
Rennet cheese	20...30
Legumes	~20
Meat in function of its fat content	8...20
Chicken egg	13...15
Fish	~15
Sausage	~10
Rice	~7

Milk protein has a higher nutritional value than vegetable protein. Cheese protein contains mostly casein, as higher value whey proteins are transferred in the majority into whey during casein coagulation. The biological value of protein in cheese is thus slightly lower than the one of milk protein. Full value cheese protein is broken down during cheese ripening via intermediate products such as proteose-peptone, polypeptides, and peptides into free amino acids. This decomposition can lead to a desamination of free amino acids into development of ammonia (NH_3) and free amino acids, or there will be some amines in form of a decarboxylation. A few peptides have some very favourable biological properties. After complete ripening (equivalent to predigestion), individual types of cheese show varying fractions of these proteins. A typical pattern in peptide fractions and free amino acids is characteristic. Nutritional value of these proteins, peptides and amino acids depends on the applied cheese technology (Tab. 1.13).