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*PROTEOLYSIS PROGRESS DURING THE AGEING  
OF PARMIGIANO-REGGIANO CHEESE*

S U M M A R Y

Proteolysis progress during the ageing of Parmigiano-Reggiano cheese was investigated. The survey was done on 2 48 hour-old wheels and 84 wheels from 2 to 28 months of age. The cheeses were sampled during different seasons in 46 cheesefactories in the provinces of Parma and Reggio Emilia. The principal nitrogen fractions of cheese were analysed by the Kjeldahl method according to the fractionation scheme proposed by Gripon *et al.* (*Le Lait*, 55, 502, 1975).

Casein solubilization is strong from the beginning of ageing. In the first months the ripening index (pH 4.4 soluble N x 100 / total N) grows quickly (12.5% at three, 23.4% at six and 25.8% at nine months), then the increase is very limited and during an almost stable period (29-30% at 15-18 months) reach the values of 32-33% at the end of ripening (21-24 months).

The strong initial proteolytic activity is marked by a remarkable increase of free amino acids: the N soluble in phosphotungstic acid increases in the measure of about 438% in the first three months and of 98% in the following three. At about three months of age this fraction represents about 55.4% of the total N and

reaches values of 60% already at 6 months; these values are very close to the *maximum* values of 61-62% corresponding to the age of 21-24 months. During the early stages of ripening there is also a good increase of peptides.

Deaminations process is intense from the beginning of ageing and produces a progressive and continuous increase of ammoniacal N during the whole ripening cycle. Starting with the 6th month the ratios among the soluble N principal fractions (peptones N, peptides N, aminoacids N and NH<sub>3</sub> N) reach a relative balance that remains (ammoniacal N apart) until the end of the ripening cycle.

*Change of the composition and evolution of the proteolysis of Parmigiano-Reggiano cheese during ripening as regards the shape (outer and inner part) of the wheel. – Panari G., Mariani P., Summer A., Guidetti R., Pecorari M.*

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**ABSTRACT** - *Change of the composition and evolution of the proteolysis of Parmigiano-Reggiano cheese during ripening as regards the shape (outer and inner part) of the wheel.* - The evolution of the ripening of Parmigiano-Reggiano was studied by analysing the outer part and the inner part

taken from 52 wheels. During all the ripening, lasting up to 24 months, a significative difference was detected between the centre and the periphery of the cheese. Instead fat and protein, expressed on dry matter, showed an uniform distribution in the mass. With regard to proteolysis, the differences between the inner and the outer part of the cheese resulted very low and showed opposite signs. In particular during the first months of maturing, in the inner part nitrogen compounds with low molecular weight (nitrogen soluble in phosphotungstic acid) were in greater amount, while the compounds with high molecular weight (nitrogen insoluble in trichloroacetic acid 12%) were in lower amount compared to the outer part. Then, beginning about from the sixth month of ripening, the differences decreased and, in some cases, the sign was inverted. The distribution of the other nitrogen fraction (peptides and ammonia) appeared casual during the whole ripening.