

Brief Communication

AMMONIA-LIKE TAINT AND CREATINE, CREATININE AND DIMETHYLAMINE CONTENTS IN REINDEER MEAT

Hyvärinen et al. (1976) and *Rehbinder & Edqvist* (1981) demonstrated high plasma urea concentrations in handled reindeer, and suggested that this might explain the urine-like taste of meat from reindeer that have been transported or have spent a long time in the corral. *Hanssen et al.* (1984) found 25 % prevalence of ammonia-like taint in their material, but could not demonstrate positive correlation between intensity of ammonia-like taint and urea concentration in the meat. In the latter study a high activity of creatine kinase was demonstrated in the plasma of transported reindeer.

Creatine kinase acts in the phosphocreatine-to-creatine reaction where ATP is released for muscle activity. During rest creatine goes back to phosphocreatine that is converted to creatinine and excreted in the urine. In the same study, very high adrenalin and noradrenalin plasma concentrations were also found in many reindeer. This may cause a reduced circulation in the kidneys and thus an accumulation of creatine and creatinine in the muscles. Creatinine may be transformed to dimethylamine (*Simenhoff et al.* 1976), which is one of the metabolites responsible for the ammonia-like breath of uremic patients. Dimethylamine may also be formed from choline and lecithin in the digestive system through bacterial activity (*Simenhoff et al.* 1977). This might also be relevant here, as the rumen content of reindeer that have been kept in the corral or transported for a long while have abnormal odour.

On this background it was studied if the ammonia-like taint often demonstrated in reindeer meat is due to accumulation of either creatine, creatinine or dimethylamine. Meat specimens were taken from the dorsal neck region of 43 reindeer. 10 g of each specimen was homogenized in 50 ml phosphate buffer. The homogenized meat was filtered, and the filtrate was diluted to a final volume of 100 ml. Creatine in the filtrate was measured spectrophotometrically by a method described by *Tanzer & Gilvarg* (1959); creatinine was measured spectrophotometrically using a kit from *Boehringer Mannheim* based on the method described by *Seetig & Wust* (1969), and dimethylamine was measured spectrophotometrically by a method described by

Dowden (1938). For the sensorial testing of taint about 200 g meat of each specimen was cooked for about 1½ h. Two well trained persons were asked to grade ammonia-like taint into the following categories: not present (0), barely detectable (1), weak (2), strong (3).

The creatine contents varied between 186 and 2,230 mg/100 g meat, while the creatinine contents varied between 0.7 and 9.99 mg/100 g meat. The dimethylamine contents were lower than 0.20 mg/100 g meat in 95 % of the specimens, and the highest concentration measured was 0.95 mg/100 g meat. Strong ammonia-like taint was observed in 3 specimens, while weak or barely detectable taints were observed in 16 specimens. There was, however, no positive correlations between intensity of ammonia-like taint and creatine, creatinine and dimethylamine contents.

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