

Relations between animal, carcass and meat characteristics across 15 European breeds

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In this study, 436 young bulls from 15 cattle breeds were reared in five different countries following the same experimental protocol. In all stations, the energy density ratio and protein content of the diet were similar. Animals were slaughtered at 15 months of age, and samples were collected 24 h post-mortem from the Longissimus thoracis muscle between the 6th and 13th left ribs. Each animal was characterized by a total of 51 variables representing animal performances, muscle biochemistry as well as sensorial and nutritional characteristics of beef quality. A statistical approach based on clustering of variables has been elaborated using the ClustOfVar package (R software 3.6.1). Using the partition stability method, nine clusters were retained. The relationships between the variables in each cluster were studied using the principal component analysis (PCA) approach. The 1st dimension of eight clusters were considered representative, showing the highest variations between variables except from one cluster where two dimensions were considered. Each group of variables in each cluster emphasizes different characteristics: physiological traits such as the muscle mass (clusters 1 and 2), fat mass (cluster 2), maturity (cluster 3); muscle biochemistry such as levels of enzymes involved in ageing (cluster 4); sensorial traits such as tenderness and juiciness (cluster 5), the muscle oxidative type (cluster 6); meat colour (clusters 7 and 9) and lipids (cluster 8). As a conclusion, the characteristics related to body composition, muscle biochemistry, sensorial traits and meat colour show an independent relationship across breeds.

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