



POSTER

RISK FACTORS ASSOCIATED WITH BRUISES IN BEEF CATTLE CARCASSES: A CROSS-SECTIONAL STUDY AT AN ITALIAN SLAUGHTERHOUSE

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Carcass bruises, defined as localised haemorrhages caused by mechanical trauma during handling, transport and lairage, are retrospective indicators of pre-slaughter welfare and represent an economic loss due to trimming. Their occurrence is multifactorial, involving both animal and management factors, with reported prevalence ranging from 20% to 40%. This study aimed to quantify bruise prevalence and to identify animal- and transport-related factors associated with occurrence and severity at post-mortem inspection. A cross-sectional study was conducted at a beef cattle abattoir in the province of Rovigo (north-eastern Italy) between February and April 2026. A total of 449 cattle (heifers and young bulls), sourced directly from farms of origin without passage through markets or collection centres, were examined. Animals were transported directly to slaughter with minimal lairage. Carcasses were inspected post-mortem by a trained veterinarian using a standardised protocol. Bruises were recorded as present/absent and characterised by size, shape, colour and anatomical region. For multiple lesions, only the largest was characterised; thus, distributions refer to the largest bruise per carcass. Associations with sex, age, breed, fat cover, transport duration and vehicle type were assessed using chi-square tests, odds ratios (OR) with 95% confidence intervals (CI) and multivariable logistic regression. Bruise size differences were assessed using a Kruskal-Wallis test. Animals were considered independent observations, without accounting for clustering by farm, transport or slaughter batch.

Overall bruise prevalence was 62.4% (280/449). Sex was significantly associated with bruising (71.3% vs 53.7%; $p <$

0.001; adjusted OR males vs females 0.35). Breed was also significant ($p = 0.004$), with prevalence ranging from 34% in the reference breed (ABC) to 66% (MTT) and 73% (CHL). In the adjusted model, bruising odds were higher in CHL (OR 4.94; 95% CI 2.03-12.01) and MTT (OR 2.21; 95% CI 1.01-4.82), while LMS showed no difference. Age, transport duration, vehicle type and fat cover were not associated with bruise occurrence. Among affected carcasses ($n = 280$), transport duration ($p < 0.001$), vehicle type ($p < 0.001$) and fat cover ($p = 0.023$) were associated with bruising size in univariate analysis. Larger bruises were frequently recorded after short journeys (<4 h) and in leaner animals. Lesions were predominantly large (172/280), irregular (177/280), red (157/280) and clustered on the ribs and loin. Bruising was highly prevalent, confirming its relevance as an indicator of pre-slaughter welfare and carcass quality. Sex and breed were associated with bruise occurrence, while transport-related factors and fat cover were associated with bruise severity rather than occurrence. Given the observational cross-sectional design, results should be interpreted as associations rather than causal relationships. The association between shorter journeys and larger bruises should be interpreted cautiously, given unmeasured factors, since bruise size was analysed univariately. Limitations include potential clustering by origin or transport group and assessment of only the largest lesion per carcass. These findings highlight the interaction between animal and management factors along the supply chain and support systematic post-mortem recording to identify critical points and improve handling, transport and welfare.