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An objective of the EU ProSafeBeef project was to determine effects of diets enriched with PUFAs and antioxidants on bovine muscle characteristics and meat sensory qualities. This study used 265 animals finished in 4 experimentations under different EU production systems. Animals were from 8 breeds including bulls (B), steers (S) and heifers (H), i.e. 25 Limousin (B), 25 Blond d'Aquitaine (B) and 24 Angus (B) from France; 47 Belgian-Blue × Friesian (H) and 47 Angus × Friesian (H) from Ireland; 25 Holstein (B) from Germany and 40 Belgian-Blue × Holstein (S) and 32 Charolais (S) from United Kingdom. The diets were aggregated in 4 classes consisting of silage (Si) or concentrates (C) supplemented with PUFAs (L) and/or antioxidants (AO). Statistical analyses were all performed using GLM procedure of SAS 9.2. Longissimus thoracis muscle of animals given the Si diet had a higher proportion of SO fibres and higher ICDH activity ($P<0.0001$), and a lower proportion of FG fibres and lower LDH activity ($P<0.0001$) associated with higher ultimate pH values ($P<0.05$). Muscles of animals of C and L groups had a higher lipid content than those of Si and AO groups ($P<0.0001$). Moreover, muscles of animals given C and L diets were more tender and juicy with a higher flavor intensity rating ($P<0.0001$) than those of S and AO groups. These results demonstrate that diets enriched with lipids (PUFAs) during the finishing period affect bovine muscle properties and meat sensory qualities.