RESEARCH OF WELFARE BIOMARKERS BY PROTEOMIC APPROACHES IN BRUNA DELS PIRINEUS COWS UNDER DIFFERENT PRODUCTION SYSTEMS

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Two groups of Bruna dels Pirineus beef cattle were maintained during the wintertime under different management systems with different levels of stress/welfare. One group (n=31) was fed on natural, scarce pastures without human contact (semiferal conditions) in the Alberes mountains in the eastern part of the Pyrenees, whereas the other group (n=31) was fed on cultivated pastures with programmed grazing and daily contact with humans. At the end of the winter season, blood and faeces were collected and several biochemical parameters including nutritional and oxidative stress markers, creatine kinase acute phase proteins, and cortisol and faecal corticosterone were analyzed. Cortisol (P=0.02), faecal corticosterone (P<0.001), 3-hydroxybutirate (P<0.001), NEFAs (P<0.001), haptoglobin (P=0.027), Glutathione peroxidase (GPx) (P<0.001), protein carbonyl content (P=0.001) and total protein (P=0.017) showed significant differences between both groups. The acute phase protein Pig-MAP also showed differences by immunoblotting. In order to identify new stress biomarkers, we performed two different proteomic approaches by bidimensional DIGE. In the first approach, non-depleted serum was analyzed. Results from MS identified several known proteins involved in the immune response (IgG, complement C3, transferrin, fibrinogen, apolipoprotein A-I (Apo A-I), alpha-2-macroglobulin). Furthermore, a new potential stress biomarker was also identified as alpha-1-antitrypsin (AAT), which was validated by an enzymatic approach. In the second approach and to get a deeper insight into the differential serum proteome, serum was depleted with ProteoMiner and subjected again to bidimensional DIGE.

Our results show that cows living in hard environmental conditions show a greater immune response and differences in acute phase protein profiling.