Welfare Assessment of Sheep During Transport using Hematological and Hormonal Biomarkers

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The transport could be a stressful procedure for farm animals. This is especially significant in traditional sheep management where seasonal transport is common for providing mountain pasture fieldsin summer periods. The objective of this study was to determine the changes in plasma cortisol, glucose and hematological parameters in sheep before and after short transport by walk and train, as indicators for stress and animal welfare disturbance. Three groups with 10 – 20 animals/group were used in the study: control group – not transported animals, group translocated by walking and group transported by train. Blood samples were taken twice in the control group (10 days between blood sampling) and five times before and after transport (7days before, immediately before and after, and first and the second week after the transport) in the walking and train group.Statistical identification of the transport effect within the group was performed using RM-ANOVA and unpaired two sample Student t - test. The plasma cortisol levels and blood glucose level in the control group were 66.13±43.08 ng/ml and 3.2±0.57 mmol/l, respectively, without significant difference between two measurements. Within the walking group significant difference ($p<0.05$) was detected in the glucose level immediately before and after the transport, 3.0±0.19mmol/l and 3.8±0.44mmol/l, respectively. Considering the hematological parameters, significant differences were found in HGB, MCV and PLT before and after translocation by walking. The group of animals transported by train showed differences in the glucose levels immediately 4.0±0.40 mmol/l and 3 days after transport 3.7±0.49 mmol/l ($p<0.05$). Additional hematological changes were found in PLT before and after transport, 116.18±52.65 and 199.00±67.86 x 10^9/l, respectively. Cortisol levels were found to be significantly different only in the train group immediately after the transport 51,30±56,40 ng/ml in comparison with the higher values before the transport.Increased glucose levels in the blood are indicating that the transport by walking and train transport are stressful procedures for the animals and have serious impact on their welfare. While the lower values of plasma cortisol levels could suggests that the transport by train is more strenuous procedure for the animals followed by additional stress from loading and unloading of the animals.

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