Short communication: Associations between oxidative status and negative energy balance indexes in the periparturient period in dairy cows: An observational study

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Short title: **Oxidative status and energy balance indexes in transition cows**

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Summary

The objective of this Research Communication was to determine changes in reactive oxygen species (ROS), serum antioxidant capacity (SAC) and oxidative stress index (OSi; ROS/SAC) during the periparturient period in dairy cows and thus, test the hypothesis that OSi predicts better the oxidative status than ROS or SAC alone. Furthermore, the relationship between all three indexes of oxidative status (ROS, SAC, OSi) with markers of energy balance (blood free fatty acids, FA and β-hydroxybutyrate, BHB) and α-tocopherol (α-T) was determined. Blood samples were collected from 131 dairy cows belonging to four commercial farms, located in Italy and Greece. Blood samples from all animals were collected at dry-off, calving and 30 d postpartum. Results indicated that ROS and OSi were low at dry-off and 30 d postpartum and high at calving. The serum antioxidant capacity followed exactly the opposite trend. There was a strong negative correlation of ROS and OSi with α-T at all three sampling points, whereas no correlation was found between SAC and α-T. Reactive oxygen species were positively correlated with BHB at all three sampling points and with FA levels only at dry-off. A negative correlation of SAC with FA was found at dry-off and 30 d postpartum. The oxidative stress index was positively correlated with FA and BHB at dry-off, with FA at calving and with BHB at 30 d postpartum period. Thus, associations between parameters related to oxidative status and those related to energy balance were found, mainly at dry-off and postpartum. The oxidative stress index does not appear to describe this relationship better than ROS or SAC alone.