Biomarkers for seasonal heat stress: a holistic approach

Environmental heat stress, present during the hot and dry summers in Mediterranean climate, severely impairs animal’s performance, particularly in animals of high genetic merit. Although heat stress has been considerable studied in dairy cattle, the mechanisms of seasonal acclimation are less well understood. Biomarkers may have great potential in identifying levels of thermal stress. The blood cortisol does not allow a full understanding of the levels of thermal stress, due to its circadian cycle and because the confounding with other types of stress. Furthermore, it should find non-invasive methods better to assess the stress. The hair, faeces or saliva fulfil these requirements. Saliva has been extensively studied in humans, due to its potential as a non-invasive source of pathology and physiology biomarkers. Nonetheless, in the last years, some research emerged demonstrating the value of this fluid for farm animal studies. Based on previous line of research, on ruminant salivary proteome and heat stress, we propose to search for salivary and faeces biomarkers of seasonal acclimation to heat stress and to compare them with other well-known physiological and endocrine indicators.

Contrary to what occurs in tropical climates, where it seeks to match the performance with heat tolerance in Mediterranean climate looking up the physiological versatility.

The aim of the study is: i) the identification of reliable biomarkers (saliva, faeces) that measure levels of heat stress; ii) the search for short and long term biomarkers of thermal stress, based on seasonal acclimatization. Will be designed some experiments that combine responses to acute and chronic heat stress. Different known physiological parameters associated with heat stress will be evaluated together with potential biomarkers, such saliva and faeces. The temporal inference will show the quality of biomarker for the short and long term. Besides, in Mediterranean region, there are also great interests in small ruminant dairy species, which are very less studied.