DESCRIPTION FOR THE GENERAL PUBLIC

The emu (*Dromaius novaehollandiae*) is world's second largest bird, and the largest avian species native to Australia. Its commercial farming beginnings date beck to the year 1970. The birds feature excellent adaptability to changing environment and climate conditions, which is reflected by a wide range of their distribution, embracing nearly all the continents. The economic importance and growing popularity of the species in various countries and parts of the world is associated with the versatility of uses the bird has. Initially, however, emus were farmed only for their hide and fat, the latter used in the production of valued oil. The meat was treated as a by-product, as it was wrongly considered unhealthy and fat. This proved to be a false assumption, as over the years the meat turned out to be of high nutritional value, in taste resembling young beef.

The project has the following objectives: 1) to determine the effect of age on proteomic composition of the emu muscles, and 2) to describe the processes undergoing during meat ageing of the emu through an analysis of changes in the proteome a of the meat. Analysis will be carried out in muscles samples taken from the thigh (*m. iliotibialis lateralis*) of young (aged 1 year) and adult emu (aged 3 years) after reproductive life. The prospective research are aimed to confirmed two research hypotheses that: 1) with the development of animals, the quantitative and qualitative composition of the emu muscle proteome will change, which will be manifested by alterations in protein expression of the contractile muscle apparatus, as a hypertrophic effect and changes in metabolic activity associated with, for example, intramuscular fat deposition and increasing energy demand, associated with higher muscle mass, and 2) meatageing process affects changes in protein composition (proteome) of emu meat. These changes will be the result of intense proteolytic degradation of cytoskeletal proteins and the effect of energy substances depletion due to the loss of tissue provisioning in nutrients and oxygen, causing alterations in protein expression associated with muscle energy metabolism and proteins related to hypoxic stress and oxidative stress response. The hypotheses will be tested by muscle protein profile analysis.

The emu is a relatively poorly described species and represents a valuable object of scientific research. Studies that have been carried out on the meat of these birds are general and scarce as compared with other poultry species. Protein maps of muscle tissue are useful given the fact that the genome of the emu has not been fully sequenced so far, and the molecular databases, NCBI and UniProt, contain 269 and 211 protein products, respectively, and the amino acid composition of most of them has been predicted based on the sequence, and only 18 of them have been confirmed at the protein level. Proteome maps will enable characterization of its protein composition and a relative accumulation of the proteins forming its structure and creating the foundation of biochemical processes. The project will also enable a comparison of muscle protein profiles between animals of different ages, in order to analyze the differences in the metabolism of this tissue resulting, among others, from muscle weight gains. In addition, a comparison of the emu muscle proteome will be carried out directly after slaughter, 24 and 48 hours post-slaughter, in order to determine post-mortem changes occurring in the muscular tissue, showing the metabolism associated with the muscle tissue being changed into meat.