

## SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

**Action number: CA15224**

**STSM title: The Effects of different sources of vitamin D on musculoskeletal development and behaviour of laying hens**

**STSM start and end date: 15/06/2019 to 15/08/2019**

**Grantee name: Tahir Shah**

### PURPOSE OF THE STSM:

The aim of the current STSM was to investigate the effect of sunlight exposure, feed supplementation of 1,25-dihydroxycholecalciferol-glycosides from *Solanum glaucophyllum* and their interaction in laying hens in the rearing period on behaviour, emotional state and physical health including musculoskeletal development.

### DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

In the current STSM, I was actively involved in the Slovenian national welfare project, carried out at campus Rodica, Department of Animal Science, University of Ljubljana, Slovenia. The head of the project Dr. Manja Zupan supervised me for conducting this STSM. The main focus of the project was to study the effects of different sources of Vitamin D to reduce bone damage in birds. The different sources of vitamin D includes the natural sunlight and a feed supplement 1,25-dihydroxycholecalciferol-glycosides from *Solanum glaucophyllum*.

In the beginning of my STSM I was a part of the think tank of the project which will last until September 2020. I actively participated in the planning of the project and construction of the indoor and outdoor compartments. I also technically and physically helped with the placement of the video cameras in the barn for behaviour observations. The project is mainly divided into three phases i.e. the rearing period, start and peak of laying period and end of laying period. For my STSM it was decided to conduct an experiment during the rearing period with the hypothesis that birds reared in a barn system with exposure to sunlight and supplementation of 1,25-dihydroxycholecalciferol-glycosides from *Solanum glaucophyllum* in the feed would display more maintenance, comfort and

locomotor behaviours and less resting behaviours indicating good physical health and more musculoskeletal development.

After completion of the construction of the facility and planning of the experiments 240 Lohman brown pullets of 15 weeks age were purchased from commercial farms and were brought to the experimental facility. On arrival the birds were tagged with foot rings, marked with non-toxic coloured spray (green and blue markings) for individual recognition of each animal on the recordings (repeated each week after markings faded), weighed, keel bones were palpated for deformities, feathers were collected for corticosterone measures and feather condition was scored. I had firsthand experience with palpating birds having keel bone deviation and fracture which was performed by an expert. Later on pullets were randomly divided into 12 pens littered with wood shavings (3 of pens per treatment, 20 birds per pen). The first treatment was control, kept indoors and fed only commercial diet (IN), second treatment was provided with commercial diet and outdoor run (OUT), the third was provided with commercial diet, outdoor run and complementary feed (OUT+CF) and the fourth was provided with commercial diet and complementary feed (IN+CF). Complementary feed was a herbal product made from the plant *Solanum glaucophyllum*, containing 100 g/kg of crude fiber, 180 g/kg of crude protein and 100 mg/kg of 1,25-dihydroxycholecalciferol-glycosides.

#### **DESCRIPTION OF THE MAIN RESULTS OBTAINED**

During the first part of the rearing phase we have collected data regarding body weight, keel bone status of the birds at arrival, feather collection for corticosterone, indoor (direct observation) and outdoor (camera recordings) behaviour observations of the pullets for the 1<sup>st</sup> week. Further data of indoor and outdoor behaviour observations, radiographic examination for KBD, bone strength and blood vitamin D needs to be collected. For this reason a new STSM will be submitted.

#### **FUTURE COLLABORATIONS (if applicable)**

This mission has create the opportunity to expand professional networks and we plan to pursue continued collaboration between our two institutions. I have already started to write a draft paper on the current work which is planned to be finalized in the coming months. We also plan to work together at the end phase of this project which is at the end of laying period.