2021. The study mainly focused on *Streptococcus uberis*, being this the main problem for this dairy farm. The herd (113 animals) was sampled at the beginning and at the end of this study, to evaluate the efficacy of the protocol.
Lactating cows were sampled, at mammary quarter level, 10 days after parturition, across lactation when showing clinical or subclinical mastitis symptoms, after mastitis treatment, and at dry-off. Moreover, an environmental microbiological survey for *S. uberis* was done by sampling bedding, drinking water, animal skin, feces from rectal ampulla, and milking parlor. Milk samples were struck onto blood agar (5% horse blood) and incubated at 37 °C in aerobiosis, while environmental samples onto Edward's modified agar for *S. uberis* count. After 24h, colonies were identified by matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF). For some strains, isolated from animals and environment, antimicrobial susceptibility test was performed by disc diffusion method, testing the most used molecules for mastitis treatment.
Streptococcus uberis and coagulase-negative Staphylococci were the most frequent isolates from milk samples and *S. uberis* was isolated from bedding, drinking water, and animal skin with a higher rate in dry-off and post-partum areas. The results of the antimicrobial test were very similar between animal and environmental isolates and, a high rate of recovery in animals treated with amoxicillin/clavulanic acid and first-generation cephalosporine was observed. From this study appears, as already described by other authors, that dry-off and post-partum were the most critical areas.
Considering all the data, the occurrence of *S. uberis* went from 24.7% to 21.2% at the end of the study confirming that the reduction of the herd, the selective treatment of mastitis held by *S. uberis*, combined with improved environmental management, led to better mastitis control.
However, to evaluate the efficiency of this protocol a longer observation period is needed, and further studies by subtyping will be necessary for a correct epidemiological evaluation.

P126

A bioinformatic pipeline for image analysis of varroa related traits in honeybees comb images

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In honeybees, *Apis mellifera*, hygienic behaviour is the uncapping and removing of dead and diseased larvae and pupae from uncapped brood cells. In times of honeybee declining worldwide, beekeepers study hygienic behaviour manually quantifying removal of freeze-killed larvae from uncapped cells. Manually counting uncapped cells in comb images is time-consuming and prone to error.
Focus of this study is to design an automated pipeline for the segmentation of honeybee comb images.
For this purpose, honeybee comb images were acquired, selected, and analysed through digital image processing techniques, which must handle problems due to uncontrolled illumination conditions, differing colours, rotations, scaling, and comb sizes.
More precisely, for simultaneously handling poor illuminations and differing colour conditions several colour normalization algorithms have been experimented, ranging from unsupervised colour-enhancement models to colour normalization techniques used in digital histology. Next rough segmentation of the area of interest (AoI), and the cells in that area, have been obtained by clustering followed by Hough transform for finding the circular AoI, and by binary operations for detaching attached cells in the AoI.
Analysis of the histogram plots describing the connected components in the AoI allowed estimating the mean cell areas and therefore computing an estimate of the cell counts.
Among the 127 comb images, 80 images containing limited artifacts and acquired under acceptable illumination conditions were selected as test images and allowed obtaining a correlation with manual counted cells of 0.948. The remaining 47 images, containing strong artifacts and bad illuminations conditions, were used for development and resulted in a lower correlation. The hereby generated pipeline yields an estimation of honeybee comb cells correlating with manual counted cells.

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P127

LATTE DIGITALE (digital milk) and environmental sustainability

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Environmental sustainability is a main challenge of the livestock farming sector. Globally the contribution of the livestock farming sector counts for 10–14% of the total anthropogenic emissions