

Animal health and welfare planning for European organic dairy herds – development and expansion

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Animal Health and Welfare Planning (AHWP) is a long-term continuous approach, as initially developed in the Core Organic ANIPLAN-Project. Within the framework of organic principles it is based on regular data collection on animal health and welfare and therewith farm specific. It identifies not only problematic areas but also farm specific successes. The approach is based on the inclusion of external knowledge and persons in the process to reach, finally, farmer ownership of the envisaged improvement measures. A team of farming advisors, veterinary practitioners and on-farm researchers from Spain, France, United Kingdom and Switzerland developed an improved RELACS AHWP protocol and introduced the AHWP approach for the first time in France and Spain. The improvement entails the introduction of the Farmer Field School approach (FFS), a specific form of facilitated farmer inter-collegial advisory in groups representing 5-7 farms. A facilitator is responsible for organization and moderation of the meeting as well as writing up and distributing the minutes to all participants afterwards. Each meeting comprises a farm walk (including the 'success case'), a structured discussion about two problematic areas pointed out by the host farmer and subsequent inputs from each individual participant on how to solve it. Discussion on each problematic area is closed by a conclusive statement from the host farmer about the next steps to guarantee a high level of farmer ownership within the process. In RELACS, 35 farms (4 from Spain, 11 from United Kingdom and 20 from France) are involved in 6 FFS groups. The impact of the advisory action will be determined based on a comparison with another 31 monitored farms (5 from Spain, 9 from United Kingdom and 17 from France) that did not undertake the FFS approach.

***In vitro* testing of plant extracts and essential oils as antimicrobials in organic farming**

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The aim of the present work was to test *in vitro* the antiparasitic and antimicrobial activity of some selected plant extracts (PE) and essential oils (EO) to explore their possible use in organic farming. Three PEs (*Malva sylvestris*, *Chamomilla recutita* and *Althaea officinalis*) were assessed for their antiparasitic properties against gastrointestinal worms through a traditional microscopic detection method (larval development assay, LDA) using a laboratory strain of *Haemonchus contortus* as target organism. Moreover, the Minimal Inhibitory Concentration (MIC) assay was measured on 8 EO following the CLSI guidelines (CLSI, 2018b) protocol, with minor modifications, on 4 main bacterial strains (*Escherichia coli* ATCC 25922, *Salmonella* Typhimurium ATCC 14028, *Staphylococcus aureus* ATCC 25923 and MRSA ATCC 43300). All the tested PE demonstrated antiparasitic effect up to 20 mg/ml concentration, but a stronger activity of *M. sylvestris* and *A. officinalis* than *C. recutita* was observed, even at lower concentrations. The average EO's MIC was 1.02% for *E. coli*, 1.5% for *S. Typhimurium*, 1.2% for *S. aureus* and 1.2% for MRSA. The lowest average MIC among all the tested strains was found for oregano oil (0.09%), followed by thymus oil (0.19%), tea tree oil (0.29%) and rosemary oil (0.8%). The highest average MIC were found for Lavender oil and Clove oil (2.57% each) followed by cinnamon oil (2.4%) and mentha oil (1.75%). Some of the tested PE and EO appear as viable alternatives to antimicrobials in organic farming based on the *in vitro* anthelmintic and antibacterial activity we observed. The setup of *in vivo* administration protocols (i.e. dosage, frequency of treatment) and the evaluation of potential side-effects deserve further studies. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774340.