



Low-input antibiotic strategies: improving animal health & welfare

Introduction

Organic principles call for a unique way of viewing animal health, welfare and disease. Animals should be given the opportunity to meet their natural needs – e.g. perform their natural behaviour such as be given opportunity to take care of their offspring – and farmers (or other actors) should intervene quickly and consequently when it is necessary to avoid any pain, stress and frustration. We view the animal as a living sentient being that has the ability to respond to its surroundings in ‘clever and resilient ways’ to stay healthy. Organic and low-input milk production are not the same in all aspects but also have much in common. At the same time, working with low-input farming inevitably means working with low-input antibiotic use. Farming to organic principles emphasises health, as one of the four principles (ecology, health, fairness and care). Low-input farming clearly aims to optimise the management and use of on-farm resources (internal inputs), minimising at the same time the use of off-farm resources (external inputs), such as purchased fertilisers, pesticides, feed compounds etc. (Parr et al. 1990). With focus on animal health low-input farming systems aim to mitigate the use of antibiotics. However, this does not simply mean denying the use of antibiotics to sick animals but it implies a more cautious and targeted use and making use of all various strategies to prevent health problems and diseases from taking hold in the herd. Actually, health can be thought of as ‘resilience’: the living animal’s ability to withstand



and absorb shocks and changes in its surroundings. This leaves the humans with a responsibility to take care of the animal among others by creating an environment which can support the animal and minimise shocks and disturbances. For example, we can provide animals with good indoor environments where they can move around peacefully, and give them possibilities to meet their natural needs as much as possible, and timely, appropriate intervention when needed. In the SOLID project (WP2; <http://www.solidairey.eu/index.php/category/wp2/page/2/> & <http://www.solidairey.eu/wp-content/uploads/Welfare-state-of-dairy-cows-in-three-European-low-input-and-organic-systems.pdf>), animal welfare assessments were undertaken in 30 herds in 3 countries and showed that animal health and welfare could be good and excellent in organic and low-input farming. There was a huge variation between farms and countries, and in specific cases, major challenges were seen in some farms, such as injuries, lesions and swellings due to poor lying-down facilities, mutilations, poor human-animal relations and even insufficient water supply could be challenging.

The question is: how do we improve animal health and welfare in practice? This technical note gives three examples of approaches to improve the herd, and of course a good animal health condition, good animal welfare and ‘natural needs’ can be met in multiple ways and by combinations of actions and management routines. There will be as many ways to answer this question as there are farms and herds. There is not a one-size-fits-all strategy, and our very different case studies in the SOLID project demonstrate very different approaches of attempting to meet natural needs of cow and calf around birth, feeding with herbs for health promotion, teat dip with iodine and working together in farmer groups.



Farmer-led studies in the SOLID project related to health and welfare

In the SOLID project, a total of 18 smaller projects were conducted by farmers working closely with researchers. This technical note summarises the results of three projects that were all aimed at improving animal health and welfare, and they took widely different approaches:

1. Using herbs in grass – for grazing, hay or silage (Denmark);
2. Farmer Field Labs and farmer groups for improving the animal and herd health (UK);
3. Improving udder health and reducing somatic cell counts (UK).

Other SOLID farmer-led projects are also relevant to animal health and welfare for example, two studies were carried out in Denmark and UK about rearing calves on cows (see Technical Note 8: Rearing calves on milking cows).



Photo: Karen Svøgaard

Herbs in pasture

Using herbs in grass – for grazing, hay or silage

There are an increasing number of farmers interested in growing herbs in pastures because of the health and production benefits to the animals and to the soil. In addition, herbs have a positive influence on milk quality and contribute to the variety and 'naturalness' of the pasture, among others by offering the cows a variety of different tastes and additional micro-minerals and other substances.

As part of the SOLID activities, we followed seven organic farmers who had established herbs for a number of years

i.e. four of them had included herbs in their pastures for 15-18 years. Several farmers experimented with keeping their herb/grass pastures for more years before ploughing. The oldest pasture was 6 years old. Most of them either bought seed mixtures including herbs or mixed herb seeds with grass and clover seeds before sowing. Almost all farmers interviewed used herbs in all of their grass-fields, for grazing and for silage production. One common problem was the survival of herbs in the swards, where they were out-competed by grasses and other plants or failed to survive droughts, hard winters or ensiling/harvesting methods. Herb seeds are often very expensive, and then it is discouraging to see them being out-competed by grasses. Plant cover analysis indeed revealed that a lot of the herbs were out-competed, and some were better survivors than others. This is very specific for the location, and local knowledge should guide the seed mixtures and which herbs to favour. One farmer was sowing the herbs in 30 cm broad strips for every 4th metre. He had observed that this improved the survival chances of the herbs and decreased the competitive pressure from grasses and clover. Other farmers had increased the amount of herb seeds per hectare. Most farmers considered following the experiments of the farmers sowing herbs in strips, and planned regular strips all over the field, while other farmers planned broad strips at the edge of the field.

All farmers reported that their cows were happy to eat both fresh herbs when grazing (except the old tough stems of chicory) and silage made from herb-grass fields. Only the silage including woody chicory and soil was disliked by the cows. Some farmers had the impression that especially in the springtime, their cows preferred herbs and leaves from bushes and trees in hedgerows more than grass (see Technical Note 12: Agroforestry). The farmer who established strips of herbs on the pasture described how the animals could stand in these rows grazing primarily there. This supports a major argument for using herbs to promote animal welfare: the cows really liked it.

Farmer field labs and farmer groups for improving animal and herd health

Treatment of mastitis incidences in dairy farms relies largely on antibiotic use and with particular emphasis to organic production the EU Regulation (EC/834/2007) postulates that "homeopathic and phytotherapeutic remedies shall be used in preference, provided that their therapeutic effect is effective for the species of animal and the condition for which the treatment is intended". Under the SOLID project and in collaboration with the Field Lab programme "Duchy Originals Future Farming Programme" the Organic Research Centre (ORC) undertook a study that aimed to help farmers to improve current on-farm practices in reducing the use of antibiotics in their farms. The study was initiated as a discussion group amongst a number of farmers that were keen to improve the health of dairy cows and in this way cut down on antibiotic use. The group met eight times, and four of the farmers conducted a trial which is summarised below.

Liniment commercial cream containing mint oil reduces somatic cell counts in dairy cows

To mitigate the use of antibiotic treatments for controlling mastitis in dairy cows, many farmers use a commercial product that is specially formulated liniment cream containing 35% mint oil. The cream is designed for massage and absorption into the udder and it is used for softening swollen and inflamed udders as well as being used as an oedema preventative at calving time on organic farms. Somatic cell counts (SCC) in milk increase as a result of an immune response to a mastitis-causing pathogen. Mint oil is known to improve blood flow by dilation of the capillaries and it is likely that application of the mint oil cream can enhance the transportation of white blood cells to the udder and thus can act as a prophylactic measure to prevent mastitis. Here we present results from a participatory research trial which tested the effect of the cream on SCC.

Four farmers participated in an on-farm trial, following a common experimental protocol in which every second newly-calved cow was treated for 4 consecutive days with the mint oil cream. The farmers massaged the udders of newly calved cows for minimum of 2 minutes with 5 ml of the liniment cream before the morning milking. SCC data from the National Milk Records of these cows were compared with data from untreated cows (control).

The results show that on average, SCC in the untreated cows remained relatively constant and above the critical threshold of 200,000. In all recording months, the SCC of the treated cows were lower than in the untreated cows but a statistically significant difference was noted only in the 3rd milk recording (Figure 1a). Combined farm data across the recordings showed that the overall SCC of the treated cows were significantly lower ($P=0.04$) compared to those of the untreated control cows (Figure 1b). The results also showed that mean SCC were not affected by the year of lactation, or by calving month.

This study showed that treatment of the newly calved cows with a liniment mint oil cream could act as a

complementary practice to reduce mastitis incidences as indicated by its effect on cows' SCC, but future studies will be needed to determine the mode of action of the cream as well as the optimum volume and massage duration for an effective treatment and to assess wider impacts, e.g. the costs of the treatment.



Photo: Christine Gosling

Applying liniment mint oil cream at milking time

The general experience, based on participation, observation and reports from the group meetings is that there is a great power and pool of knowledge in farmer groups. This is demonstrated in this field lab group, and confirms what other studies of other types of farmer groups have also shown, e.g. the Danish so-called stable schools. The creation of ownership among the farmers is paramount for taking action, and the framework has to enable this ownership by every participant.

Farmers that participated in this study have commented that although they considered their management prior to this discussion group and the on-farm trial was quite good, they have benefited from the process of coming together to discuss the various methodologies the other farmers employed.

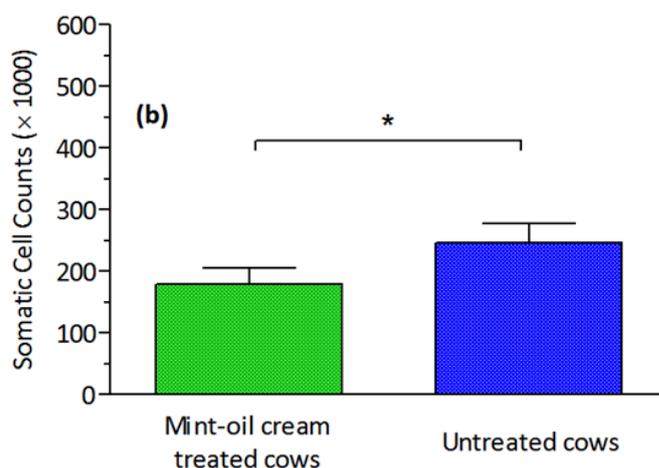
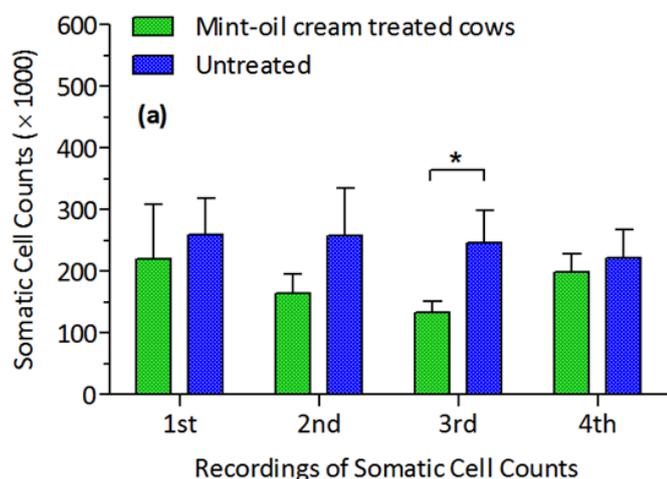


Figure 1: Average SCC in each recording month combined across the participating farms [panel (a)] and average SCC combined over the recording periods and over farms [panel (b)] (in each panel, means marked with * indicate statistically significant differences).

Conclusions and recommendations

The reduced use of antibiotics is an important characteristic of low-input and organic farming and the management of such farms should be oriented towards health, which is more than the absence of disease. This practice enhances animal welfare and farm profitability as well as contributing to efforts to preserve antibiotics for life or death situations.

Humans have the responsibility to take care of the health of the animal by creating an environment which can support the animal resilience and by minimising various shocks and disturbances. Also see Technical Note 8: Rearing calves on milking cows.

Working together in a discussion group can be an excellent way to further develop approaches to reducing antibiotic use if such groups share common understanding of working towards a shared goal and show mutual respect for each other in working together in finding practical solutions for the participating farms.

There is a need to further explore the use of complementary therapies in health management. The example of a trial of using a liniment mint oil cream for the treatment of the newly calved cows on four practical farms has shown the potential of one of those practices for reducing mastitis incidences.

Cows and other ruminants like a variety of plants in their diet. Danish farmers have reported that the cows like herbs in their feed, both grazed and as silage. This gives them different tastes and potentially micro-nutrients and minerals, even if the direct benefit on animal health is difficult to prove experimentally. It is in accordance with organic principles to provide ruminants with a broad variety of plants instead of monocultural grass fields, and also giving them different tastes and potential micro-nutrients and minerals.

Herbs in the grass field contribute to an attractive environment for different types of beneficial insects and enhance biodiversity.

Some herbs are very vulnerable and not good survivors, and it is important to exchange experiences and learn from other farmers for each geographical location, to choose the most robust herbs. Sowing herbs in strips seems a viable strategy, making it easier to re-establish in a long-term grass field. In Danish and similar conditions, making silage rather than hay seems to be a better option for herbs. In many cases it might be better to focus on increasing wild herbs which naturally grow in fields rather than introducing herbs in expensive seed mixtures, which may have problems competing or surviving. For more information about enhancing forage production of diverse swards please refer to Technical Note 3.



References

EU 2008 Commission regulation (EC) No 889/2008 laying down detailed rules for the implementation of council regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control. Available: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:250:0001:0084:EN:PDF> Accessed: 18/03/2014.

Karydi E, Kudahl AB, Vaarst M (2015) SOLID participatory research from Denmark: Use of herbs in pastures for dairy cows: Farmers' experience, pasture coverage analyses, and literature survey of Danish research results. Aarhus University, Animal Science, Aarhus University (<http://orgprints.org/28754/>)

Parr JF *et al.* (1990) "Sustainable Agriculture in the United States," in Sustainable Agricultural Systems, ed. by Clive A. Edwards, et al. Ankeny Iowa: Soil and Water Conservation Society, 1990

http://www.solidairy.eu/wp-content/uploads/Final_Report_UK_Antibiotics.pdf

Author: Mette Vaarst (Aarhus University), Konstantinos Zaralis and Susanne Padel (ORC)

The work behind this leaflet is compiled with contributions to the herb studies from Anne B. Kudahl, Emmanouela Karydi, and a summary of research in the field of herb use in pasture is based on research conducted by colleagues mainly at Aarhus University. The work on Farmer Field Labs also refer to other European experiences with farmer owned farmer groups.

Editing and design: Phil Sumption (ORC)

Sustainable Organic and Low-Input Dairying

SOLID is a European project on Sustainable Organic and Low Input Dairying financed by the European Union. The project ran from 2011-2016. 25 partners from 10 European countries participated



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n°266367

©SOLID 2016

