Herbs oust antibiotics

Because of restrictions on the use of antibiotics, livestock farmers are increasingly resorting to herbal remedies, bacterial drinks and other natural products to make and keep their animals healthy. Although there might not always be hard medical evidence, farmers sometimes get spectacular results from natural remedies.

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The news was all over the Dutch papers in April when British scientists at the University of Nottingham used instructions found in a ninth century medical textbook to brew a natural remedy that kills bacteria. The mixture of leek, garlic, wine and ox gall was intended to cure inflammations of the eyelid but it had an unexpected effect: it even killed MRSA bacteria, which are resistant to antibiotics. The researchers now think such methods from over a thousand years ago can help tackle the problem of the increasing resistance of bacteria to antibiotics.

Maria Groot, a vet and researcher at RIKILT Wageningen UR, is not surprised by the British microbiologists' results. 'There are numerous examples in the literature of herbal remedies having an effect on bacterial or viral infections,' she says. 'More and more people are becoming interested in them; herbal medicine is no longer seen as old wives' tales.' Although there are no statistics, she reckons that farmers and vets are increasingly using natural therapies, especially now that government policy is focused on a dramatic reduction in the use of antibiotics in order to stop bacteria from becoming ever more resistant to those antibiotics.

But knowledge of herbal medicine is still limited and Groot says that much 'traditional knowledge' has been lost. Even so, the shelves of specialized garden centres such as Welkoop and Boerenbond are full of animal health products based on natural ingre- >

dients. Some products are even registered as animal medicines, such as udder ointment with eucalyptus oil for inflammation of the udder, or Colosan, a mixture based on the oils of linseed, cinnamon, aniseed, fennel and caraway seeds that livestock farmers use to treat gastro-enteritis in cattle. According to Groot, both experience in the field and clinical studies show that natural products can make a significant contribution to keeping animals healthy. For example, she says garlic has an effect on worms in the intestines of chickens while urinary tract infections in pigs can often be dealt with using bearberries, cranberries and stinging nettles. A mixture of garlic and oregano prevents diarrhoea in calves. Research has shown that this mixture has an antibacterial, antiviral and antifungal effect.

‘More and more people are becoming interested in herbal medicine’

SNIFFLING PIGS

Pig farmer Harry Bloemenkamp’s farm in Lettele is a textbook example of natural products being used as a replacement for antibiotics. For a number of years there were problems in the transition from piglet to adult pig, despite the use of antibiotics. ‘They didn’t grow that well and we had a lot of losses due to lung problems,’ says Bloemenkamp. On the recommendation of his vet, he started using Bio-Even, a product containing formic acid, citric acid and herbal extracts of camomile, plantain, thyme and sundew. ‘If pigs start sniffling, I spray this product in the barn,’ says Bloemenkamp. ‘It reduces infection levels and encourages the secretion of mucus.’
He also added a herbal mixture that included oregano to the feed. The results were ‘astonishing’. The use of antibiotics fell from an average of 12 grams per animal per day to virtually nothing. What is more, losses due to disease halved, from 3 per cent to 1.4 per cent. The pigs also grew about 15 per cent faster. ‘We are now achieving excellent results,’ says Bloemenkamp enthusiastically. ‘It costs about one euro in natural products per pig but that gets us increased yields worth nearly six euros per pig.’

SAVING LIVES

Even so, cutting antibiotics completely out of livestock farming is not an option, thinks Gerdien Kleijer, a vet and project manager at Projecten LTO Noord. ‘Antibiotics remain necessary for urgent situations; they save lives,’ says Kleijer. ‘However the unthinking application of antibiotics of recent years was not a good thing,’ she argues. ‘They were used so that animals could be kept packed together in greater numbers and in less hygienic conditions. They were even a standard ingredient in feed until 2006.’
Then the national government banned the preventive use of antibiotics and research programmes were set up to enable further reductions. Since then, livestock farmers have been looking for ways of keeping their animals healthy and robust. Livestock farmers who adjust their barn systems and management methods by improving hygiene in the barn and keeping fewer animals per square metre turn out to be able to manage with less antibiotics or even none at all. ‘If you work on the basis of what each animal needs and adjust the way you manage things accordingly rather than just focusing on production levels, you can reduce the use of antibiotics to a minimum,’ says Kleijer. According to her, the preventive use of natural products such as bacterial drinks and herbal remedies can also keep livestock healthy and robust. Livestock farmers can use them during times of stress for the animals, for example, such as a change in feed or a move to a different location.
Although Kleijer knows of plenty of examples from actual practice where natural remedies have helped keep animals healthy or recover more quickly, there is often insufficient scientific research or evidence. That is because a natural product cannot be patented unless it is based on a genetically modified crop. What is more, studies that meet the strict clinical research conditions that allow a product to be registered as an animal medicine are extremely expensive. Scientific proof is particularly difficult to obtain for herbal remedies as they are a complex mixture of various compounds.

That makes it tricky to identify the active ingredient or combination of active ingredients. Kleijer thinks such rigorous scientific evidence is not actually necessary in many cases: 'Practical experience shows that many natural products improve health. It would cost a huge amount of money to demonstrate this scientifically sufficiently to enable the manufacturer to make a medical claim.'
That is why manufacturers of natural products often carry out practical tests and studies, then file away the results internally rather than publishing them. 'That is a real problem as it is a major obstacle to the dissemination of knowledge,' says Maria Groot at RIKILT.

SUCCESS OF PROBIOTICS

Michiel Kleerebezem, professor holding a personal chair in Host Microbe Interactomics at Wageningen UR, confirms what Groot and Kleijer say: 'There are a lot of signs pointing to the success of relatively simple products in livestock farming such as probiotics – mixtures of good bacteria – and herbal remedies,' he says. 'But it's not easy to provide irrefutable scientific proof.' Indeed, health claims for probiotics have not been approved by the European Food Safety Authority (EFSA). But he is in no doubt that these bacterial drinks have a positive effect on some people and animals. Kleerebezem thinks that the EFSA's approach to evaluating study results is too geared to the demonstration of powerful short-term medicine-like effects. There is also an idea that these products should have a positive effect on everyone. He thinks this is a misconception. 'Probiotics have a relatively mild effect that may only become apparent in the longer term,' explains the professor. 'Also, much more attention should be given to the differences between individuals; what doesn't work for one person may well work for someone else.'

Kleerebezem sees the bacterial populations in the intestines as an ecosystem that you can influence and control in order to boost the health of animals and people. Probiotics can play a role, for example by competing with pathogens and preventing them from getting a foothold in the intestines. Kleerebezem: 'You may be able to prevent animals from becoming sick or help them recover by using a diet or microbial therapy to change the intestinal ecosystem. Such approaches can help reduce the use of antibiotics in livestock farming.'
The Central Veterinary Institute at Wageningen UR is also carrying out research into the effect of natural products on infections. 'In test tubes, garlic extract inhibits some pathogenic bacteria,' says Annemarie Rebel, head of the Infection Biology department, to illustrate the >

PATTERN BOOKS

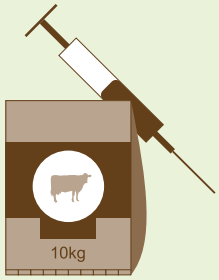
Both farmers and vets need more knowledge and awareness of natural products if these products are to be used effectively on a larger scale, says Maria Groot from RIKILT Wageningen UR. That is why she took the initiative in 2009 to collate the knowledge of diseases and natural remedies in what are termed 'pattern books' for poultry, pigs, veal calves and cattle, with financial support from the Ministry of Economic Affairs. For each disease, the booklets describe the natural products that can be used to keep the animals healthy or help them recover. Grazix for example, a product based on pomegranates and green tea, improves the intestines' immune function and is effective in treating diarrhoea in piglets. Cryptosporidium is a parasite that is causes severe diarrhoea and is difficult to treat. In calves, it can be treated or prevented using Solucox, a vegetable product based in part on goldenrod and thyme. The pattern books also consider the scientific and clinical evidence, especially for vets, for the effects of the different natural products. The pattern books were originally intended for organic farmers but the Ministry of Economic Affairs is now promoting and subsidizing their dissemination in the conventional sector including the necessary modifications and updates. This will let knowledge of natural products be shared with livestock farmers and vets.

THE USE OF ANTIBIOTICS IN LIVESTOCK FARMING AND THE RESISTANCE PROBLEM

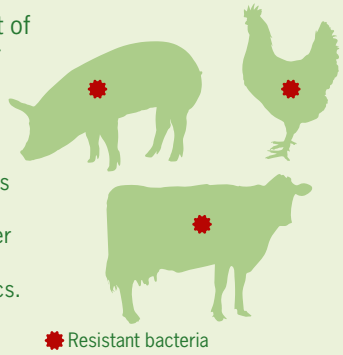
By cutting down on antibiotics in livestock farming it is hoped that the development of antibiotic-resistant bacteria can be stopped. Such bacteria are often dangerous for humans as well as livestock.

Development of resistant bacteria

Until 2008, antibiotics were often added to feeds as a preventive measure, as well as being prescribed by vets when diseases were diagnosed.



Due to years of high levels of antibiotic use in the livestock sector, a number of bacteria have become unresponsive to antibiotics.



From animals to humans

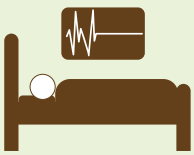
Some resistant bacteria from livestock farms are dangerous to humans as well. Examples are MRSA and ESBL.

MRSA bacteria can be transmitted from animals to humans through direct contact with the livestock.

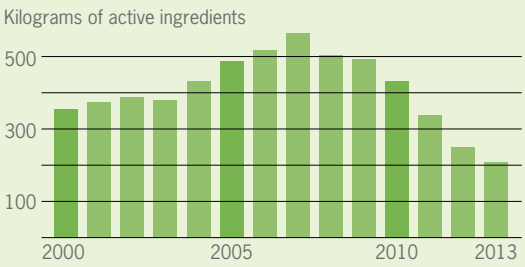
ESBL bacteria are probably transmitted through contact with infected poultry meat.

Reduced immunity

When humans are infected with antibiotic-resistant bacteria, treatment with antibiotics is impossible. Patients with reduced immunity are at risk of death; estimates suggest that this happens to many thousands of patients in Europe every year.



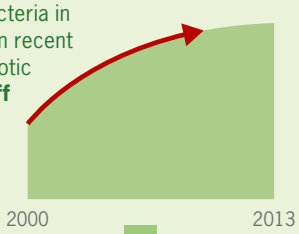
Antibiotic use in livestock



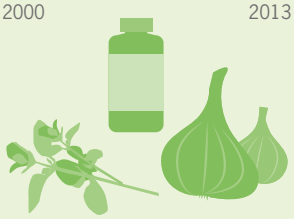
The sale of antibiotics for livestock rose to almost **600 tonnes** in the Netherlands in 2007. Since then the use of antibiotics in the country has fallen as a result of government policy. In 2013, **209 tonnes** of antibiotics were sold. By the end of 2015 the use should have been cut further, to **70%** of 2009 levels.

Preventing antibiotic-resistant bacteria

Numbers of antibiotic-resistant bacteria in the Netherlands went on growing in recent years, in spite of the drop in antibiotic use. This growth began to **level off** for the first time in 2013.



To curtail the growth of antibiotic-resistant bacteria even more, the use of antibiotics in livestock farming needs to be reduced **further still**. Changes to how farms are run and the application of **herbs and probiotics** can help here.



research. 'It turned out that garlic in feed also inhibited the bacterium *Actinobacillus pleuropneumoniae* (APP), which causes infections in the lungs and pleura of pigs. The animals became sick less often, suffered less damage in the lungs and there was a decrease in the number of pathogens in the animals.' Even so, a good result like that does not mean you are finished: the quantity of garlic needed to achieve that effect in the animals was far more than is usually used in clinical studies. Animals are also not fond of garlic, which can make it difficult to administer the remedy.

LEARNING FROM INDIA

The European Commission and Oxfam Novib and some provinces such as Overijssel and Friesland are subsidizing exchange programmes between various countries in an effort to promote knowledge about the use of natural remedies and reduce the use of antibiotics. For example, Dutch vets and farmers paid a visit to farmers in India in 2014 to learn about the use of natural products, especially herbal remedies. 'Dairy farmers in India use far more herbal formulations than Dutch farmers,' says Kleijer. 'For example, a mixture of aloe vera, turmeric and calcium carbonate is a tried and tested recipe for treating inflammation of the udder in India.'

The Dutch government would also like to see a broader application of natural products in livestock farming. The Ministry of Economic Affairs, for instance, is investigating the possibility of making farming more sustainable with less antibiotics through the application of natural products such as herbal remedies and nutritional supplements. Wageningen UR Livestock Research and the Animal Nutrition group are collaborating with the private sector in research into the relationship between nutrition, intestinal health and immunity. This has resulted in the development of the nutritional supplement Presan, for piglets and broiler chicks, that improves the diversity of the bacteria in the intestines.

REGISTERING PRODUCTS

Groot and Kleijer expect that herbal remedies and other natural products will play an increasingly important role in modern livestock farming now that there has been a big fall in the use of antibiotics. Hard scientific evidence is not always available but practical experiments show that many apparently esoteric mixtures of natural ingredients lead to improvements on the farm. Animals become ill less often and production increases. As the surprising result with the Anglo-Saxon herbal formulation that killed bacteria showed, humans and animals could benefit from more knowledge about the natural approach to treating sickness, or preferably avoiding sickness through the prophylactic application of herbal remedies. Groot advocates special rules for natural products such as herbal formulations to prevent quackery and uncontrolled proliferation in the production and development of such treatments: 'I would prefer to see a separate register for this kind of natural products: if the quality is good, it has a clinical effect and it's safe, that should be it.' ■

MARIA GROOT,
vet and researcher at RIKILT Wageningen UR

'Herbal medicine is not so often seen as old wives' tales'

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