Reducing antibiotics in pig farming

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The widespread use of antibiotics (also known as antibacterials) in human and animal medicine increases the level of resistant bacteria. This makes it more difficult to treat diseases in an efficient way. The guiding principle for antibiotic use in pig farming is still to "use antibiotics as little as possible, but as often as necessary". Everyone who is involved in the pig industry – from 'farm to fork' – can help to achieve this goal, by making sustainable improvements in pig health and welfare.

Innovative technological solutions and research initiatives can be successful if they reach out to the field and include experts from different disciplines and backgrounds. It is key to motivate stakeholders such as farmers, advisors and veterinarians to adopt better biosecurity, management and other practices that help reduce the need for antibiotic treatments. One way to do this is by showing that applying new measures can be economically beneficial. Providing information and improving the education of farmers and veterinarians can help to change attitudes and create change in the long run.

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The EIP-AGRI Focus Group on Animal Husbandry brought together 20 experts with different backgrounds (scientists, farmers and advisors) in 2013-2014, to propose innovative and transferable solutions on this topic. This document is based on the final report in which the Focus Group listed its conclusions, which can be found online via www.eip-agri.eu

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Introduction

To lower the use of antibiotics in modern swine rearing systems, the EIP-AGRI Focus Group on reducing the use of antibiotics in pig farming recommends a number of existing solutions and future initiatives, in the following three areas:

- Improving pig health and welfare
- Finding specific alternatives to antibiotics
- Changing attitudes and human habits

Definition

Antibiotics (antibacterials) are natural or (semi-)synthetic agents that kill or inhibit the growth of bacteria but cause little or no damage to the host. They are most commonly used to prevent or treat diseases and infections due to bacteria.

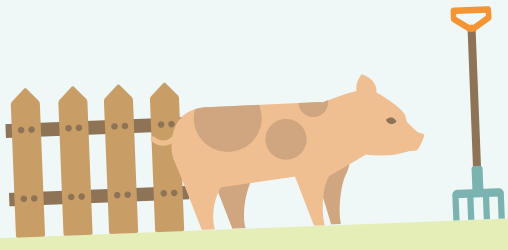
Area A : Improving pig health and welfare

▶ Practical solutions for improving pig health

It is self-evident that healthier pigs will need fewer antibiotic treatments. To increase the health and welfare of pigs across Europe, we need to invest in effective biosecurity (preventing diseases from being introduced to and spreading in a herd), in improved husbandry, management practices and housing conditions. The better these are, the better the general health of the animal will be, resulting in less need for treatment.

Improving health management starts by creating awareness. Farmers and their advisors across Europe should have better access to information that highlights how biosecurity can be improved, especially through actions that don't cost much or that don't take up a lot of time, such as hand washing or herd-specific clothing. In general, practices that create stress or cause diseases to spread should be avoided or changed. Bringing better biosecurity, husbandry, management practices and housing to pig farms can be supported by:

- Organising guidance for farmers and demonstrations of successful practices, across Europe.
- Setting up coaching programmes and advisory task forces that give practical advice to farmers and help to turn knowledge on biosecurity, hygiene and health management into common practice.
- Promoting existing and new interactive tools that help farmers, veterinarians and agri-advisors measure disease risks.
- Developing certification processes for herd health status across the European Union (EU), as a first step towards larger disease elimination programmes.
- Encouraging slaughterhouses to give better feedback on the health status of animals, so that solutions can be found before reaching a chronic disease status in the herd.



New research initiatives that can make a difference in pig health and welfare

Research and practice form a strong team. Innovative research that reaches out to the field should be encouraged. To reduce the use of antibiotics on pig farms, future studies should explore new technologies, efficient building design and equipment, and hygienic measures that promote natural pig behaviour and a stress-free environment.

Evaluating whether biosecurity and management measures have a positive economic impact is urgent, because this is key to changing attitudes. Developing cost-benefit and efficacy analyses on the relationship between new measures and a lower use of antibiotics may contribute to EU-wide changes in health management.

Disease prevention is not limited to individual farms. To broaden our views on how to keep diseases away from pig herds, we should compare the different biosecurity measures that are adopted by conventional, organic or other farms across Europe. Hearing success stories on low-use herds can encourage farmers and veterinarians to reduce their use of antibiotic treatments.

Solutions to keep diseases away from the herd

To detect diseases at an early stage and prevent them from entering and spreading within a herd, the following concrete tools and measures could offer solutions and should be tested in the field.

- Developing easy-to-use decision support tools, which can help farmers and their advisors see which decisions will improve the health dynamics of the herds. Experts from different fields should work together on this.
- Promoting Precision Livestock Farming (PLF) technology, which allows a targeted use of antibiotics so that only animals that are actually sick need to be treated.
- To keep infections away from the rest of the herd, hospital pens need to be efficiently designed for dealing with sick pigs. Better and safer ways also need to be found for performing euthanasia and for disposing of dead animals.
- Setting up specific control programmes, innovative air treatments or manure treatments (e.g. ammonia treatment, solid-liquid separation) to prevent diseases from spreading through the air or through manure.
- To break up chains of infections, animals can be kept together in separate groups (e.g. according to their age) when they move through the most distinct production phases (i.e. the farrowing, nursery and finishing units). These "all-in-all-out" systems allow for empty buildings to be cleaned and disinfected. New types of cleaning processes and equipment should be developed to make this possible for small farms and outdoor production as well.
- Developing time- and cost-efficient equipment (e.g. water-saving systems) for effectively cleaning and disinfecting pig facilities and vehicles for live animal transport.

▸ Protect water quality, a solution to keep diseases away from the herd:

Low quality drinking water contains higher levels of chemical and microbial contaminants, which can bring illnesses into pig herds. Furthermore, antibiotic treatments can be given through drinking water. When the water quality is low, they may become less effective. To protect and improve the quality of drinking water in pig facilities, experts from different fields (e.g. engineers, hygiene experts, veterinarians, drug designers and farmers) need to collaborate and exchange experiences. The following concrete solutions should be tested in the field:

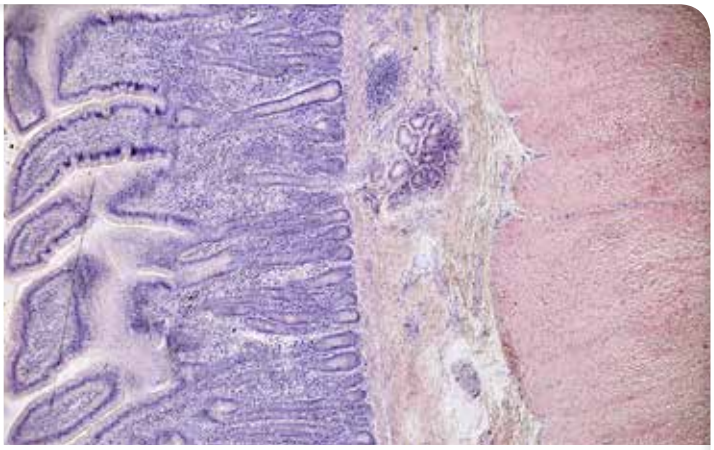
- Periodical controls, which measure the levels of chemical and microbiological contamination, both at the source (incoming water) and at the end of pipelines (water taken up by the pigs).
- Regular cleaning and disinfection measures, to purify the water supply system.
- Periodical or continuous chemical or physical treatments, to improve water quality.

Cleaner systems lead to healthier animals that need fewer antibacterial treatments. It prevents the development of resistant bacteria in pipelines and guarantees an effective treatment in cases where antibacterials are still necessary.

Promoting natural pig behaviour

By working together, farmers, engineers, veterinarians and other experts can develop new innovative solutions in building design and internal equipment which help to promote natural pig behaviour and better welfare and hygiene:

- Setting up ventilation or air filtering systems, or equipment to warm or cool the air before pigs come into a building can prevent them from falling ill. Giving piglets flexible facilities or adjustable pen sizes can improve their well-being. New technologies that reduce stress should be further evaluated in the field.
- To avoid stress during transportation, vehicle design, stocking density, and climatic factors need to be considered.
- Long lactation periods can benefit piglets in many ways. More research is needed to evaluate the effect this has on pig health as well as the economic benefits.
- Reducing different causes of stress at weaning can have a positive effect on the piglet's immune system. Options such as "get-away pens", in which piglets get to mingle with other litters before weaning should be tested in the field to give a better insight into ideal circumstances.
- Offering piglets an enriched environment after weaning, for instance by giving them the opportunity to learn from their mother about what, how and where to eat, helps them cope with weaning. It can even reduce diarrhoea and improve feed efficiency.
- Setting up standardised protocols for fighting certain diseases (at regional, national or EU level) could be helpful to control widespread co-infections (especially respiratory ones) and prevent new infections from spreading widely across Europe.
- Lower welfare conditions can in some cases lead directly to diseases that require antibiotic treatment, for instance through tail biting which can lead to infection. The relationship between better welfare and better pig health therefore needs to be examined. The cost-benefits of possible solutions need to be taken into account.



Area B : Finding specific alternatives to antibiotics

Encouraging existing solutions

Exploring alternatives is one way to minimise the use of antibiotics. The search for alternatives is especially promising in the areas of vaccination, nutrition and breeding programmes that support disease resistance. Setting up vaccination programmes, for instance, can replace antibiotics for important diseases. The use of plant-based pig feed additives and zinc as feed additive should be further examined. Finally, we can make breeding programmes more efficient by improving our knowledge on genetic markers for disease resistance. By testing the effectiveness of these alternatives in the field, and by evaluating their economic impact, farmers may be encouraged to increase the use of vaccines to help reduce the use of antibiotics in their pig herds.

Future research needs

Innovative research can speed up the search for alternative solutions. The most promising ideas are listed here:

- Understanding the immune system of pigs better, especially that of newborn pigs, can allow us to eliminate infections, improve current vaccines and design more efficient ones.
- Improving current vaccines and producing new, efficient, safe and low-cost vaccines offers solutions for diseases where no vaccines are available at the moment. Private-public partnerships can speed up this discovery process. Modern technology can simplify the use of vaccines and increase their efficiency.
- We need to find ways to close the immunological gap after weaning (when maternal antibodies have become weaker but a piglet's active immunity is not complete yet).

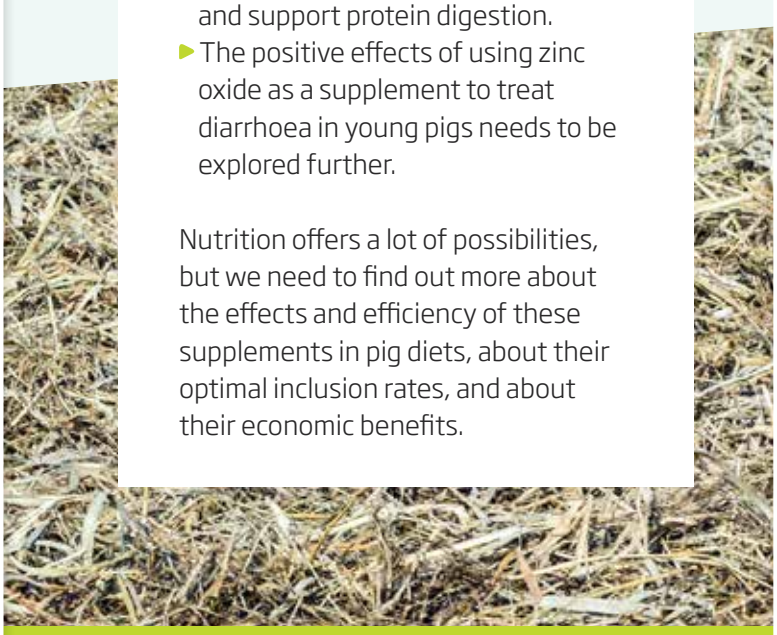
Practical solutions through nutrition:

Including certain additives in pig feed may help to create a stable intestinal flora for pigs, but more research is needed on this. A number of supplements and techniques show possibilities for making pigs healthier.

- Adding probiotics (these are live microbial feed supplements) can help to create a healthy gut. Their effects are diverse and need to be further explored.
- Prebiotics actively stimulate the growth of bacteria that have a positive effect on intestinal flora.
- Changing the structure (e.g. through coarse grinding) and viscosity of pig feed can reduce the risk of Salmonella infections and gastric diseases and support protein digestion.
- The positive effects of using zinc oxide as a supplement to treat diarrhoea in young pigs needs to be explored further.

Nutrition offers a lot of possibilities, but we need to find out more about the effects and efficiency of these supplements in pig diets, about their optimal inclusion rates, and about their economic benefits.

- To detect health problems early on, fast, accurate and cheap diagnostic tools need to be developed. They allow a targeted use of medication, to tackle diseases before they have an impact on performance, and help to avoid the use of antibacterials when an infectious disease is not caused by a bacterium.
- Breeding for disease resistance and improved robustness: To produce commercial pigs that are resistant to diseases and have better general health, breeding programmes need to use technologies which identify specific genes and pathways that help to control disease resistance.



Area C : Changing attitudes and human habits

Changing human behaviour and attitudes forms the basis for a more balanced and sustainable use of antibiotics. Improving the education of farmers, veterinarians and advisors and giving accurate and positive information can be a first step in the right direction.

▶ Existing good practices that should be further promoted

By creating easy-to-use benchmarking systems, farmers are given a tool to compare their own results to national threshold values across EU Member States. This can create awareness and motivate them to make changes. These systems can be used to compare mortality rates, meat inspection results or animal performance (e.g. growth rates). Including economic information on animal health (e.g. mortality rate, slaughterhouse lesions) can highlight the benefits of using less antibiotics even more.

Setting up voluntary problem-solving groups can stimulate discussion between farmers, advisors and veterinarians. These groups can identify problems, stimulate future innovation projects, and even inspire governments to set thresholds for antibiotic use.

Consulting boards give tailored advice to farmers and show them how to get the best results without using antibiotics. Advisors from different backgrounds can guide farmers in developing long-term herd health programmes and adopting best management practices.

Farmers and veterinarians need to be aware of what they can do and how making changes could actually benefit them. Spreading clear and positive information to a wide group of people can contribute to this.

▶ Bringing change through veterinary education:

Veterinarians and advisors should be trained to get the necessary 'soft skills' to be able to influence and guide their clients towards change. In countries where veterinarians still depend on the antibiotics sales they make, they should be encouraged to take up more inspiring roles within advisory programmes.
National education plans give different information on requirements and motivations to use antibiotics, and on best practices. This could be solved by obligatory education programmes at EU level. They could function as programmes for continuous professional development, for veterinarians and farm managers. Specialised colleges, such as the European College of Porcine Health and Management (ECPHM) can play a role in organising and coordinating this project for increasing knowledge transfer.

▶ Five key areas for future research

1. Exploring the causes of antibiotic prescribing habits in different countries more thoroughly.
2. Developing and optimising easy-to-use software platforms, based on smartphones, for data collection and information transfer.
3. Showing the economic benefits for farmers and society of using less antibiotics in animals. The real effect on resistances should be linked to information on human resistance data and public health.
4. Getting insight into social factors affecting the acceptance of technological innovations that would reduce the need for antibiotics on farms.
5. Looking into motivations and attitudes on animal health products from different countries, to be able to propose national training schemes for veterinarians and farmers and educational measures at EU level.

Lowering the use of antibiotics in modern swine rearing systems

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