

Protecting the food chain: food safety, animal and human health and the use of homoeopathy in farm animals

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Abstract

Human health is related to animal life, health and disease primarily through animal food products and the safety and risks connected to these products. In other terms: the quality of the food produced from animal products (eggs, milk and meat) is important in order to maintain human health and be a safe resource for food. In this paper, food quality can be described in terms of process quality and product quality: Process quality arrives from how animals live their lives, and how the food is produced and processed, and product quality is defined by the values of the food product itself (nutrition, sensorial), including food safety. In this paper, the relations between animal production with focus on disease handling and human health risks is briefly explored and discussed. Animal health and food safety is related to each other through the presence of zoonotic diseases, and the potential threats of certain substances in the food product such as mycotoxins, heavy metals, or drug residues, and through transfer of bacteria being resistant to antimicrobial drugs. The potentials for veterinary homoeopathy is concluded to be linked to food quality and safety through a potential for gradual minimisation of disease level in animals, no transfer of antimicrobial residues or resistant bacteria, and through a philosophical impact on the way of keeping animals and systematically removing all obstacles to cure not only WHEN they are diseased via building up a good and healthy animal production system and focus on breeding, feeding, human care-taking and allowing the animals as much freedom of choice as possible in order to fulfil natural needs and natural behaviour. The potentials for developing a good veterinary homoeopathic treatment practice is far from being fulfilled at the moment. Education among farmers as well as among veterinarians is needed, and the current conflicting legislation complicates the use of veterinary homoeopathy in the EU countries. The perspectives for using veterinary homoeopathy in farm animal treatment practice on a more global level seems very relevant, as much medicine is being used followed by severe problems with antimicrobial resistance and drug residues in many countries, e.g. in the so-called developing world. The perspectives of implementing homoeopathic treatment approaches into veterinary practice in e.g. African countries seem even more difficult than for e.g. Northern Western-European countries.

Introduction

Human health is related to animal life, health and disease primarily through animal food products and the safety and risks connected to these products. In other terms: the quality of the food produced from animal products (eggs, milk and meat) is important in order to maintain human health and be a safe resource for food. When an animal is diseased, the quality of the food is lower, and it may contain risks when consuming it. The emerging new threats to food safety world wide have been connected to globalization of the food supply, intensified food production industries in developing countries, centralized processing of human and animal foods, and followed by widespread distributions (Pappaioanou, 2004). When the animal is treated with drugs it adds another safety issue to the food production: there is a potential risk of transferring drug residues or drug resistant bacteria to humans, so that they cannot receive standard antimicrobial treatments and expect them to be successful. Veterinary homoeopathy may play a role in order to change the patterns of risks linking animal disease and human health together, in order to replace the considerable current use of allopathic or 'chemical drugs', antimicrobials being the most important part of it. About half of all the antimicrobials produced today in the world are used in animal production, presenting real possibilities for drug residues in animal food products (WHO, 2001).

The incidence of drug residues in food animals remains low in most parts of the production and the world, and the human health risks associated with these residues are therefore small compared to other food-related hazards, but it is nevertheless an unacceptable risk. An emphasis on health promotion and disease prevention effort in combination with an explicit policy to reduce the use of chemical medicine, including the use of alternatives to allopathic medicine, will lower the risks.

The argument for using allopathic medicine has been the fact that animals are sentient beings, and suffering should not be allowed. We need to be able to offer a diseased animal the appropriate help, which in many cases turn out to be medical treatment. Most treatments in the animal production systems are bio-medical, which is the most widely accepted treatment approach in the Western-European and North-American world and therefore also considered the most effective. Veterinary homoeopathy is a treatment method, which has been actively used, developed and debated during the past centuries. The use in farm animals has recently been restricted in Europe through legislation, and the legal basis for using homoeopathy in farm animals is not yet clear. In national legislation throughout Europe, the different handling of veterinary homoeopathy in relation to farm animals has caused significant confusion.

In the following the relations between animal production with focus on disease handling and human health risks will be explored and discussed. The possibilities, and the potential advantages and disadvantages for using veterinary homoeopathy will be discussed. Much of the discussion in the following will be based on examples from organic farming, especially organic dairy farming. The reasons for this are mainly the emphasis on high food quality, good animal welfare and an explicit goal about reducing the use of antimicrobial drugs. Furthermore, in the EU-regulation for organic livestock production (EC-Reg. 1804/99) homoeopathy is explicitly preferred to allopathic medicine.

Aspects of food quality in relation to animal health and welfare

Food quality can be described in terms of process quality and product quality, where process quality primarily is expressed through how animals live their lives, and how the food is produced and processed, and product quality covers the values of the food product itself e.g. in terms of nutrition, taste, and that there are no risks connected to consuming the product. In other words, food safety is a part of product quality. In Table 1 these two aspects of food quality are described.

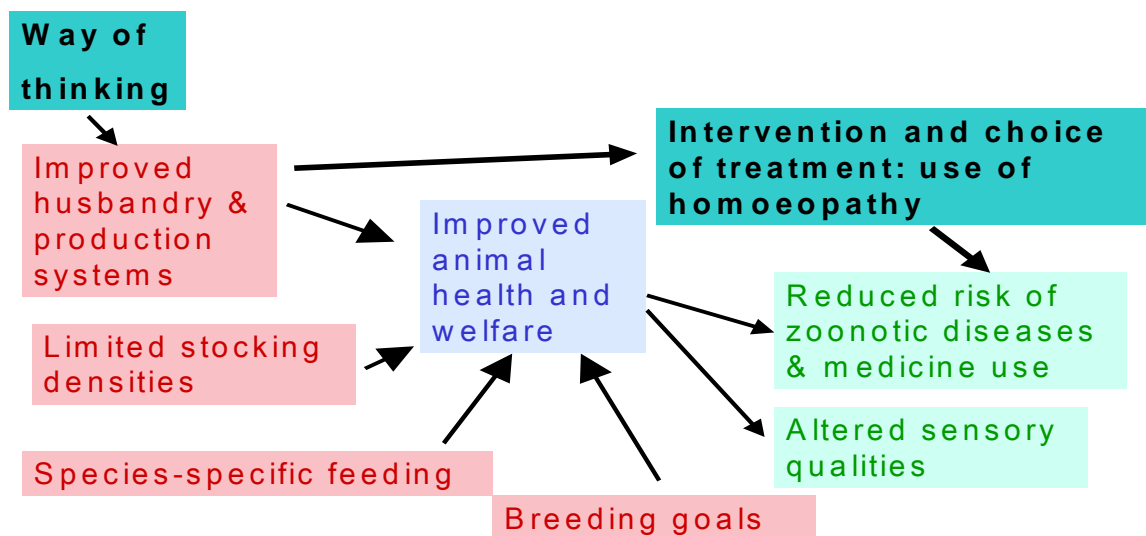
Table 1 An analytical framework for the examination of food quality in organic livestock production. (From Vaarst & Hovi, 2004).

Process quality	Product quality
<ul style="list-style-type: none"> • Animal husbandry and its impact on animal health and welfare • ‘Naturalness’ • Food processing • Impact of the primary and processing level on environment, social balance, human culture, global and local ecological and social justice etc. 	<ul style="list-style-type: none"> • Limited to food as it is consumed • Includes: <ul style="list-style-type: none"> - Food safety (residues, toxins, zoonotic diseases, contamination etc.) - Sensory quality (taste, smell, texture, colour etc.) - Nutritional quality (composition, ingredients)

Animal health and food safety is related to each other through the presence of zoonotic diseases, and the potential threats of certain substances in the food product such as mycotoxins, heavy metals, or drug residues. Transfer of bacteria being resistant to antimicrobial drugs is also considered a severe food safety issue as it may limit humans’ response to disease treatments using antimicrobial drugs. If animal health and welfare is improved through health promoting measures and initiatives,

like e.g. good animal husbandry systems, choice of appropriate breeds and harmony in feeding and the way land areas are used, then the risks for disease occurrence are minimised, and the sensory qualities might be improved (in some cases they are changed, but the consumer of the 21st Century does not always consider it as an improvement). In many cases, there is little knowledge about how livestock systems improving animal welfare actually influence food safety (McGlone, 2001). Outdoor life may for instance change the patterns of some zoonotic diseases (in some cases higher risks, in some cases no clinical disease but silent carriers), or the content of heavy metals or dioxine in the product.

Figure 1 An illustration how animal health and disease influences product quality, linking product and process quality, and inserting the use of homoeopathy (Modified from Vaarst & Hovi, 2004). It must be emphasised that homoeopathy plays a role both as medical application, and as a way of thinking at the whole farm level with the aim to bring animals and the herd into balance.



Risks connected to the use of antimicrobial drugs in veterinary treatment

One major link between the use of veterinary homoeopathy in farm animals and food safety aspects is the fact that use of homoeopathy may cause a significant decrease in the use of antimicrobial drugs, and this will lead to a decreased risk for residues in human food and transfer of antimicrobial resistance from animals to humans.

The problems with antibiotic residues in food products and the development of antimicrobial resistance are increasing in global agriculture. In 1997, approximately 10.5 tons of active antimicrobial substance was used in EU, of which 3.494 ton (33%) was used therapeutically in veterinary medicine, and 1.599 ton (15%) was used in animal food, and the largest amounts of antimicrobial drugs is administered to animals through feed and water (Séveno et al., 2002).

Resistance to antimicrobials is a natural consequence of bacterial cell adaptation after being exposed to antimicrobial drugs. Séveno et al (2002) explain that multiple use and misuse of antimicrobial agents among others in agriculture have increased the selective pressure for resistance in a wide range of bacterial groups, and that the problems following this form a major potential public health hazard, being the single most important factor responsible for increased antimicrobial

resistance. In UK, the presence of tetracycline-resistant *S. typhimurium* isolates from calves fell from 60% in 1970 to 8% in 1977, following the ban of tetracycline as a feed additive (Séveno et al., 2002). Because farm animals are carriers of zoonotic disease pathogens such as *Salmonella*, *Yersinia* spp. and *Campylobacter* spp., these species also undergo similar selection pressure due to the use of antimicrobial drugs (Aarestrup & Engberg, 2001). The high level of antimicrobial resistance in some countries like e.g. USA and The Netherlands may be explained by the free market of medicine, mismanagement and inappropriate use. In huge areas of the world, the concern for development of severe consequences of antimicrobial resistance has not yet led to any official policies to control the use. Not very many studies have been made in e.g. African countries with focus on antimicrobial resistance, but in some existing studies the levels of antimicrobial resistance are extremely high and present a significant concern for the consumer (Byarugaba, 2004). In many African countries, any person can obtain antibiotics from many sources, and farmers are often not well educated in the use of veterinary medicine, including the handling of the animal food products for human consumption. Below, the potentials of using homoeopathy on a global level are discussed.

Zoonotic diseases

One aspect of the link between human health and animal health is the use of medicine in terms of residues and transfer of antimicrobial resistant bacteria, as discussed above, but another important aspect of the relationship between animal disease and human health is the risk of zoonotic diseases, e.g. infections with *Listeria*, *Campylobacter* spp., *Salmonella*, and *Toxoplasma gondii*. The risk of zoonotic diseases can be handled in various ways:

- Minimizing the risk of diseases in animals by appropriate stocking density, space, air and in all ways good living conditions, which improves their welfare and decreases the risk of diseases
- Intervention in cases of disease. When focusing on homoeopathy, there is a possibility here to intervene with homoeopathy and in that way minimise the risk of transferring zoonotic diseases to humans in milk, meat or eggs. Animals can be healthy carriers of some zoonotic diseases, and in such cases, intervention may not take place, as the animal is not ill.

The use of homoeopathy in farm animals

The interest in and use of veterinary homoeopathy is widespread in some countries, especially among organic farmers (Hovi, 2003; Vaarst et al. 2001), and the possibilities to use veterinary homoeopathy in an appropriate way and with emphasis on herd health management are described and recommended (Striezel, 2001; Walkenhorst et al., 2001; Martini et al., 2001). The reasons for farmers deciding to use homeopathy to treat their animals are several, e.g. frustration because of lack of effect of conventional treatments, avoidance of withdrawal time after treatment and personal experience with the use of homoeopathy (Hektoen, 2004). There is a severe lack of research in the area, and suggestions to research designs combining demands from natural sciences and based on the principles of classical homoeopathy have been discussed recently (Hektoen, 2004; Fossing, 2005). Hegelund (2004) concludes that veterinarians using veterinary homoeopathy can switch between two distinct systems of thinking. In a discussion report from 2001 from an international workshop on organic farming, Vaarst and co-authors point to several factors that might influence a successful implementation of veterinary homoeopathy into farm animal practice: lack of training, information and education, besides an immature and incidental EU regulation in the area of veterinary homoeopathy. They furthermore emphasise that the role of homoeopathy in organic farming seems overemphasised at the expense of preventive measures, and that health planning and support of animal health and welfare should be included in the veterinary involvement in the herds. In conclusion, there is a potential, but an effort in order to systematise and integrate veterinary homoeopathy into farm animal management in theory and practice and in the areas of education,

structural systems (e.g. easy access to homoeopathic remedies), advisory system and legislation is an absolute pre-condition to make it happen.

The case of organic farming

A major goal of organic animal husbandry is improving animal health, preventing disease and ensuring animal welfare. The understanding of animal welfare addresses the aspects of naturalness and the principle of precaution in organic farming (Alrøe et al., 2001; Verhoog et al., 2004; Lund, 2002), and this can serve as a guideline for an organic approach to disease management. It can be viewed as a very important strength and potential of organic animal farming that there is such an explicit and strong focus on the health of the whole animal production system, the animals and the interaction between humans, animals and system as the primary way of reducing the risk of disease outbreaks and medicine use. But in EU, it is allowed to use allopathy or biomedicine for treatment of animal diseases, which puts livestock production into a unique position compared to other organic enterprises, as the use of chemical or artificial inputs are permitted but only in case of 'need'. However, there are attempts to minimise the use of inputs of chemicals in organic farming, and some e.g. animal health professionals (veterinarians) see this primarily as a restriction and raise concern with regard to animal welfare. In any case, there is an existing goal in organic livestock farming to reduce or eliminate the need for medicinal inputs primarily through disease prevention and health promotion efforts. Besides the focus on health promotion, this goal can be managed in several ways with regard to alternative treatments (Striezel, 2001; Walkenhorst et al., 2001; Martini et al., 2001; Vaarst et al., 2004).

The use of homeopathy for treatment of farm animals may raise concerns as homeopathy has not yet been demonstrated efficient as treatment against most farm animal diseases, such as mastitis.

EC Regulation No. 1804/1999 states that 'diseases of organic farm animals must preferably be treated with phytotherapeutic products or homeopathic solutions provided that their therapeutic effect is effective for the species of animal and the condition, for which the treatment is intended'. In practice these to points 1) that phytotherapeutic and homeopathic products should be preferred to conventional treatment in case of need for intervention, and 2) the fact that the therapeutic effect of these treatments have to be proved effective in relation to this specific disease condition and this specific animal species) have led to conflicting arguments and legislation, as it is now illegal to treat with homoeopathy in many countries, in organic farming, as there are no 'legal homoeopathic remedy', having been through the process of being legalised.

In the US organic dairy standards (USDA, 2000), a complete prohibition of the use of biomedical products has been made, which emphasises the need for development of sustainable standard framework for organic products.

The implementation of the homoeopathic philosophy and not only use of potentized remedies

The primary way of improving the animal as hence the human health situation is to base the whole animal production system on current organic principles and non-medical health promotion and disease prevention initiatives. This involves closed flocks and herds as much as possible, as well as minimal transport between regions and herds. It also involves breeding programs in harmony with regional and farming systems conditions, and improving the harmony between the animal species, number and production levels of animals and the land area, as well as feeding and physiological balance in the animals. Much of this may involve discussions on a much more farming structural level, like whether we want to maintain the animal production as it currently exists, or we should decrease the number of farm animals. This discussion has to be taken elsewhere. I have emphasised the need for health promotion and disease prevention several times in this paper, but it cannot be underlined too much: the main effort in order to improve animal health and welfare and via this, also food safety, is avoidance of disease rather than treatment. Numerous examples can be given on

inappropriate use of potentized remedies, where the guiding homoeopathic principles are not followed or where the person applying the medicine has little knowledge about the treatment method and how to look at an animal including observing for improvements, and in such cases nobody will be able to conclude that the animal health situation is better. The food safety might be better, but in case of letting inappropriate use of homoeopathy replace e.g. antimicrobial drugs, the decreased food safety risk is then solely due to the non-use of antimicrobial drugs.

In conclusion: if animal health and the situation of the animal herd and population should be improved, the homoeopathic treatment methods have to be used in accordance with their principles. It is obvious and logical to emphasise the consistency and coherence between theory and practice in any treatment method in order to make it work as it should.

A basic principle in the homoeopathic theory is the idea of balance and health. This principle does not allow us to separate our thinking about disease treatment and health support: no treatment should take place unless the circumstances allow the diseased individual to become healthy. This leads to severe questions to many farm animal production systems.

If homoeopathy – in theory and practice – can contribute to an improved animal health leading to improved prognosis for good human health, the basic idea of homoeopathy: to make sure that the conditions of the animals allow them to reach and maintain balance, is a convincing and revolutionary corner stone for livestock production throughout the world.

Taking the discussion to a more global level: which potential role can homoeopathy play?

When we talk about the potential use of homoeopathy in farm animals today, we very often base our discussion on our experiences from European or North-American farming systems. However, farm animals and livestock production systems form a major part of farming and food production worldwide. A quarter of the world's land is used for grazing and accounts for approximately 40% of the gross value of agricultural production (Steinsfeld, 2004). About one-third of the livestock production is taking place in the so-called developing countries. Taking Africa as an example, about 70% of the livestock mass in sub-Saharan Africa is in the hands of rural farmers and forms a part of multipurpose enterprises.

In many areas, local traditional knowledge of animals, diseases and disease treatment and control is widespread, e.g. in pastoral livestock areas. Acknowledgment of the value and active support from the surroundings to develop and use traditional knowledge can empower local farmers to try to solve disease problems in their own herds in a cost effective and sustainable way. However, the widespread use of veterinary drugs has frequently been at the expense of this local knowledge. Traditional treatment approaches have been categorised as 'folk medicine' as defined by Kleinmann (1985), where traditional knowledge is passed from one person to the next. Some of these practices are primarily 'spiritual' or 'belief-oriented', and others are based on more definite experience and knowledge about the effect of certain substances and plants.

In contrast to folk medicine, classical homoeopathy can be characterised as a 'professional medical schools', according to Kleinmann (1985), which means that homoeopathy has a specific, coherent theory of health and disease, which is in accordance with the practice of homoeopathy.

The development of veterinary homoeopathy is primarily based on the development of human homoeopathy. Homoeopathy is an empirical treatment method, and therefore it is necessary to continue the process of systematically develop the knowledge and describe and discuss all levels of experience in relation to the homoeopathic theory. Homoeopathy including veterinary homoeopathy is widely distributed in Europe, North America, India and South America, but has often little impact

on veterinary medical practice especially in relation to farm animals. In the perspectives of the discussion above, the potential and need for development of this approach to animal diseases is great. However, the characteristics of diseases are widely different in various parts of the world, and all treatment initiatives have to thought into the existing farming systems in theory and practice as well as disease patterns. Where production related diseases can be prevented through health promoting management practices, endemic and highly infectious diseases, which are dominant in many tropical areas, have to be managed differently both in terms of prevention and treatment.

Conclusion

- Food quality can be described in terms of process quality and product quality:
 - Process quality arrives from how animals live their lives, and how the food is produced and processed.
 - Product quality comprises the values of the food product itself e.g. in terms of nutrition, taste, and that there are no risks connected to consuming the product. In other words, food safety is a part of product quality.
- Animal health and food safety is related to each other through the presence of zoonotic diseases, and the potential threats of certain substances in the food product such as mycotoxins, heavy metals, or drug residues. Transfer of bacteria being resistant to antimicrobial drugs is also considered a severe food safety issue as it may limit humans' response to disease treatments using antimicrobial drugs.
- Veterinary homoeopathy is concluded to be linked to food quality and safety through
 - a potential for gradual minimisation of disease level in animals,
 - no transfer of antimicrobial residues or resistant bacteria, and through
 - a philosophical impact on the way of keeping animals and systematically removing all obstacles to cure not only WHEN they are diseased, but long before that, in terms of building up a good and healthy animal production system and focus on breeding, feeding, human care-taking and allowing the animals as much freedom of choice as possible in order to fulfil natural needs and natural behaviour.
- The potentials for developing a good veterinary homoeopathic treatment practice is far from being fulfilled at the moment. Education among farmers as well as among veterinarians is needed, and the current conflicting legislation complicates the use of veterinary homoeopathy in the EU countries.
- The perspectives for using veterinary homoeopathy in farm animal treatment practice on a more global level seems very relevant, as much medicine is being used followed by severe problems with antimicrobial resistance and drug residues in many countries, e.g. in the so-called developing world. The perspectives of implementing homoeopathic treatment approaches into veterinary practice in e.g. African countries seem even more difficult than for e.g. Northern Western-European countries.

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