THE OBSERVANCE OF ANIMAL BREEDING TECHNOLOGIES IS A GUARANTEE FOR HUMAN HEALTH

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Summary

The premise of this study was that almost all the diseases considered as new were known effectually a long time ago and they had enough frequency for counted those entities. Antibiotics, regular administered in our days to pigs, broiler chickens, dairy cattle and fishes, are inducing and provoking many problems artificially solved not technically and not effectively. The conducted studies proved that antibiotics are used above the normal limit in order to compensate the lacks in the growing period, inobservance of the technologies and more or less justified crowds.

Below is presented the current situation in Europe and the perception mode of each country about the usage of antibiotics in animal's nutrition.

Biological systems are in a dynamic balance; that is why when a part of the system is destroyed, the other parts adapt and finally it comes to a new equilibrium. The premise from which this report has started was that most diseases considered to be new have been actually known for a long time and their frequency is high enough to be taken as entities. Maybe the best example is represented by typhoid fever evolution, at the beginning of the 20^{th} century. During that period, many people used to live in crowded towns, in bad sanitary conditions; that is why the typhoid fever was frequent. The efforts of improving the sanitation conditions have led to the decrease of the typhoid fever prevalence.

However, as time went by, another disease has become very frequent. This disease was poliomyelitis. During the period in which the typhoid fever has evolved, children were exposed to the infection with a poliovirus, as results of the lack of hygiene. Because children` mothers were exposed to this poliovirus, too, their children have contacted, from them, maternal antibodies against this virus. Successive to the improvement of the hygiene conditions, the exposure to poliomyelitis was less frequent, leading to lower concentrations of maternal antibodies; so children were scarcely exposed to poliovirus. Conversely, this made the population to be more susceptible to infections. Poliomyelitis and its paralyzing effects have become a disease with a high incidence. It has been a mystery why this disease has become suddenly a problem, since its incidence was so low in the past.

Such situations seldom occur within animal populations, too. The analysis of these problems from the perspective of a biologist may lead to the understanding of the phenomena involved. According to my opinion, this is the

basic role of practitioners and it differentiates them from the other ones, who do not have the proper educational background to understand the biological mechanisms.

Supposing that management's objective is to control costs, "the object of study" that we must process is represented by the livestock. The only problem is represented by the capacity of each individual to profit fully on the existent situation. Most livestock produce more products than we need to replace the animals which die naturally. Moreover, farms sell, every year, the equivalent of this livestock in weaned products. Similar healthy populations from wildness maintain constantly their number of individuals, removing the excess through natural selection. Domestic herds maintain a constant number of individuals through human intervention. Can we control the animals bred in farms and those which are removed?

I think that veterinary medical education could have only advantages from studying the biology and the natural history of one species. The best conclusions may be drawn concordant with the results and profit achieved. Vets` knowledge regarding biology is very important for the industry of animal-based products. This approach applies the biological principles applicable for the species we work with and the knowledge concerning the evolution of changes and the involvement of science and technology in the achievement of economic advantages.

Use of antibiotics in animal farms

Nowadays, antibiotics are administrated regularly to swine, broilers, dairy cows and fish. Animal treatment with antibiotics (therapeutic utilization) is obviously essential. However, antibiotics are administrated regularly in animal farms for growth stimulation and for disease control and prevention.

According to the World Health Organization (WHO), more than a half of the all antibiotics produced worldwide are frequently used in animal farms, most of them to stimulate growth, and not in disease treatments.

As a conclusion of some researches carried out, antibiotics are mostly used over the normal limit in order to compensate the needs from the growth period, the bad consideration of growth technologies, agglomerations more or less justified.

The measure in which antibiotics use in animal farms influences human medicine

Modern medicine depends very much upon antibiotics in infection control. A special place is occupied by the apparition of antibioresistance, especially the post operator one, and in individuals who have not been submitted to drug-based treatments. Many of the antibiotics used in human treatments are similar to those used to stimulate weight growth and to control and prevent diseases.

In human, antibiotics are used only when necessary. However, they are administrated as a routine in animal farms. They are used to stimulate the average daily gain, in these terms being harmful for human. They are also used to prevent

and control diseases, being useful to face an intensive growing system, where animals are more agglomerated and seldom under bad hygiene conditions. Because antibiotics have been used in animal breeding for a long time, and also due to the fact that bacteria have been frequently exposed to a stress, the self-defense reaction has appeared, transforming bacteria's way of defense in order to be able "to defeat", or "to resist" to antibiotics.

The overdosing of antibiotics in animal farms has contributed, for many important antibiotics used in the treatment of human diseases, to make these medicines inefficient.

Resistant bacteria may be transmitted from animal to human by various means:

- a direct contact with the animals bearing a resistant bacteria (in the case of animal breeders);
- eating meat contaminated with resistant bacteria;
- eating food (eggs, milk) contaminated with resistant bacteria, which has not been pasteurized or properly prepared;
- eating fruit or vegetables fertirrigated with an organic matter contaminated with resistant bacteria;
- eating preserved food, contaminated with resistant bacteria.

What antibiotics have been forbidden in the E.U. and why aren't they efficient?

In 1997, E.U. has canceled the utilization of veterinary antibiotics as growth stimulant because they have observed the apparition of bacteria with resistance to vancomycin, an antibiotic often used for human, too. Seldom, the infection with vancomycin-resistant enterococci is untreatable.

In December 1998, E.U. Council of the Ministries of Agriculture has forbidden the utilization of four antibiotics as growth stimulants: virginiamycin, spiramycin, tylosin-phosphate and zinc bacitracine.

In July 2003, E.U. has adopted a new regulation concerning the forbidding of use of antibiotics as growth stimulants within feed, by forbidding four substances, namely: sodium monensin, sodium salinomycine, avilamycin and flavophospholypol. The use of the other antibiotics as growth stimulants was excluded in January 2006.

Although this decision is extremely necessary, we think that it will not exert influence on long term. We consider that the utilization of antibiotics in terms of prophylaxis must be also reduced significantly. It is not enough to forbid the utilization of antibiotics as growth stimulants without other restrictions concerning their utilization in prophylaxis in order to prevent the problems caused by the excessive utilization of antibiotics in farms.

- The consultative committee of the Food Microbiological Safety (1999) has declared: "We believe, despite other opposite opinions, that resistant bacteria within animal fodder are the consequence of the utilization of antibiotics in all breeding types and in population households". They have also specified that

"Practice adaptation to a Good Breeding Guide may reduce significantly the need for antibiotics" and that "antibiotics should not be used to compensate the practice of a bad breeding".

- World Health Organization (WHO) (1997): the 70 experts in health have concluded that "The resistant species of four bacteria (Salmonella, Campylobacter, enterococci and E. coli), which cause diseases in human, have been transmitted from animals to human and they proved to have consequences upon human health". They have also mentioned that "healthy practices of growing animals in households reduce the need for antibiotics" and the antibiotics would not be used anymore as substitute for the adequate hygiene".

We may consider that:

- the daily utilization of antibiotics in non-therapeutic treatments during the animal growing period is useless and unacceptable;
- the daily utilization of antibiotics in animal breeding represents a major threaten for human health and it is a cause for resistance to antibiotics;
- overcrowded environments from industrial farms create the need for antibiotic overdosing for the control and prevention of antibiotics;
- disease control and prevention and the resistance to antibiotics would not be a problem if the result of animal farm wellness would be the real one;
- the Governments and the E.U. should impose severe restrictions concerning the utilization of antibiotics as prophylaxis in farms.

The need to limit the utilization of antibiotics in animal farms in order to prevent human resistance to antibiotics.

Antibiotics have begun to be used normally especially under intensive breeding of swine and poultry

- as growth stimulant, to increase the daily average gain with 4-10%;
- as prophylactic, to prevent the spread of diseases, especially the respiratory ones, which cannot be avoided when a big number of animals are kept in small area, in non-hygienic conditions. In fact antibiotics were used as substitute for the technology mistakes and to cover the hygiene lacks.

Theoretically, we may distinguish between all antibiotics used as growth stimulants and the other ones used in prophylaxis. Practically, this difference is compromised because the antibiotics used as growth stimulants, help to prevent diseases as well.

It is clear that without the daily utilization of antibiotics, in the actual form, industrial farms cannot survive to infectious diseases which may destroy many intensive breeding units. But if the usual antibiotic use is reduced, then farmers are encouraged or obliged to introduce many healthy and human breeding practices.

Preoccupations concerning human health

Human health is now threatened by the exaggerated use of antibiotics in farms, fact that has led to the apparition of anti-bioresistance to bacteria; this may be transmitted from animals to human through the food circuit. World Health Organization has emphasized the idea that the bacteria resulted from the transmission of the four types of bacteria (salmonella, campylobacter, enterococci and E. coli) which are the cause of some major evolution in human, are now transmitted from animals to human. These bacteria may achieve resistance not only towards the antibiotics used in animals, but towards all similar antibiotics used in fighting against the serious diseases in human.

Numerous organizations have been recently warned about the current risks of the public health, caused by the overdosing of antibiotics under intensive breeding systems.

- The House of Commons Agriculture Committee (1998) declares that “the emphasizing of the transmission of microorganism anti-bioresistance from animals to human by food is the only way, and due to this consequence with such a severe potential, we favor the forbidding of antibiotic use in animal breeding as growth stimulants and exact restrictions concerning their use as therapy and prophylaxis”.

- In October 1997, World Health Organization has emphasized the fact that the excessive antibiotic use, especially as growth stimulants in animal farms, presents a major risk for human health and so it should be reduced.

- The House of Lords Select Committee on Science and Technology (1998) recommends “The use of growth-stimulant antibiotics, for example virginiamycin, which belongs to the class of antimicrobials used (or proposed to be used) in human as the most proper ones for the contribution to the creation of resistance in human medicine, should be stopped step-by-step, preferably in concordance with common decisions between the professional and industrial interests, but by law, if necessary”.

- In their report from 1999, Advisory Committee on the Microbiological Safety of Food recommends that “the Government should coordinate the development of a coherent strategy aiming at the reduction of the utilization of veterinary antibiotics”.

The scale of antibiotic utilization in animal farms is huge. World Health Organization has reported that “more than a half of the total world production of antimicrobials is currently used in animal farms, with a great proportion of utilization in growth stimulation, not in disease treatments”.

A recent report made by Soil Association show that about 1225 tones of antibiotics are used annually in Great Britain, 38% of them are used for human, 37% in animal breeding and 25% for companion animals and horses. This report also shows that the use of tetracyclines in animal breeding has increased with 1500% in 30 years and while the use of penicillins has increased with 600% during the same period.

The Swedes have forbidden the utilization of antibiotics as growth stimulants within animal feed in 1986. Frequently, it has been suggested that this fact has led to the increase of antibiotic use in Sweden (because the antibiotics which stimulate growth, help in disease prevention as well). Anyway, this was not necessary. The Federation of Swede Breeders gas specified that "the total antibiotic intake from all farms, in 1986, has been reduced with 60%, from 50 tones to 19.6 tones (1997)". Beside this, with their report from 1999, Advisory Committee on the Microbiological Safety of Food has mentioned that "Sweden has proved that it is possible to defeat the transmissible diseases through food when the utilization of growth stimulants is used".

In order to achieve success with regards to the interdiction of using antibiotics within food, the Swede farmers have also introduced major reforms including the modification of growth technologies and shelters. These changes concern hygiene and nutrition, ventilation, more environmental stimulants for animals and less stress factors (swine are kept in the same locations from kidling up to killing, so we may guarantee the elimination of the stress caused by the meeting between swine and other foreign swine, along their life).

The prophylactic use of antibiotics should be allowed only in the case of planned programs, with direct implications upon management and shelters. World Health Organization (1997), through its 70 experts, has specified that "healthy practices of growing animals in households reduce the need for antibiotics", and the antibiotics would not be used anymore as substitute for the adequate hygiene". In their report from 1999, Advisory Committee on the Microbiological Safety of Food has specified that "Practice adaptation to a Good Breeding Guide may reduce significantly the need for antibiotics" and that "antibiotics should not be used to compensate the practice of a bad breeding".

The daily antibiotics use as prophylaxis has led to the fighting against the diseases which cannot be avoided under intensive breeding systems, taking into account the association aero-micro flora specific to crowded places; it is not surprisingly that many intensive breeding environments are unhealthy and favor the apparition of some conditioned diseases.

The real solution for this problem is represented by animal breeding under hygienic conditions and not by daily antibiotic use. Animals grown under intensive systems need technological discipline and physiological conditions of maintenance. The incidence of diseases would be significantly reduced if the breeding systems would assure enough space, good ventilation and proper alimentation. Here are two examples of problems caused by the intensive breeding system:

Swine intensive breeding, in the situation in which, in Great Britain, about 14 million pigs are killed annually for consumption and most farms do not have good maintenance conditions. The short, unproductive pig life determine their growth in overcrowded shelters, without access to fresh air or daylight, maintained without straws, on naked beddings or on drilled iron-plate bottoms. The necessity for straws was associated to a severe agglomeration, impeding animals from giving

a natural behavior, like rummage and exploring. Moreover, in the same farms, pigs are maintained in old, humid and badly-ventilated shelters. In the same cases, shelters are badly isolated. These conditions are ideal for respiratory diseases (PRRS). Without the daily use of antibiotics, such breeding systems cannot survive. The incidence of diseases would not be due to a regular antibiotic use, if the management and the breeding system would get improved. Practically, pigs should have enough space and straw bedding, in order to prevent agglomeration. Moreover, these animals should be kept in shelters that are well ventilated and isolated and their alimentation should be adequate, with good fodder and fresh water.

Broiler intensive breeding. About 800 millions of broilers are bred each year in Great Britain. Most of them are kept in sheds with huge windows, which are so populated that adult poultry can see the floor just like a “chicken carpet”.

Chicken breeding in such conditions does not cause only suffering, but also it affects human health. But about 10% of poultry – namely 80 millions of individuals per year – are contaminated with salmonella. Moreover, in 1996, Advisory Committee on the Microbiological Safety of Food gas reported that 44% of broilers have been contaminated with Campylobacter, Salmonella and E. coli – the most important source of food-based infections in human.

Like for the situation of pigs, the solution is to respect the breeding technologies and to use products which could help to maintain the physiology of the digestive tract, allowing animals to face the conditions provided by the intensive breeding, without using antibiotics.

References

1. **Ahl, A.S. Acree, I.A.** (1993) – Standardation of nomenclature for animals heath risk analysis. Rev. Sci. Ed. Tech. 12, P. 1045 – 1053
2. **Dufour Barbara, Hattenberger Anne Marie** (2002) – Apreciation quantitative du risqué et expertise colegiale. Epidemioologie et sante animale, 41. p. 45 – 52
3. *** Terrestrial Animal Health Code 12th edition 2004, http://www.oie.int/eng/normes/mcode/en?sommaire.htm