ANIMALS ARE FED, AND WE PEOPLE, ARE EATING

JÁNOS GUNDEL

BBS Faculty of Commerce, Catering and Tourism
Budapest

One of the most essential conditions of the human and animal life, besides breathing, is nourishment (including water!), that has to be intake every day. How simple and clear! As someone would imagine, who never had (any) animals yet, who just goes into the store and buys the "daily".
This presentation is a brief description, and guaranteed not complete, attempts to show the characteristics of feeding farm animals (in particular those identified as omnivorous pigs) and of the (also omnivore) human diet. The basic idea of the compilation is to review some important nutritional characteristics of healthy humans and animals – always compared simultaneously –, and to explain it with some extras.
The first starting point of the presentation is the 2008. XLVIth Act about the food chain, and its official control, and its 7th §: "...feeds cannot adversely affect neither the productivity of the animals nor endanger or harm the animal, directly or indirectly the human health"

Another starting point is that

- we are not eating because we would like to cover our nutrient requirements, but for the pleasure of the white table!
- our eating habits are part of our national culture!
- but it should be kept in mind that eating is a basic biological need!

A small glossary: 'fattening' animals means that they are raised for meat production / rearing. "Gain" in practice means all the weight (mass) gain while in the research there is the protein and/or fat gain as well. The "fatty" animal is "cutting-ripe" with the desired body composition. In the human practice "weight gain" and "obesity" always mean "fat gain", and the weight gain is by analogy to the "weight" change.

Why do we feed, and why do we eat? Basically, to increase the production of animals (except for pets), including covering their nutrient requirements, according to the well-being (animal welfare) and the environmental protection requirements. The aim of human diet is basically enjoyment (deliciousness) and covering the nutrient requirements is only a secondary target, but health cannot be ignored. Exceptions are mothers and young children, and some special situations (e.g. sports, military).
This simple activity (i.e. feeding and nutrition), starts highly complex processes in the organs that are tested and dealt with multidisciplinary.

The animal and plant **genetics** are production-oriented and continuous (such as plant and livestock breeding, crosses/hybrids, GMOs, performance tests, offspring control, etc.), while human genetics deal particularly with disease forecast, genetics, and they face a tremendous growth with the introduction of "gen surgery".

The feeding/nutrition science deals with the refinement of the animal nutrient requirements, the feed processing and feeding technologies. The human nutrition and the food science works out special/diet plans, specifying the nutrient supply, developing recommendations for the meals of the different age groups.

The **anatomy** of the gastrointestinal tract in pigs and humans is very similar. There is a "monogastric" simple stomach, the size and function of various intestinal sections are almost identical (unlike the ruminant gastrointestinal tract, where the stomach is complex and has four compartments).

System of feeding and nutrition: feeding animals is on strictly cost/benefit basis (approximately since 1970 it is computerized – using a linear optimization, with biphasic simplex algorithm), according to age and utilization of animals, with minimizing the price of feed or the cost of feed in respect to the food safety and animal welfare aspects. The nourishment of people is mostly at "luxury" level (exceptions are: the "institutional" (public) food, for example military, schools, etc, and the hunger zones), taking food safety into account. The calculation is usually done by age (certainly not in the household, but in the institutional meals (at least in theory).

Compilation of the feed/food recipes: The composition of feed is rational, on price or cost minimum, basically on age or utilization and quality needs according to nutrient requirements. Our recipes are "irrationally" put together, according to the hedonic value, habits, fashions and trends, and many times on misconceptions and/or ignorance, more recently, on the "conscious" (?) based diet! Part of this "irrationality" is the inadequate knowledge of nutrition – which is not new at all.

The nutritional value when calculating the nutrient content of in case of animals is almost exclusively based on *in vivo* or *in vitro* specific digest ratio, which does not mean the actual digestibility, but is closer to it than the chemical analysis of several foods, on which our foods are still reported. This is especially significant, among others because of the different effects of heat treatments on the (protein) digestibility (e.g. gently drying the corn, and frying the meat!). The pig's **energy** requirement, and accordingly the energy content of feed are calculated as DE (digestible energy) or ME (metabolizable / transformable energy) (possibly NE (net) energy). Food energy content and the recommended energy intake are always calculated with the GE (i.e. gross energy "heat of combustion") value. Another significant difference is the evaluation of **proteins**. In case of feeds the crude protein (N x 6.25 i.e. because it is the easiest and cheapest to determine), or the digestible protein (and sometimes a true protein) data and the crude protein together with fecal or ileal (*in vivo*) digestible and/or the available (*in vitro* "digestibility") amino acids are given. In contrast with that, the protein content of the foods is usually only given as total protein (i.e. N x 6.25).
The basis for the calculation of the feed composition is the DE/amino acid (lysine) ratio, while in the food, the energy and protein content are calculated separately. It is well known that the unwanted fatty gain of pigs can only be avoided if the intake of energy and lysine (and other amino acids expressed as percentage of lysine) is in certain proportions.

The **carbohydrates** in the feed are recorded as the so-called (digestible) N-free extracts
[calculated as: organic matter – (crude protein + crude fat + crude fiber)]

only rarely declaring the starch content separately. In the food usually only the total carbohydrate content counts, and recently the concept of resistant starch (which is a non-digestible carbohydrate that functions as a fiber) has appeared.
Although fibers are counted separately, they are also carbohydrates. In case of feed these are crude fibers and/or digestible fibers (cellulose, hemicellulose, and lignin = structural fiber), in food dietary fibers (partially or completely resistant to enzymes). Despite the apparent similarities, the concept behind them is different and their chemical analysis is different too.

The **ash** is a residue if the feed or food material is burned, which means the content of the inorganic material. In feeds crude ash is counted, where the macro- and microelements (i.e. minerals) are included. In response to requirements for these (e.g. Ca, P, microelements), regular and complete supplementation are in the feed for all animal species, based on age or utilization of them. In case of food we are talking only about "minerals", and supplements are mainly up to individual demands. Both supply and environmental reasons are considered when the efficiency of utilization of minerals (such as available or digestible phosphorus) in feeding is calculated.

Feeds have also a regular and complete **vitamin** supplement, with the same system as the minerals and the human diets will only be supplemented on individual needs too.
There is a lot of misinformation in the public opinion about the drug content of the feed, in turn in raising and farming of livestock, **using preventive drugs is strictly prohibited!**
Many people do not realize that the potential range of feed and food are almost the same (practically interchangeable!), and this is regulated by the law cited above. (An example: as feed wheat is used as coarse meal or bran, as food it is used as miscellaneous quality ground into flour or coarse meal, and the bran is also eaten as well).
Either feed or food/meal is in some way, to a greater or lesser extent, it has to **be prepared**. It can be done in a feed mill or on the farm (feed-kitchen), in the food industry or in an amateur (household) or a professional kitchen.

Feeds are basically used in their original form, but in many cases prepared with some sort of technology, **foods are basically processed** but sometimes used raw (original form). The reason for feed processing is achieving higher transformation efficiency, for food processing, it is increasing enjoyment for example by heat treatment. Cooking/baking our foods, as excavations show, have been used for several thousands of years, and are not an invention of modern times!

Although **the processing technology is nearly the same, but the utensils used differ significantly**. In the feed processing there are different possibilities e.g. reduction of feed particle size or heat treatment (e.g. extruding, expanding, flaking, micronizing), pelleting (in this case grain size is increased) or moistening, etc. The technology of food preparation is the classical cooking, steaming, baking in oven, roasting in grill, etc.. The tools used are: the classical "stove", microwave "oven", the steamers, the hot air "ovens", and there are classical and "new" (?) methods (e.g. cooking in vacuum/sous vide, baking at low temperatures, etc.) as well.

To sum up the above introduced facts: feeding is always based on the latest scientific results, on strict cost/benefit basis, paying maximal attention to animal protection, animal welfare, food safety and environmental aspects. The human nourishment and eating (taking food safety into account) is realized basically on the hedonic value, but it is a typical and

important part of national culture. Therefore, it should never be forgotten that human nourishment is different and more:

„...believe me, a meal prepared without heart, mood and loving care is like the person who made it. I would like to hand over this love, this mood and this heart to everybody, who prepares a dish by cooking, baking, roasting or frying for his/her family, guests or customers; no matter what the circumstances are: either in a small or large kitchen, like a poor or a rich man, in a modest pot or in a shiny kettle, on an old or on a modern stove, from the cheapest or from most expensive material in order to give culinary delights...
And all this is to make...
..... with eyes open, paying attention and with strong nerves, always keeping one eye on mischievous sprites not to let them spoil the food prepared with much efforts, that we can give to our guests with a good appetite that pure pleasure of life which can only be expected at the table." (KÁROLY GUNDEL, 1941)

REFERENCES

BÍRÓ G. –BÍRÓ GY. (2000): Élelmiszer-biztonság és táplálkozás egészségügy (Food safety and nutritional health), Agroinform Kiadó

FEKETE, S. GY. (ED.) (2008): Veterinary nutrition and dietetics. Pro Scientia Veterinaria Hungarica

MÉZES M. – HAUSENBLASZ J. (2009): Sertéstakarmányozás (Pig feeding), Mg. Kiadó

RODLER I.(ED.) (2005): Új tápanyagtáblázat (New nutritional table), Medicina Könyvkiadó Rt.

SCHMIDT J. (2003): A takarmányozás alapjai (The basics of animal nutrition), Mg. Kiadó)