

# Meat and Its Derived Products Provide Relevant Quantities of Essential Nutrients

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## Description

When gauging the relationship between nutrition and health, animal-derived foods (and meat in particular) are usually assessed in a global manner: the lay public perception of their actions is consequently often quite negative. However, various aspects of this relationship deserve to be analyzed in detail, in particular the relevant differences that characterize the health effects of different meat types. Only a few studies, in fact, have considered the impact of these foods on health in relation to the animal species of origin; in many cases, the distinction is simply made between red and white meat. Nonetheless, the literature focused on poultry meat has identified many positive aspects, from a nutritional point of view, associated with its regular consumption.

The aim of this consensus document is to review the available evidence on the association between poultry meat intake, diet quality, and general health status. In fact, a number of observational studies and meta-analyses have been published on these topics; these data represent the source of information on which this consensus document has been based.

Meat and its derived products provide relevant quantities of essential nutrients at higher concentrations compared with other foods. The nutrient content in the animal's musculature does not vary significantly between species, whilst the ratio between fat and muscle mass in the edible part does vary considerably. The quality of animal fat and the amounts of nutrients largely depend on the animal's diet or its genetic pattern, despite the fact that recent specific farming techniques (organic, free range) have been shown to influence some compositional aspects of meat (specifically, poultry meat). Cooking and heating processes usually have only minimal effects on the nutritional profile of meat, mostly corresponding to the concentration of nutrients (including fat) and a decrease in water content.

Poultry production involving farmed avian species (chickens, turkeys and ducks) is globally recognised as a vital aspect of animal agriculture. It contributes greatly to supply of high-quality protein (meat and egg) for humans. The intensification and commercialization of the poultry sector is accelerated and continues to be so as a result of research discoveries in the field of breeding, nutrition, housing management and disease control. However, the explosion in poultry nutrition research, in particular, has significant impact on the success of the poultry

sector. The progress in nutritional research is made possible by several advanced techniques reported by researchers in both academia and industry. Nutritional research is mainly geared towards improving knowledge on ingredients good for the growth and health of the bird and of nutritional requirements for various types and classes of birds, as well as the ability to match nutritional requirements of any type or class of bird for variable conditions including that of the environment. This chapter discusses the importance and growth of the poultry sector. Also, nutritional research efforts over the years, achievements, some notable advance research techniques employed, and challenges confronting nutritional research in the 21st Century have been highlighted.

## Growth of the Poultry Sector

Globally, poultry (avian species such as chickens, turkeys, ducks and guinea fowls) production is an important aspect of the animal agriculture. It is undeniable fact that the intensification and commercialization of the poultry sector is accelerated by research discoveries in the field of breeding, nutrition, housing management and disease control. That is to say, the success of the poultry sector is underpinned by considerable research efforts over the years through application of scientific innovations. These research efforts were largely geared towards the following: improving genetic strains specialised for food use (meat and eggs) and regional conditions; improving knowledge of nutritional requirements and ability to match these for variable conditions; and ensuring stable environment for growth and production. These research efforts are still ongoing in the light of new challenges facing the animal industry in terms of birds' welfare and issues of environmental pollution as well as consumers' concerns of food quality and safety.

## Feed Analysis

Poultry meat and eggs are cherished worldwide and consumed in various forms. They are proteins and a source of essential micro-nutrients such as vitamin A, vitamin B12, riboflavin, calcium, iron and zinc. Therefore, they are important in human nutrition and health.

Both the meat and eggs are produced in large quantities all over the world for food and income. As such, the poultry sector is one of the leading suppliers of meat worldwide. So much

income can be derived from poultry products. For example, America which is the world's leading producer of poultry in 2017 had its combined value of poultry meat and eggs up to the amount of \$42.7 billion. Besides, poultry products are generally cheap, making them affordable for low-income earners in both developing and advanced countries.

In fact, the poultry sector has the potential to grow faster as a result of enabling factors such as population growth, breeding of highly-productive strains of meat-and egg-type birds, improvements in consumers' incomes, and modern technologies for processing feed/poultry products. However, the cost of feeding poultry is a major factor controlling the push for more incomes by farmers.

The surest way of meeting the nutrient requirements of birds is having adequate knowledge of nutrient contents of various feedstuffs available. This requires feed analysis with regards to nutrient composition and anti-nutrient contents. There have been advanced techniques employed over the years which give true reflections of chemical composition of feedstuffs that enables nutritionists to be able to accurately formulate diets for

all types and classes of poultry. These include improved methods for determination of dry matter, proteins, carbohydrates including fibre, fats/oils and macro-and micro-minerals as contained in the official Methods of Analysis (2019) and published by the Association of Analytical Chemists (AOAC) International. These techniques not only determine the true content of feedstuffs but also saves time and amounts of samples to be analyzed as well as minimum operator training. Examples are vacuum-oven drying/toluene distillation of high fat feeds for moisture determination; automatic kjeldahl analyzer/dumas technique/amino acid analyzer for protein determination; magazine enzyme kit for starch determination in cereals; rose-gottlieb/soxhlo method for fat determination; fiber analyzers for determination of acid detergent and neutral detergent fibers, and the use of Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) analyzer for determination of several minerals at the same time; Near-Infrared Spectroscopy (NIRS) technique for determination of moisture, crude protein, metabolisable energy and digestible amino acids of whole feed sample.