STUDIES REGARDING THE EVOLUTION OF COMPOUND FEED FACTORIES IN THE CONTEXT OF AUTOMATION OF THE WORK INSTALLATIONS

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ABSTRACT

The technological flow that takes place in compound feed factories is a complex process, which involves performing activities such as: grinding the grains, mixing the ingredients from the recipe produced, granulating, homogenizing and cooling. These operations are carried out with the help of specialized installations, with a high degree of automation, in order to obtain high productivity at the lowest possible cost prices.

Given the international requirements and competition in the market, the automated installations of the compound feed factories must ensure the full protection of the staff that serves them and also of the environment. Concidering the diversity of compound feed recipes depending on the species and the age category of the animals fed, this article follows an evolution of the production of compound feed factories in the last period of time.

INTRODUCTION

Livestock is a basic branch of agriculture because it produces a very large part of the food intended for population. That is why it can be considered a very important indicator of the economy, with repercussions on the standard of living of the population that is reflected in the consumption of products from the zootechnical sector.

These aspects show that the development of zootechnics is a necessity and this can be achieved by automating and computerizing this sector of activity, in order to obtain flexible and efficient installations for the production of compound feed for agricultural farms with zootechnical profile. Such installations minimize transport costs, ensure a consistent food and avoid losses of raw materials, while creating the possibility that, depending on the specifics of the recipe, in the homogenization phase of the resulting flours can be introduced various ingredients (eg: vitamins, various flours, mineral salts, etc.).

Compound feeds are mixtures obtained by combining plant and animal origin feed with mineral salts, antibiotics, vitamins, proteins, amino acids, flavoring or coloring material, enzymatic preparations and medicinal substances, dosed so that to meet the physiological needs of different categories of animals (figure 1). The advantages of using compound feed in animal feed are numerous and act on multiple levels, but all can be expressed by a single indicator, namely the reduction of the costs of animal products.

In order to face the competition on the profile market, all the compound feed factories have as a central objective the production of compound feed recipes with a high quality, but at the lowest possible prices. Also, another objective is to ensure strict control over dust and pollutant emissions removed in the air so as to ensure the protection of the environment. For this, automated work installations are used, and the entire technological flow is driven by a process computer.

Studies and statistics carried out in recent years by the specialized institutions (IFIF, FEFAC) have shown an ascending trend in the profile market and

it is estimated that the production of compound feeds will increase worldwide by an average of 2.3% per year.

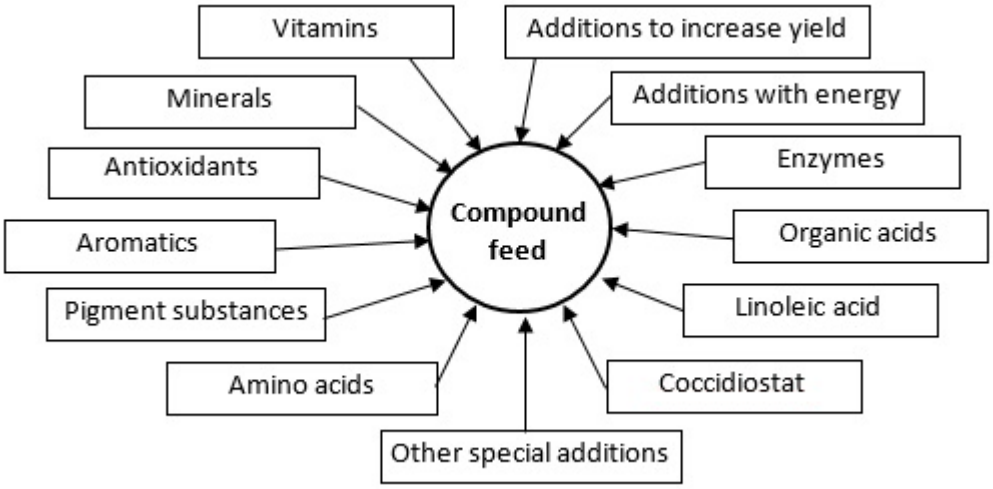

Figure 1 - Ingredients from a recipe for compound feeds

MATERIAL AND METHOD

Experimental research and statistics by specialists in the nutrition and zootechnics have shown the many benefits of using compound feed for animal feeding. In order to satisfy the very diverse requirements of the consumers, specialized farms have been set up on different species of animals. Farmers know that obtaining high performance in terms of quantity, quality, but also ecological, is based on proper feeding with different recipes of compound feeds, depending on the species and age of the animals.

The production of compound feeds is achieved through a complex technological process (figure 2), with activities of transporting raw materials from silos to work facilities, grinding, dosing and mixing, homogenization, granulation, cooling, packaging and delivery to beneficiaries.

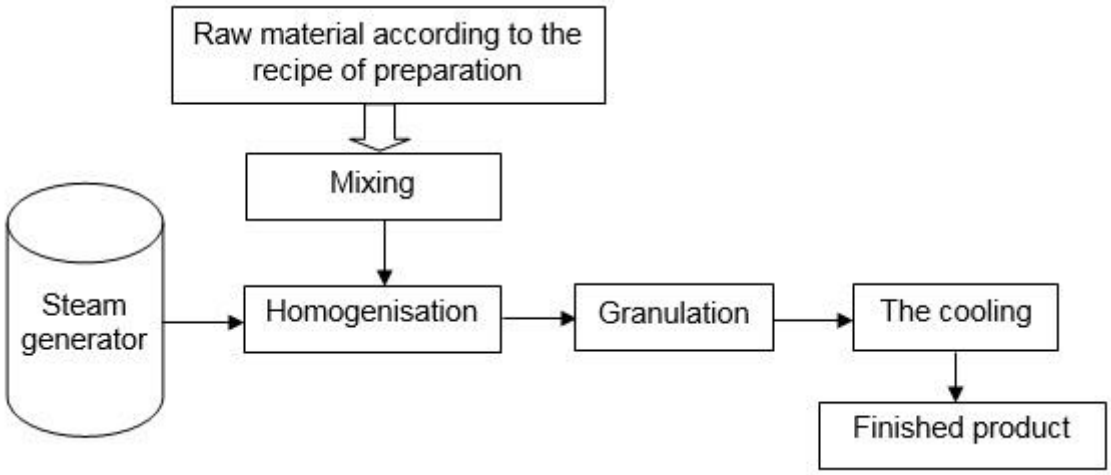

Figure 2 - Technological flow from a compound feed factory

The first activities carried out in a compound feed factory are those of supply of raw materials and their storage in bunkers or silos with ventilation installations. From here, with the help of horizontal conveyor belts or vertical elevators, the grain cereals that represent the raw materials reach the grinding mills

and then the dosing and mixing installations. Thus is obtained the desired recipe for the compound feed to be produced. In figure 3 these work installations are exemplified.

a b c d

Figure 3 - Working installations from a compound feed factory: silos (a), conveyor belts (b), grain mill (c), mixer (d)

The mixture thus obtained will then pass to the homogenization installations in which are used steam jets with very high temperatures, then in machines with special molds is done the granulation of the product, with different sizes and shapes. The granules are then cooled by means of jets of cold air so that they can be packaged for later distribution to the beneficiaries. These work installations are shown in figure 4.

a b c d

Figure 4 - Working installations from a compound feed factory: steam generator (a), granulator (b), cooling plant (c), packing plant (d)

To increase work productivity, most working installations from compound feed factories have been automated, so that the entire technological flow is driven by a process computer (figure 5).

Figure 5 - The process computer used to control the technological flow

The most well-known compound feed factories (CFF) have adapted over time to the requirements of livestock farms, in order to obtain high quality recipes of compound feed at the lowest possible price. Thus, they have been equipped with high-performance work installations, by last generation, with a

high degree of automation and computerization.

RESULTS AND DISCUSSIONS

An important aspect of intensive animal husbandry on livestock farms is the provision of cost-effective and high-quality feeding, through the widespread use of various compound feed recipes.

The International Feed Industry Federation (IFIF), through its annual publicity reports, best reflects consumption trends and, implicitly, the development of compound feed factories. In figure 6 presents a graphical statistic regarding the distribution of compound feed consumption by animal species.

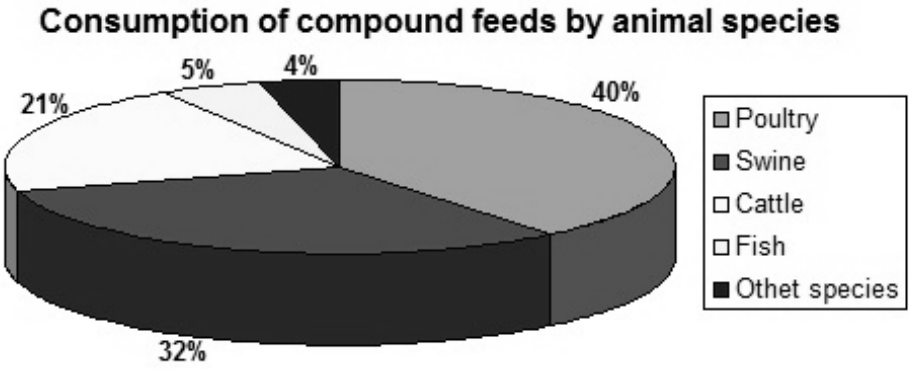

Figure 6 - Distribution of the consumption of compound feed by animal species

The statistics showed that the compound feed production obtained last year worldwide was about 1100 million tons, and in the last 5 years the fodder market has grown on average by about 2.3%/year. Also based on analyzes and statistics performed over time, it can be seen that the geographical areas in which the production and consumption of compound feed have increased the most are Asia and South America, especially due to the two countries, Brazil and China, which have become leaders in recent years in the profile market. The same statistics indicate a significant development of compound feed factories in European Union countries, including Romania.

The studies and analyzes presented in this paper followed the evolution of compound feed factories and their productions for the last 10 years. A very interesting statistic is the one showing the values of compound feed production worldwide and, also, in EU countries (Figure 7).

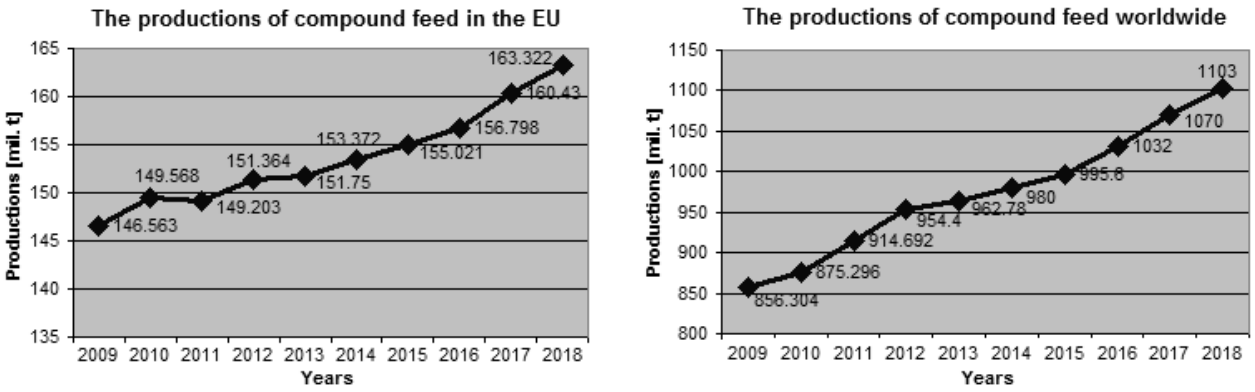

Figure 7 – The productions of compound feed in the last 10 years

Considering the interest for the development of the livestock sector in Romania and implicitly of the compound feed factories in our country, the studies

and statistics carried out for the European area are of interest.

As can be seen from figure 7, according to the latest report published by the European Federation of Feed Producers (FEFAC), in 2018 the EU manufactured 163.322 million tonnes of compound feed, representing 80.1% of the total feed purchased and, at the same time, presenting a increase of 2.2% compared to the previous year (160.43 million tons were produced in 2017).

Depending on the species of animals fed, the highest production of compound feed was produced for poultry (55,884 million t), followed by swine (51.087 million t) and cattle (46.729 million t), according to the annual FEFAC reports (figure 8).

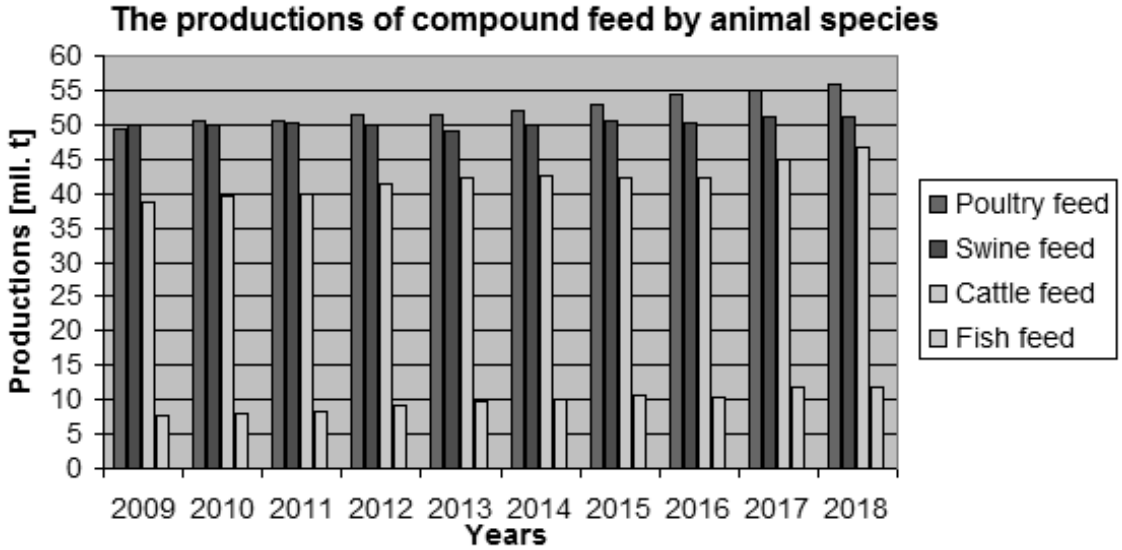

Figure 8 - Statistics on compound feed production by animal species

All these statistics indicate an accentuated development of the compound feed factories and implicitly of the zootechnics in all the countries, thus becoming a basic branch of the economy of these countries.

The increase of the productions in the compound feed factories generated by the increased demand from the population for animal products, determined the endowment with fully automated and computerized work installations, which ensure a high efficiency and, also, an environmental protection.

CONCLUSIONS

The diversification of people's food needs, with an emphasis on the demands of products from animals, has determined development of the zootechnical farms, but also their specialization for the growth of certain animal species.

Intensive animal growth is based on the widespread use of compound feeds for animal feeding, so that they are kept in perfect physical form to obtain the best quality animal products.

Global statistics which have been published by IFIF and FEFAC show an increase of about 1.4% in compound feed production for poultry and swine in recent years, as well as a decrease of about 0.6% in compound feed for cattle.

The compound feed factories (CFF) equipped with fully automated and computerized work installations have seen an ascending trend, with an average increase in production of about 2.3%/year, by obtaining dedicated recipes of compound feed depending on the species and age category of the animals which will be fed.

The statistics of the last 10 years presented in this paper show that the production of compound fodder has experienced an ascending evolution, which represents a positive economic indicator for the development of zootechnical farms worldwide.

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