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# *ALTERNATIVE PRODUCTION OF RATIONS FOR THE FEEDING OF POULTRY AND SWINE*

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## Abstract

The use of organic waste for manufacturing animal ration is a technique that aims to reduce the waste of organic matter otherwise directed to discharge dumps. At the same time, it represents a source for the production of alternative food for animals such as swine and poultry. This bibliographic review aims to present an alternative formula for the production of animal rations that can improve feeding systems for animals raised in rural areas.

**Keywords:** Organic matter. Pelleting. Alternative animal ration.

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# 1 Introduction

Brazilian Federal Law nº. 12305/2010 regulates the destination and treatment of solid residues, including alternatives for their reuse (BRASIL, 2010). Solid organic waste represents more than 50% of the total solid residues resulting from human activities. Non-organic residues have high rates of recycling or reutilization due to evolving technologies and to economic return. The absence of a selective process for organic residues makes them unfit for recycling and/or reutilization. They represent a risk for the environment and for the contamination of hydric resources. Deleterious results include decomposition, bad odor, presence of vectors, and attraction of rodents and other animals, that use them for feeding.

This study aims to present alternative ration for the feeding of poultry and swine in rural areas.

# 2 Methods

This research was based on a quick search in Google Scholar tool (https://scholar.google.com.br/), based on articles, books and theses.

# 3 Results and Discussion

Organic ration is produced from fruit and vegetable residues, such as from peels discarded in the residences of farmers in the community. A source of protein, such as fish viscera, or cattle blood, is added to these residues. Such feeding rations are packed in commercial plastic bags and stored at 18 ºC in domestic freezers available in the living quarters of residents, before being processed.

Viscera and blood are also stored in plastic bags until their use. This alternative ration may be produced monthly, according to the suggestion of Torelli et al. (2010).

The percentage of macronutrients contained in the rations may vary according to the stage of development and growth of animals. The obtention of organic rations involves some stages that are indispensable for the final composition, such as a thermic pre-processing of the manioc peel, which should be exposed to the sun for drying during 48 h.

After this period, it should be triturated in a blender until a homogeneous powder is obtained.

Coconut bran, after trituration and extraction of the excess of liquid, should be spread under the sun for drying for about 72 h. Vegetable and fruit residues should be cut into small pieces of about 5 cm, and then processed in a meet-mincing machine, until a pasty consistency is obtained. The manioc powder and the coconut paste are then mixed (see components in the table 1).

After obtention of this mixture, chemical supplements are added: dicalcium phosphate (calcium and phosphorus in the proportion 1.1:1.0) and a vitaminic and mineral supplement. Dicalcium phosphate is a phosphorus supplement that is widely used in animal rations. The addition of a multivitamin and a mineral supplement are recommended for the good development of the animals (Table 1).

After these steps, the material must be processed again in the meet-mincing machine, in order to produce pellets, which is a characteristic shape of rations. In this last stage, the pellets are dried in the sun for 2 days (48 h) to reduce the humidity of the ration.

**Table 1**. Composition of first and second organic rations developed according to the indicated procedures.

| Ingredients | 1st part % | 2nd part % |
|---|---|---|
| Vegetable and fruit residues | 16.20 | 31.60 |
| Manioc powder | 9.70 | 26.70 |
| Animal protein* | 64.90 | 32.10 |
| Coconut powder | 6.50 | 7.60 |
| Dicalcium phosphate | 1.30 | 1.00 |
| Vitamins and minerals | 1.30 | 1.00 |

**Fish muscles and viscera (catfish)*
Source: Adapted of Rolim (2015).

The use of carbohydrates in rations aims mainly to give consistency to pellets. It also represents the main source of organic carbon, that is necessary for the development of the animal.

Cuzon et al. (2004) indicate that the presence of carbohydrates in rations is important for providing animals with energy derived from starch, and thus avoiding energetic use provided by proteins.

Although our alternative ration has been produced with other products containing organic carbon, they contribute to the adjustment of carbon/nitrogen relations, as suggested by Silva et al. (2009).

In order to facilitate the comprehension of the whole process of production of alternative rations, a step-by-step diagram follows (Figure 1).

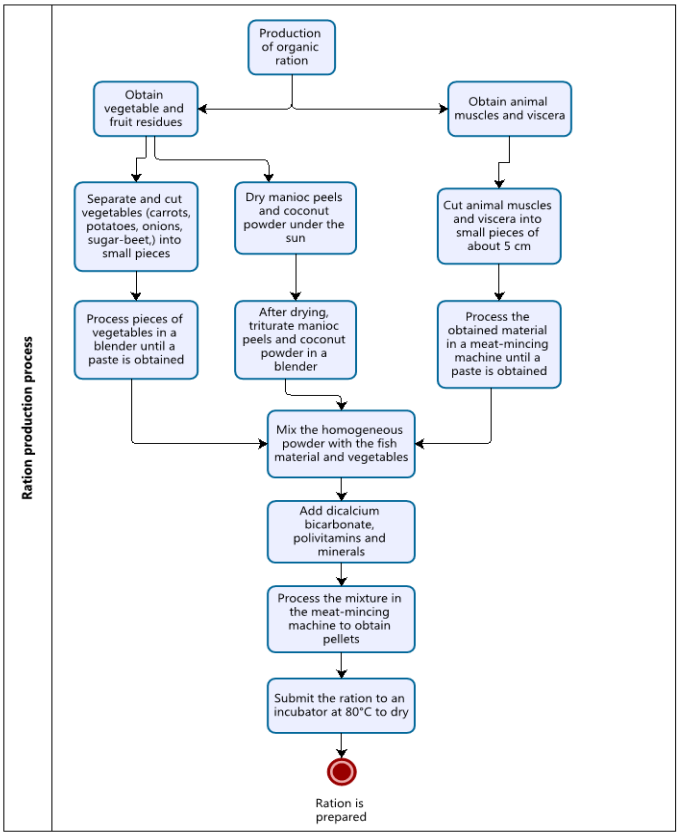


**Figure 1**. Ration production process, adapted of Rolim (2015).

Another important parameter measured in food is humidity. Also known as water content of food, it corresponds to the loss of weight occurring when the product is heated and water is removed (ZENEBON; PASCUET; TIGLEA, 2008). Water directly affects chemical stability, quality and composition of food, and may affect storage, packing and processing (ROLIM, 2015).

Another important component in bromatological analyses of food are ashes, because they represent a fixed mineral residue or an inorganic residue resulting from the burning of organic material (ZENEBON; PASCUET; TIGLEA, 2008). Ashes usually contain mineral salts such as calcium, magnesium, sodium, phosphorus, chlorides, lead, and other components (ROLIM, 2015, see table 2).

**Table 2**. Bromatological analysis of two rations made from organic sources.

| Composition % | Organic Ration Part 1 | Organic Ration Part 2 |
|---|---|---|
| **Humidity** | **2.74** | **1.09** |
| **Ashes** | **11.31** | **4.87** |
| **Protein** | **37.78** | **18.64** |
| **Lipid** | **6.48** | **5.45** |
| **Carbohydrate** | **41.69** | **69.95** |

Source: Adapted of Rolim (2015).

Lipids are important nutrients in the formulation of diets. Besides furnishing energy, they participate in the synthesis of fatty acids and are good fat-soluble vitamin vehicles such as vitamins A, E, D and K.

Among nutrients, proteins are one of the most important components of food diets. Their presence is related to the availability of indispensable amino acids for animal development. Because our target animals are omnivores, mixed diets of animal and plant origin are required (ROLIM, 2015). Given their importance, proteins are the costliest components in commercial rations.

We suggest the use of inputs from the agricultural industry, such as meat, bones, beef powder, chicken meal, bird viscera, blood powder, and mixtures of specialized proteins, fat from secondhand industries, eatable meet fat, lard, yellow fat, food grade fats, and many products such as liver, lung, etc. as viable sources of proteins and other nutrients indispensable for animal development.

# 4 Conclusions

The use of organic residues coming from food pre-preparation and leftovers is a good alternative for animal production. Their use reduces the daily volume of residues sent to the sanitary landfill.

The residue is transformed into animal protein with a high added value. Its use may increase jobs and income, maintaining families in activities developed in rural areas.

# CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

GDF and FESS contributed with the research and writing of the article. GDD and SAPB established the method of research, analyzed data, and contributed to writing the article. MLC reviewed the final version and translated the article into English/proofreading.

# DECLARATION OF INTEREST

The authors declare that no conflict exists between participants or collaborators of this article, directly or indirectly.

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