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Popular Article

## Insects as Companion and Exotic Pet Feed: A New Trend

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A New Trend of the most important ingredients in pet diets due to the high protein requirements of pets, which range from 18% to 22% for dogs and 26% to 30% for cats on a dry basis. The highest quality foods contain more protein and a higher proportion of animal proteins, which are more expensive than vegetable-based proteins. Human population growth has increased demand for animal-based foods; this, combined with pet owners' preference for pet foods containing a higher proportion of animal protein, places significant strain on natural resources.

Animal-based ingredients have several advantages in pet nutrition, including a high crude protein content (20% to 23% on a fresh basis for meat and fish), and amino acids that are more digestible than those derived from vegetable sources. They also contain significant amounts of some vitamins and minerals, such as complex B vitamins, particularly B12, phosphorus, and calcium, which are found in organic form in animal-derived foods and are more bioavailable than plant sources.

Industrial-scale insect production for obtaining protein ingredients has been proposed as a viable alternative. Insects have been used as food ingredients for farm animals and humans due to their excellent nutritional quality, specifically high protein (25% to 70%) and lipid (10% to 50%) contents on a dry matter basis, and their low environmental impact. Several advantages of insect production over animal farming systems are

- (1) they have a lower water and carbon footprint.
- (2) less land use is required to raise insects.



- (3) insects can be fed with waste (agro-industrial, household, forestry, slaughter plant and others). Waste can be converted by insects into excellent food. Black soldier flies and mealworms can consume leftovers from fruits and vegetables as well as garbage from homes, slaughterhouses, mills, and other sources.
- (4) insects emit low levels of greenhouse gases and ammonia
- (5) insects' feed conversion rates are more efficient. Feed conversion efficiency of poultry is 33% while that of black soldier fly is 455 and that of meal worm is 55%

While there are also certain limitations like: -

1. Insect's nutritional depends upon many factors like stage of rearing, species and diet
2. Insects have high content of manganese which can be excessive for dogs and cat
3. Lack of studies on large scale insect production

### **The three insects currently used in pet food are**

- 1) Black soldier fly larvae (*Hermetia illucens*),
- 2) Mealworm larvae (*Tenebrio molitor*)
- 3) Adult house crickets (*Acheta domesticus*) because they are industrially produced in large quantities

Insects' primary amino acids are glutamic and aspartic acids. Glutamic acid has been linked to the perception of umami taste, which has been described as a pleasant and appetizing taste for dogs, cats, and other animals. In insects, methionine was the limiting amino acid in black soldier fly larvae and mealworm larvae for dogs and cats, and threonine was the limiting amino acid in black soldier fly larvae for dogs.

Insects provide a lot of energy because of their high lipid content, especially in larval stages because larvae need to build up energy reserves for metamorphosis to pupa and in the adult stage where a lot of energy is expended for reproduction. The unsaturated fatty acid profiles of mealworm larvae and crickets may be beneficial to humans.

The third most important component of insect meal is ash. The ash content of the black soldier fly larvae is high, as it contains high concentrations of calcium and phosphorus. Insects are rich in several microminerals such as copper, iron, magnesium, manganese, phosphorus, selenium and zinc

### **Rearing of insects**

The rearing of edible insects is relatively simple and inexpensive. There are currently different industries that raise insects called "mini-farms", located mainly in Africa, Asia, the European Union and the United States



Some examples of insect meal are:- Agriprotein (South Africa), which produces meal, fat and fertilizer from black soldier fly larvae, Entocycle (UK), which produces black soldier fly larvae, Ynsect (France), which produces mealworm larvae-based ingredients, and Cricket Farm (United States), which produces whole adult crickets and meal, among others.

Some industries are also located in developing countries, such as Food for the Future (F4F) (Chile), which produces meal, fat, live and dehydrated larvae and fertilizer from black soldier fly larvae,

Stages of rearing are: -

- (1) Reproduction and egg production are the first stages of insect rearing.
- (2) Development, which occurs when eggs are transferred to rearing sheds, where they develop and transform into larvae, which are fed until they reach an optimal size and yield for harvesting. Insects can be easily raised in small plastic containers that are ventilated at room temperature of up to 30 °C and relative humidity of up to 70%.
- (3) Harvesting and sorting, in which insects are processed for food or chosen as broodstock

The insects are transformed into food ingredients after being raised and graded. The first step is to sacrifice the insects by briefly immersing them in boiling water, followed by a cold-water immersion Oven, vacuum, freeze-drying, and microwaving at different temperatures and times—between 60 and 80 °C for 8 to 24 hours—are the primary drying techniques. Drying primarily affects color, which tends to darken, and odor, which results from increased volatile emissions like alcohols, alkenes, aldehydes, and alkanes. Autoclaving insects is another method that can be performed.

### **Pet Owners' Perceptions of Insects in Dog and Cat Food**

Because the acceptability of insect consumption is influenced by cultural factors, people living in Asia, Africa, and Central America have a favorable perception of insect consumption and practice entomophagy. However, the Western population regards insect consumption as disgusting, unpleasant, malodorous, and filthy There is a scarcity of data on pet owners' perceptions of insect consumption by dogs and cats however in a study by Higa et al on black soldier fly suggests that people prefer the indirect route of insect consumption which is via consuming productive animals that were fed on insects then direct insects as such.



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