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ORIGINAL ARTICLE

The Development of Hermetia Illucens Larvae as a Life Cycle Balance of the Black Soldier Fly Fly Type Encourages the Strongest Professionalism of Independence.

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Abstract:
Hermetia Illucens is a maggot or maggot larva of a black soldier fly that is not dangerous to human health. Its life cycle is estimated to be 45 days from the hatchery, cultivation, to the final packaging process. A good magnification and cultivation process, obtained more useful maggot quality and capacity can provide significant welfare potential gains. Grouping and independence encourage the creation of professionalism and independence of organizers through wet feed as well as more potential dry feed. Fermented organic food becomes an optimal success and its management and management ability become a reinforcement of the achievement of professionalism and independence of its managers.

Keywords : life cycle of BFS, potential maggot larvae, professional development

Introduction

Maggots are organisms in the second phase after eggs Black flies often called Black Soldier Fly (BSF) flies are flies that do not have natural diseases and antibiotics in their bodies. The lowest water content in the body of BSF larvae is in the pupa phase. The protein content in the body of BSF larvae has a relatively high content. The dry skin from BSF and the dead larvae obtained can then be utilized into a mixture of animal feed ingredients.

The results of chemical analysis show that BSF is rich in proteins and fats of economic value for the manufacture of animal feed. The fat content of BSF larvae can also be used as biodiesel. BSF prepupae and pupae also have a high content of calcium (Ca) and phosphorus (P). The chemical content of the BSF body at several stages of the life cycle of BSF flies.

Continuous fermentation feeding since the breeding process must be carried out properly and correctly so that the maggot enlargement conditions are healthier and more efficient and sustainable. In the mating process, the flies that come out will be taken from the dark cage, mating occurs, so we named it "love cage" three to four dark cages to collect the newly discharged flies.

This method allows for a constant and stable density of flies in the breeding cage. The number of eggs will be predictable so that mass breeding can be carried out more efficiently. The mating cage is equipped with a damp cloth to keep the flies in it from lacking moisture. In addition, there are also eggies and a box containing attractants. Changes within 72 hours will give the appearance of parts such as the spiracle channel extending from the lateral spiracle to the posterior spiracle, as well as eye spots and mouth parts that appear more and more obvious, the movement of the embryonic body is also visible called ovipositing. It is thought to be caused by factors of air temperature and humidity, since ambient temperature and humidity correlate and measure around 19 millimeters. While the color becomes a bit creamy.

The life cycle of BSF flies can be grouped into five stages consisting of nesting, maggot, prepupa and pupa development and adult fly development. Professionalization of the potential for maggot development in the economic cycle of the community can be supported by the market share

of maggots as poultry food, fish and the like can provide considerable welfare ranging from small to large cycles supporting community independence.

Goals

Supporting the strengthening of protein content in the body BSF larvae have a relatively high content, especially proteins and fats of high economist value with the regulation of an effective and professional maggot management system and the use of dry skin from BSF and dead larvae that can be used as a mixture of animal feed ingredients avoiding foods and drinks that endanger the life cycle of sustainable maggots.

Methodology

The approach in conducting this study is through the sustainability of the development of black soldier fly (BSF) maggot larvae through the overall BSF fly life cycle system approach and implementing professionalization of financial potential to support the independence of managers and the success of a more harmonious environment. The life cycle of BFS flies consists of 5 stages including the process of spawning, maggot handling, prepu cycle and pupa cycle as well as BSF fly maturation imago as well as measuring the potential professionalism of sustainable maggot management. The spawning cycle takes five working days so that the eggs can hatch well according to the adjusted temperature and temperature conditions.

The development of the maggot cycle requires 14 working days with well-fermented and regularly circulated food. The development of prepupae close to 8 working days can encourage better harvesting by drying and petroleum so the treatment must be done properly.

Professionalization of financial potential in the management of dry maggots is a contributor to the manager's finances on a larger scale and can be done with domestic and foreign management.

Results and Discussion

BSF fly life cycle system

Nesting or Hatchery

In the life cycle of black soldier flies (BSF), they store enough fat and protein reserves until they become flies, then find a mate, mate, and lay eggs (for females) before finally dying. The structure of the mouth changes into a structure that looks like a hook and the color becomes dark brown to charcoal gray. This hook-shaped mouth makes it easy for him to get out and move from his food source to a new, dry, textured environment like humus, shade, and protected.

Maggot/ Larva

It is this stage of development of the larvae that stores fat and protein reserves until they are quite high. This hook-shaped mouth makes it easy for him to get out and move from his food source to a new, dry environment. Body weight also continues to increase until when it is about to enter the prepupa stage. The weight of the maggot becomes larger during the kurrang over 18 working days. The color is still whitish with the weight gain of the organism heavier than before.

Prapupa

The prepupa stage is the stage when eating activities are no longer carried out. With the weight of the organism becomes reduced. Whitish skin lasts approximately 7 days. Subsequently the larvae begin to turn brown and darken a week later. Prapupa since the 19th day.

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Pupa

100% pupa is achieved on the 24th day. The pupa stage lasts for 8 days then Pupasi is the process of transformation from a pupa to a fly. The pupa stage lasts 6 days, then the imago begins to appear on the 32nd day. Pupation is characterized by the exit of flies from inside the pupa.

Figure 1: life cycle *Black Soldier Fly (BSF)*

Figure 2 : Hatchery cage and nesting models

Figure 3 *: Cycle BSF and Maggot and pupa*

Adult Flies (Imago)

Imago that emerges from the pupa, which is then supplemented with water and honey to hydrate. After exiting the pupa cycle, flies can live about a week. Flies will look for a partner, mate and lay eggs (for the females) in a fairly short time. Sufficient natural light and warm temperatures (25- 32°C). According to the results of the study, this type of fly prefers to carry out mating in the light morning time. After that, the female fly is looking for a suitable place to lay her eggs. The Black Soldier Fly is black with the same part of the abdominal basal segment as the bee.

Figure 4 : dried maggots

Pengelolaan maggot

Food

Kitchen waste, fruits, vegetables, liver, fish waste, urban waste, human waste, and animal waste made into maggot food The flexibility of BSF larval feed can be an ideal insect in producing protein. proper formulation in feeding BSF larvae in order to maximize the production and efficiency of some microbes used as a pre-treatment process can improve the digestive ability of BSF larvae, the process of development of larvae, as well as the increase in mass from the prepupa stage. The potential solution of this feed determination is the use of probiotics .

The life rate of adult Hermetia illucens ranges between 1 and 2 weeks depending on the larval feed and also additional feed in the adult stage. Water-fed and honey-fed imago can live longer than those that are not given water at all. The water content in food is between 60% and 90%.

Hermetia illucens does not belong to proovigenic insects, does not carry a certain number of mature eggs. Hermetia illucens lays eggs only once in her life, because the ovaries are no longer oviposition. But insect sinovigenic.

Foods containing cadmiun material and the like as well as harmful pathogens can be avoided while still paying attention to the life cycle and fermentation system of BSF fly 5 | 8 feeding with internal selection of organic waste mixed with harmful elements for the survival of BSF flies in the future.

Temperature and Sanitation

The optimum temperature of BSF growth is between 30-36°C. Optimal environmental conditions and food sources. The climate is warm, the ideal temperature is between 24°C to 30°C. Water the floor of the cage regularly and use disinfectants to eradicate microorganisms, be it germs or bacteria, from inside the cage and avoid predators. The effectiveness and quality of larvae or maximizing the quantity of larval mass produced is similar to animal breeding systems.

Mass breeding of maggots

This unit is used to maintain small larvae so that they are always available in consistent quantities and can be used to process organic waste that comes every day at the processing facility. However, in this unit of rearing, the number of hatched larvae is limited to a certain number to guarantee the stability of breeding its population litter and pre-processing.

The first step is to control the waste to ensure that it does not contain hazardous materials and non-organic materials. reduce the particle size of waste, reduce moisture content if the humidity level is too high, and/or mix various types of organic waste to produce a nutritionally balanced diet and humidity for larvae (70-80%).

The rest of the dead flies can be an additive in composting. Also the rest of the maggot feed can be processed into liquid organic fertilizer (POC). POC is a fertilizer in the form of liquid derived from the remains of food, plants, or animals that have undergone fermentation.

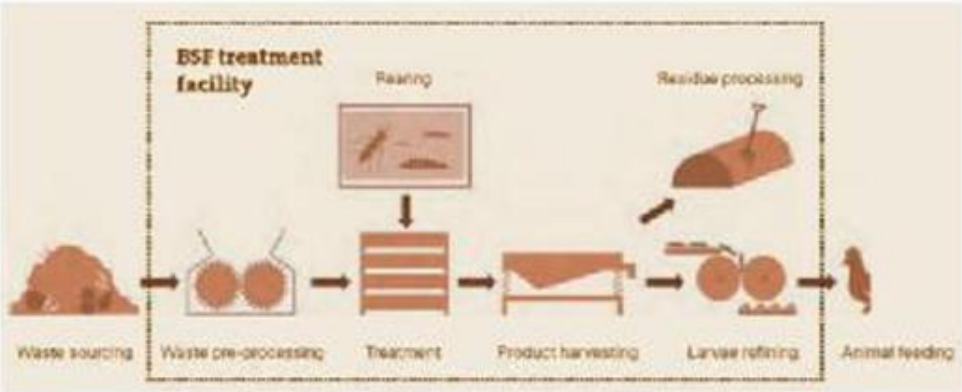

Figure 5 : Units in the BSF processing system

Maggot Professionalization

The nesting cage should be in accordance with the context which is expected to maximize various efforts to accelerate the spawning so that the financing becomes more effective and efficient

financing. Eggs that are small in size with a condition of 10 grams can provide a larger number of maggots with a maggot amount of about 20 kilograms.

The spawning process must be followed by minimizing direct contact with the adjusted food by not putting on top of the food which is very juicy so that the hatchability of the eggs becomes more accelerated with the existing temperature and temperature conditions.

Maggots have a high protein content, which is around 30-45% so they are often used as animal feed. This high protein content has great potential in the growth and enlargement of livestock. Maggots also contain lauric acid which acts as an antimicrobial and chitin which can improve the immune response and health of livestock.

Maggot managers in the amount of 100 kilograms a day, can be obtained with biophones numbering about 10s with adapted room conditions. The condition of fermented food is good but simple as possible so that its development improves. It can take 14 working days before harvesting.

Drying and Petroleum

Microwave drying becomes a more advantageous option for managers with the efficient utilization of circular heat from drying. The dried maggots were 100 kilograms wet, 35 kilograms of dried maggots were obtained.

Dry maggots are expected to produce approximately 80,000 rupiah to 180,000 rupiah per kilogram while wet maggots produce from 6,000 rupiah to 8,000 rupiah per kilogram. Meanwhile, dried maggots from the premium prepupa cycle are estimated to have a price of around 180,000 rupiah per kilogram. The BSF eggs are estimated to cost 2,600 rupiah to 3,000 rupiah per gram. Contextual exporters of maggot shipments abroad can be carried out according to the requests related to the certified maggot manager of the company.

Maggot oil can be done by emphasizing dry maggots which can be used as an effort to strengthen antibodies at an estimated price of 150,000 rupiah per tube, although there are still not many who touch it. This condition needs to be developed as part of efforts to strengthen the welfare of the people in general.

Conclusions

The gradual maggot life cycle of nesting, maggot enlargement, prapu and pupae before becoming a BSF fly can be used as a benchmark for the development of BSF larvae more effectively and efficiently. The development of maggots and prepupae can provide a potential to grow the professionalism of managers in getting a better income.

Some other results in the form of management waste become kasgot and other food becomes a meaningful output in the management of this maggot. The regulation of dry maggots and their oiling can be more applied in a controlled system so that their management becomes simpler and healthier.

The output of dried maggots and their oil can be used as a quality driver to achieve efficiency levels in a faster time by taking into account the life cycle of maggots and their prepupae. Better automation rules in the management of maggot, enlargement circulation in being used as input for the development of motorization systems and artificial intelligence.

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