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# The Utilization of Vegetable Waste as Fermented Chicken Feed for Maintaining Super Native Chickens in the Young Farmer's Group at ALC

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A B S T R A C T

The community service activity was carried out for the young farmer group at Agro Learning Center in Peguyangan Kangin Village, North Denpasar District, Denpasar City. This activity aims to increase the young farmers' knowledge about making fermented feed based on vegetable waste for nativee chickens. A nativee chicken is a type of local chicken widely cultivated in Indonesia. By utilizing vegetable waste which is commonly found, the breeder can produce chicken feed. Service activities are carried out by practicing making fermented feed with vegetable waste with the help of an EM4 fermenter, molasses and other feed ingredients. After fermentation, the fermented feed will be directly given to nativee chickens from the age of 3 weeks. After the post-test was carried out, it was seen that this activity could increase the training participants' knowledge about fermenting feed of vegetable waste.

**INTRODUCTION**

A nativee chicken is the easiest livestock to find in many areas of Indonesia. Intensive nativee chicken rearing is suitable for rural areas with a clement environment, abundant chicken food, and painstaking people taking care of it. Raising nativee chickens does not use chemicals which makes nativee chickens naturally healthier. For this reason, many people prefer to consume nativee chicken because it does not use chemicals that support the development of the body or meat. Nativee chickens have strong immune systems and are easy to care for. Therefore, nativee chickens can grow well as long as they are given enough feed, like grains and also vitamins. Moreover, farmers do not need to make extra efforts to maintain the health of nativee chickens. A nativee chicken is more nutritious than a domestic chicken. It makes the nativee chicken meat more popular than the domestic due to its prominent taste. Eating nativee chicken meat provides many benefits because it contains lots of protein, vitamins, fat and phosphorus, which are very important for humans. The government has protected nativee chicken farming through Perpres No. 77 of 2007. In this case, the Indonesian government guarantees that nativee chicken businesses can only be accomplished by residents, starting from fledging to growing phase. Through this program, the government directs the nativee chicken industry to farmlands run by individuals rather than by the industry. The request for nativee chicken is rising. Many restaurants are increasingly offering nativee chicken menus. This training is given to the younger generation of ALC to prepare the participants to be competent in raising super-nativee chickens. The material studied includes an introduction to the types of nativee chickens and their crosses, rearing systems, livestock production facilities, cultivation issues, rearing management, and harvesting. ALC is designed as a center for training and creativity for young people in agriculture

Livestock is a sector with a huge opportunity to develop as a future business. The need for livestock products will increase yearly, along with the growth of public awareness of nutritional needs to improve quality of life since livestock provides protein, energy, vitamins, and minerals. Poultry meat is one of the livestock that can be used as a source of animal protein because this livestock can produce meat in a short time, and the price is relatively low. The popular poultry in the community is broiler chicken, yet the other types of poultry still have great potential to be developed as meat producers, namely super nativee chicken. Most people enjoy eating this nativee's chicken meat since it has a tough texture.

Nativee chicken is a type of local chicken widely cultivated in Indonesia. Super nativee chicken is included in the non-breed chicken group, a cross between a local roaster and a hen (Iskandar, S., 2006). This type of chicken is found in both rural and urban areas. Moreover, super-nativee chickens can also be found in high and lowlands (Wiranata , dkk, 2013). The characteristic of super-nativee chicken can produce large quantities with the same weight, has a faster growth rate than nativee chicken, has a low mortality rate, adapts easily to the environment, and has the same taste as nativee chicken (Kaleka, 2015). The harvest age for super nativee chickens is approximately two months (Munandar, A. dan V. J. Pramono. 2014 ). The advantages of super nativee chickens compared

to nativee chickens are greater body weight, lower feed conversion values and mortality values (Gunawan, B. dan T. Sartika. 2001). Aside from being a source of meat and egg production, the nativee chickens in Bali are also used as ceremonial materials. Many activities in Bali use nativee chicken as complement offerings, especially nativee chickens with certain coat colors such as biing, brumbun, selem, putih tulus, and putih kuning.

In raising chickens, genetics and environmental factors have a significant impact. One of the environmental factors is the feed of the nativee chickens. Expensive feed costs are usually an obstacle to the production of nativee chickens. Therefore it is necessary to look for alternativee feeds that can reduce the cost of rations in rearing nativee chickens. Chicken feed is important for breeders since it can spend up to 60% of the total cost. The composition of the feed given to the poultry is important to note so that the poultry produced by the farm can achieve maximum outcomes. Feeding also depends on the growth of poultry. The high percentage of the need for feed costs from the total cost will easily change farmers' profit. High feed prices are still often encountered due to imported feed ingredient components. Consequently, there is a need for innovation in the manufacture of poultry feed to streamline the cost of animal feed, especially for smallholder breeders. According to (Iskandar, 2006), the ration's protein content affects the ration's quality and quantity. The higher the protein content in the ration, the quantity will also be high and vice versa. If the ration protein is low, the ration quality will also be low because protein is the main nutrient required for the growth of poultry.

In ALC, besides raising native chickens, various types of vegetables are also cultivated. Vegetable waste is used as an alternativee feed for nativee chickens. Vegetables cultivated include caisim, kale, lettuce, kailan, tomatoes, eggplants, chillies, carica, and various rhizomes. The availability of vegetable waste is quite a lot considering that the ALC land area also reaches 30 acres. Usually, there will be a vegetable harvest every day, which produces vegetable waste. For nativee chicken feed, caisim waste, kale, and carica are commonly used. Caisim waste contains many nutrients. Several vegetable waste types from market can be used as ruminant animal feed, including spinach, kale, cabbage, green bean sprouts, cauliflower leaves, corn husks, and cassava leaves.

Furthermore, vegetable waste also comes from agricultural vegetable waste for human consumption and types of vegetables that are not suitable for sale. Based on the results of interviews with farmers who work as vegetable suppliers to traders and supermarkets, the amount of vegetable waste is quite a lot every day. The types of vegetable waste include white cabbage leaves, broccoli leaves, and cabbage. This type of vegetable has the outermost leaves that stick when the vegetables are harvested, such as white cabbage and broccoli. If this part of the leaf is separated from the main vegetable part, it will produce quite a lot of leaf waste. The number of vegetables that are not suitable for sale is also quite large, like cabbage, caisim, bok choy, and lettuce. According to the study conducted by several researchers (Abun,dkk., (2007) , (Bakshi, *et.al*., (2016). ) and Truong,et.el., (2019) , explained that vegetable waste still contains a protein of 10-19% or, in other studies, 9-11% and some even reach 24%. If vegetable waste

is added to supplementary feed ingredients and minerals, it can be used as raw material for chicken feed. Another advantage of using vegetable waste is that it can substitute corn and soybeans as the main raw materials for animal feed, so the use of corn and soybeans can be diverted to other processing industries. MdSalim, et.al., (2017). Explained that processing waste derived from vegetables can have a positive impact on a sustainable basis for the environment. Environmental problems will arise if the vegetable wastes are thrown away because it will add to the waste in the final disposal site. Superianto, *et.al.*, (2018) emphasize that market waste in the form of vegetables can pollute the market environment, such as causing bad smells and diseases. Therefore, this vegetable waste needs to be processed again into an alternativee animal feed ingredient, especially for chickens, to help reduce the cost of buying factory feed. Besides, it is cheap, has good quality, and easy to obtain.

Most small-scale chicken farmers only rely on finished feed or leftover food ingredients from human consumption for their livestock. Therefore, it is urgently needed to empower small farmer groups in the form of synergistic efforts between them, to encourage the creation and development of more advanced and productive farming businesses. The fermentation process can retain nutrients during storage. This process can provide feed when feed sources are unavailable and preserve feed when feed sources are abundant. The condition of the feed source with high water will accelerate the fermentation process, where feed ingredients can be used without going through the drying process first. Gunawan, B. dan T. Sartika ( 2001) stated that fermented feed with a moisture content of 50% was able to have the best quality in terms of conversion of broiler chick feed. The initial goal of fermentation is to increase the digestibility of the feed. Hence, the absorption of the nutritional value of the feed is more optimal, which will increase productivity. The benefits of fermented feed, namely: 1) Increasing the nutrition in the feed from the previous. Fermented vegetables have much better nutrition than fresh vegetables. 2) Saves expenses in procuring animal feed because the price of vegetables is lower than the price of pellets. 3) It can be stored for a long time without worry of spoilage..

## 2. IMPLEMENTATION AND METHODS

1. The implementation of student creativity program is carried out in several stages, namely:
2. Site survey for counselling activities and locations survey for demonstration plots.
3. Interviews and questions and answers regarding problems faced by partners, as well as planning activities that demonstrate technical steps to solve the problems.
4. Utilization of vegetable waste produced in ALC for chicken feed
5. Fermentation technology is carried out to improve feed quality by utilizing vegetable waste.

1. Prepare the ration using vegetable waste to get the right ration formulation according to the needs of super nativee chicken.

Partner participation in the implementation of student creativity program is needed for the smooth process of this program.

1. Partners are expected to comply with all agreements that have been made
2. Partners are expected to be disciplined and earnest in doing the activities until all planned programs end.
3. After the program ends, the partner can maintain super nativee chickens using fermented vegetable waste.
4. Assistance, evaluation and monitoring will continue even though the program has ended.

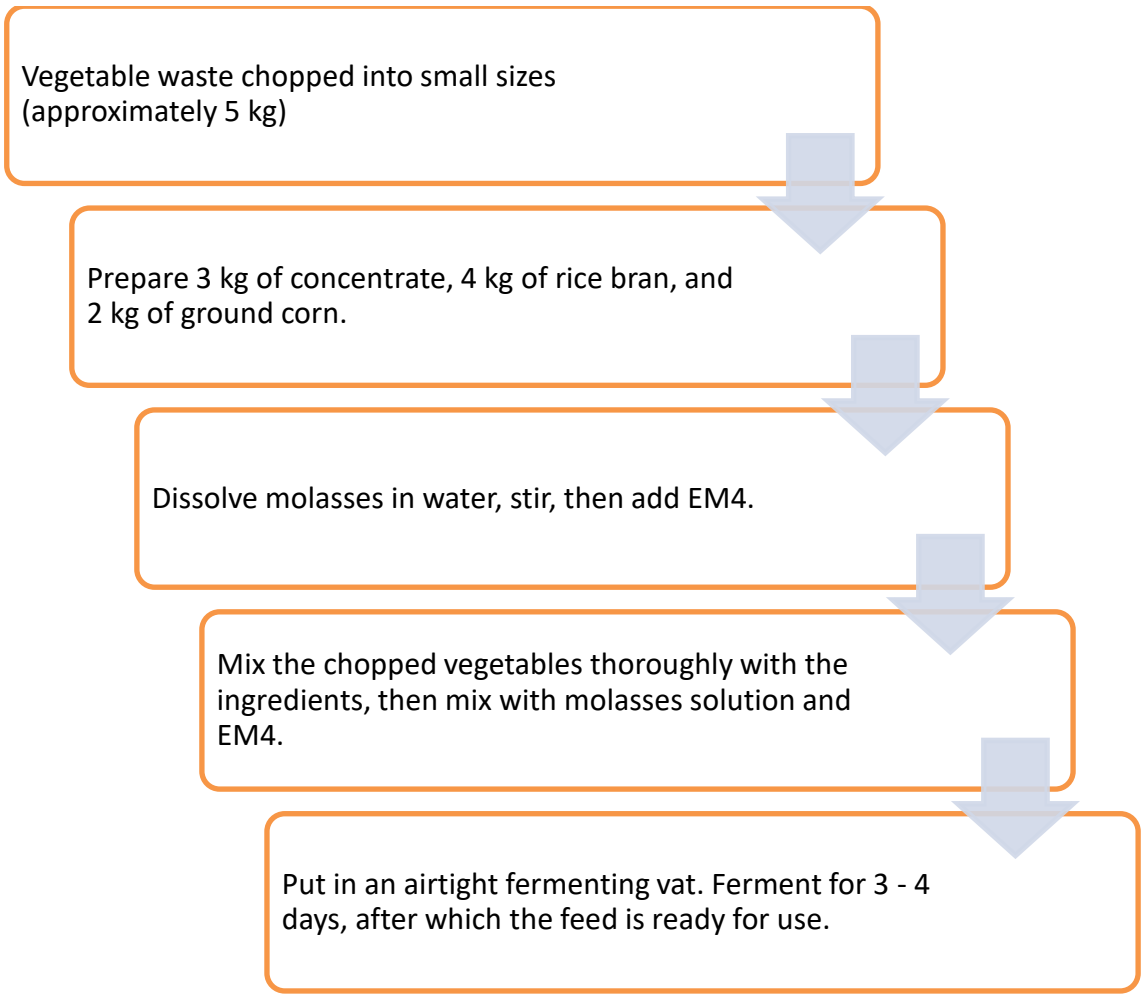
Figure 1. Conditions at the ALC

## 3. RESULTS AND DISCUSSION

### 1. Implementation Activities

This activity was carried out from September 2 until September 6 and attended by 35 young farmers. The activity began by introducing super nativee chickens and its maintenance procedures. The maintenance of super nativee chickens begins with keeping the DOCs placed in its boxes with the warmer from electric lights, vaccinating the chickens, and making fermented feed by mixing the vegetable waste produced there. The fermented feed is composed of feed ingredients consisting of 511 concentrate, corn, fish flour, rice bran and vegetable waste. The vegetables used in fermented feed depend on the type of vegetables harvested. Thereby the waste can be utilized. The vegetable waste is then cut into small sizes, and after that, it is mixed with bran, milled corn, and 511 concentrate. The feed is mixed evenly. Molasses is dissolved with water and EM4 and then used to wet the feed mixture. After this, the feed is stored in airtight vats, fermented for 3-4 days, and then used as a nativee chicken feed of three weeks old and above.

Making fermented feed is done every week, depending on the feed requirements. Fermentation can improve the quality of feed from waste due to the involvement of microorganisms in degrading fiber, reducing levels of lignin and anti-nutrients as the digestibility value of feed from waste can increase (Astuti & Yelni, 2015). Fermentation can occur due to the activity of fermentative microorganisms found on suitable organic substrates, causing changes in the material's properties by the breakdown of the ingredients in the material. The fermentation process causes changes to the chemical components of a feed ingredient. Fermented feed ingredients will have better nutritional value than the original ones due to the activity of microorganisms that have catabolic properties towards complex content and convert it into simpler components. Besides being able to separate lignin from cellulose, fermentation in soybean straw can also damage the cellulose crystal structure. It then forms an active structure for hydrolysis by cellulase enzymes which produced by microorganisms. Another advantage of fermented feed is making manure from livestock odorless. So that the environment will remain good without the pungent odor produced by livestock manure.




Picture 2.
Flowchart of making fermented feed using vegetable waste

In this activity, the participants also learned about rearing nativee chickens and participating in all activities in raising nativee chickens. The nativee chicken has a big role for Balinese people since it is widely used in ceremonial activities. Rations and drinking water were given ad libitum two times a day, in the morning and evening. The drinking water provided comes from a drilled well. Drinking water containers are cleaned daily to prevent disease, then filled with fresh water. The addition of drinking water is done when the water is almost gone. Before the chickens are put into the coop, the equipment is cleaned and sprayed with a disinfectant to eradicate pests, viruses, bacteria, and fungi.


Figure 3. Fermentation feed production activities

Every day after the drinking water is cleaned, the chickens are given vita chicks through drinking water at a rate of 5 grams per 7 liters of water to avoid stress, maintain the chickens' immune system, and increase their appetite. Vaccination is done by administering the Gumboro A vaccine at 13 days of age and the Newcastle disease-Lasota (ND-Lasota) vaccine given at 21 days of age and at 35 days of age the Gumboro B vaccine. These vaccine processes are carried out through drops in the chicken's mouth.

Picture 4.
Other activities carried out

2. **Benefits of the Study**

The group gained knowledge about the technology of fermented feed by utilizing vegetable waste to become good quality chicken feed. Participants' understanding of fermented feed significantly increased. Before the training, only 15% knew about fermented feed. After completing the practices and training, it increased to 79%. In the monitoring and evaluation activity, 70% of participants practiced making fermented feed. It can be said that this training is very useful because the provision of fermented feed can eliminate the smell of chicken manure and also helps increase the weight of nativee chickens. After all, with fermentation, the quality of the feed can be improved.

### 3. Restricting and Supporting Factors

**Supporting Factors**

The enthusiasm and great desire of the young people to take part in all events that have been scheduled is one of the supporting factors in this activity. Partners are still willing to participate and will implement the knowledge gained in raising nativee chickens.

**Solutions and Follow Up**

The obstacle encountered in implementing the student creativity program appears when doing the demonstration plot of raising nativee chickens. Rats often appear at night. These mice appear and bite the chicken. The rat only eats certain parts of the chicken's body, which then causes the chicken to die. This problem is overcome by giving rat poison placed above the chickens' coop and on the chicken coop floor.

**The next plan**

This training activity will be followed by assistance in terms of super nativee chicken maintenance, starting from preparing the cage, keeping the DOC, and preparing fermented feed from existing waste materials. Utilization of this waste aims to reduce the cost of rations and grow the profits of nativee chicken breeders. Moreover, it also increases the nutritional value of livestock. Besides, fermentation is expected to lengthen the shelf life of the feed ingredients.

**Strategic steps to realize the next plan**

The strategic steps to realize the next plan is conducting assisting training about animal feed preservation technology by utilizing available vegetable waste or other sources of feed ingredients that are easy to get and inexpensive. With this technology, partners are expected to be able to reduce rations costs and utilize existing resources, both vegetable waste and other agricultural waste. This activity ran smoothly and well. As much as 70% understood and were able to practice how to make fermented feed by utilizing vegetable waste or other available resources around the breeding grounds. In addition, the provision of fermented feed has also been able to reduce the price of nativee chicken rations and reduce odors during rearing.

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**REFERENCE**

Abun, A., Rusmana, D., & Saefulhadjar, D. (2007). Efek pengolahan limbah sayuran secara mekanis terhadap nilai kecernaan pada ayam kampung super JJ-101. Ilmu Ternak, 7(2), 81–86.

Astuti, T. dan G. Yelni. 2015. Evaluasi Kecernaan Nutrient Pelepah Sawit Yang Difermentasi dengan Berbagai Sumber Mikroorganisme Sebagai Bahan Pakan Ternak Ruminansia. Fakultas Pertanian Universitas Muara Bungo. Jurnal Sain Peternakan Indonesia 10 (2) : 101-105

Bakshi, M. P. S., Wadhwa, M., & Makkar, H. P. S. (2016). Waste to worth: vegetable wastes as animal feed. CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources, 11(12), 1–26. https://doi.org/10.1079/PAVSNNR20161 1012

Gunawan, B. dan T. Sartika. 2001.Persilangan Ayam Pelung Jantan X Kampung Betina Hasil Seleksi Generasi Kedua (G2). Pusat Penelitian dan Pengembangan Peternak, Deptan. Bogor

Iskandar, S., 2006. Pertumbuhan Ayam- Ayam Lokal sampai dengan Umur 12 Minggu pada Pemeliharaan Intensif Dalam Prosiding Lokakarya Nasional Inovasi Teknologi Pengembangan Ayam Lokal 132- 137. Pusat Penelitian dan Pengembangan Peternakan. Bogor

Kaleka. N. 2015. Beternak Ayam Kampung Super Tanpa Bau. Arcitra.

Munandar, A. dan V. J. Pramono. 2014. Produksi *Crude Aspergillus Fermentation Extract* untuk Meningkatkan Kualitas Bahan Pakan Sebagai Pemacu Produktivitas Ayam Kampung Super. Jurnal Sains Veteriner, 32(2): 199-204.

Md Salim, N. S., Singh, A., & Raghavan, V. (2017). Potential utilization of fruit and vegetable wastes for food through drying or extraction techniques. Novel Techniques in Nutrition & Food Science, 1(2), 15–27. https://doi.org/10.31031/ntnf.2017.01.00 0506

Superianto, S., Harahap, A. E., & Ali, A. (2018). Nilai nutrisi silase limbah sayur kol dengan penambahan dedak padi dan lama fermentasi yang berbeda.

Jurnal Sain Peternakan Indonesia, 13(2), 172–181. https://doi.org/10.31186/jspi.id.13.2.172-181

Truong, L., Morash, D., Liu, Y., & King, A. (2019). Food waste in animal feed with a focus on use for broilers. International Journal of Recycling of Organic Waste in Agriculture, 8(4), 417–429. https://doi.org/10.1007/s40093-019-0276-4

Wiranata, G. A., I. G. A. M. K. Dewi dan R. R. Indrawati. 2013. Pengaruh Energi Metabolis dan Protein Ransum Terhadap Persentase Karkas dan Organ Dalam Ayam Kampung (Gallus domesticus) Betina Umur 30 Minggu. Peternakan Tropika. 1 (2) : 87 – 100.