

# The Potential of Trigona Honey as A Functional Food Solution for Malnutrition in Menggala Village, North Lombok Regency, NTB Province, Indonesia

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**Abstract:** - Improving the quality of human resources from Menggala Village is constrained by the low quality of health of the residents in Menggala Village. This condition is known from the large number of residents in Menggala Village who have poor nutritional status. The potential of trigona honey as a functional food solution for malnutrition in Menggala Village, North Lombok Regency, is one of the efforts that can be made to improve the nutritional condition of the community. The purpose of this activity is to improve the poor nutritional status of the community for the better through independent trigona honey therapy. The method used is discussing existing problems with the community, educating and seeing the potential of natural resources, human resources in the village, as well as the potential of Trigona honey in overcoming malnutrition, establishing problem formulations with the community, formulating activity objectives and carrying out activities with the community to overcome malnutrition through the cultivation and development of trigona honeybees independently. Trigona honeybee therapy in overcoming malnutrition can improve the nutritional status of toddlers towards a better direction; this can be seen from the physical and behavioral changes experienced by the community in Menggala Village. The nutritional status of toddlers who are malnourished after being given trigona honey therapy can experience an increase in nutrition towards a better.

**Keywords:** Functional Food; Malnutrition; Menggala Village; Trigona Honey

## I. Introduction

Menggala Village is the youngest village in Pemenang District, North Lombok Regency, West Nusa Tenggara Province, this village is new formed as of June 22, 2020 through a Regency Regional Regulation North Lombok Number 8 of 2020 concerning the Establishment of Menggala Village Pemenang District, North Lombok Regency, which is where the Regency North Lombok itself is still classified as an Underdeveloped Region Presidential Regulation Number 63 of 2020 concerning Regional Determination Lagging behind in 2020-2024, so that it is the youngest village in the region being left behind is a challenge in itself for Menggala Village. Business improving the status of disadvantaged areas can be implemented by improving the quality of human resources [5,6]. The preliminary survey on the condition of the community surrounding Menggala Village reveals the condition of people who are unaware of the potential of Trigona honey bee cultivation, are unaware of the environmental potential of fruit and flower plants for Trigona honey bee cultivation, and require alternative solutions to increase agricultural-based income [2, 4]

Efforts to improve the quality of human resources from Menggala Village constrained by the low quality of population health in Menggala Village, this can be seen from the number of residents in Menggala Village who have status malnutrition. Based on data on the number of frequencies of malnutrition per district in North Lombok Regency in 2010, Pemenang District is a sub-district of Menggala Village that has a frequency of malnutrition as much as 27% of the frequency of malnutrition throughout North Lombok District [5].

The potential of natural resources owned by Menggala Village if managed creatively and efficiently can be a solution to complete the problem of malnutrition. Menggala village has a forest Protect Pusuk North Lombok which is located on the south side and borders directly with West Lombok Regency including the territory of the Village Gala. Based on field surveys that have been conducted, Protected Forest Pusuk North Lombok has various types of plants diversity and a very large population so that Menggala Village has the potential for abundant nectar-producing plants, which causes air pollution low, and the climate is stable. Potential regional conditions of Menggala Village it is very appropriate if Trigona beekeeping is developed because provide nectar as food and air as well as climate trigona bees need to develop and produce trigona honey [1,9].

The potential of human resources from Menggala Village also supports this implementation of trigona bee development to produce honey products trigona. Most of the work is carried out by villagers Menggala is farming and raising livestock [4], so that agricultural crops or the ability to raise livestock of the population can be an initial capital for the development of trigona bees so that produce trigona honey.

Honey is a supersaturated sugar solution from the nectar or secretion of plant that was converted into honey from the enzyme produced by bees. Honey contained around 80 to 85 % of carbohydrates, 15- 17 % of water, 0.3 % of proteins, 0.2 % of ashes. Honey consists of high concentration of fructose and glucose, with low levels of amino acids, phenolic acids, organic acids, vitamins, minerals, enzyme and other phytochemicals [3,4]. Trigona honey itself is a solution to the problem of malnutrition experienced by the villagers of Menggala. Trigona honey has been known to be one of the good food sources because it contains amino acids, carbohydrates, proteins, vitamins and minerals that are easily absorbed by cells body. In addition, Trigona Honey has a high content of vitamin C functions as an antibiotic, antioxidant and as well as to boost the system immunity or immunity, as well as the content of vitamin A, iron (Fe), and vitamins B12 which functions as the formation of red blood cells and hemoglobin can treat anemia caused by malnutrition for pregnant women [11], trigona honey has also been shown to increase body weight and hemoglobin levels in toddlers [5], so that therapy is given Trigona honey is the right solution to eradicate nutritional problems bad for the people of Menggala Village.

Independent Trigona honey therapy can be realized through cultivation independently of trigona beekeeping which produces trigona honey by residents zangga Village. The condition of the majority of the Menggala Village population is as farmers and breeders will accelerate the transfer of knowledge in terms of cultivation trigona beekeeping.

## **II. Materials and Methods**

### **Preparation**

Preparation of activities is carried out before the implementation of coaching and community empowerment. Teams of students take to the field to validate target data, see condition and potential the target community, the location of each target's house, as well as stipulates the time for socialization of activities to the community which will be held on 20-25 August 2021. After the team students do data validation to the Health Centre. Winning nutritional data obtained are 6 toddlers experiencing malnutrition. This data is obtained from the latest data recapitulated by Health Centre's officers, because officers previously transferred to another area. So, the data is accurate obtained by students in accordance with the amount and nutritional conditions society at that time. After visiting each target house, the student team immediately discussed at once notify regarding the implementation plan of the program that will be initiated with socialization activities at the Menggala Village office.

### **Program outreach**

The socialization of the program was carried out on September 2, 2021 which located in the village office menggala. The socialization activity was attended by guests invitations, especially the target community, the village government, the candidates partners who will be invited to collaborate facilitate future activities. Training success is monitored and evaluated. This stage is designed to examine the cognitive and psychomotor components of the community's knowledge and absorption of the counseling materials and practices that have been implemented. Cognitive characteristics were assessed at the start and conclusion of the exercise by administering a before and post-test [11].

### **Making beds and trigona bee boxes**

Making beds and bee boxes is done 1 day after socialization activities for the community. Making beds is done with assistance by the North Lombok trigona bee development team. Making Beds are carried out in each house of the target community take turns.

### **Procurement of trigona bee colonies**

Procurement of bee colonies was carried out after the bee beds and boxes were made, namely on September 18 2021. The distribution of the bee boxes was carried out evenly to each target house. Each family head gets a bee box containing 8 boxes and 8 empty boxes.

### **Harvesting trigona honey**

Harvesting is done 1 month after the distribution of bee boxes. Harvesting is done one month after distribution, this is an effort to give bee colonies an opportunity to adapt to a new environment. So that at the time of harvesting the conditions of the bee colony can adapt well.

**Implementation of trigona honey therapy**

Trigona honey therapy will be carried out starting on September 15, 2021, starting with a pretest to see the nutritional status of the toddler or the results of the toddler's HB, BB and TB. Evaluation is carried out in accordance with the monitoring form that has been made by the student team. HB is evaluated once a month, BB and TB are carried out once a week assisted by prospective Trigona team cadres and each head of the family at the service location.

**Trigona beekeeping training**

The training was carried out on October 3, 2021 which was attended by the heads of each target family or community, representatives of prospective Trigona team cadres who were guided by the North Lombok Trigona Bee Development Team. Trigona honey bee cultivation methods training The training is broken down into phases: a. Growing organic food for Trigona honey bees. b. Raising awareness of the benefits of Trigona honey bees and their derivative products. c. Honeybee colony log preparation: Setting up colony log boxes and harvesting techniques. d. Colony propagation e. Post-harvest handling and care [11].

**III. Results and Discussion**

**Behavior Change**

Behavior changes can be seen in the figure below:

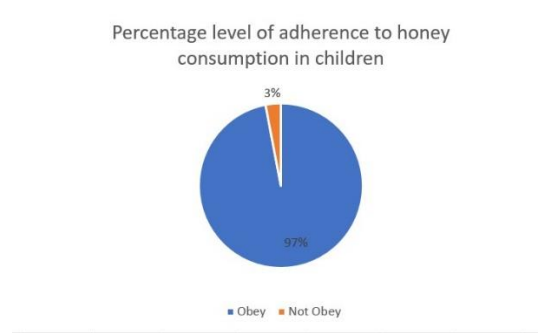


Figure 1. Level of Compliance with Consumption of Honey in Children.

Based on the figure that you included, the level of adherence to consumption of trigona honey therapy is 97% and the level of non-adherence is 3%. (Fig.1).

When looking at this data, we can conclude that most people involved in this study adhered to taking trigona honey therapy. This is certainly positive because it shows that this therapy is considered effective and beneficial by most people who have tried it.

However, even though the percentage of non-compliance is quite small, it is still important to note because it can provide important information regarding the factors that affect the level of patient adherence. There are several factors that can affect patient compliance in taking therapy, such as unwanted side effects, difficulties in use or administration, or even financial problems.

*The success rate of harvesting and breaking bee colonies*

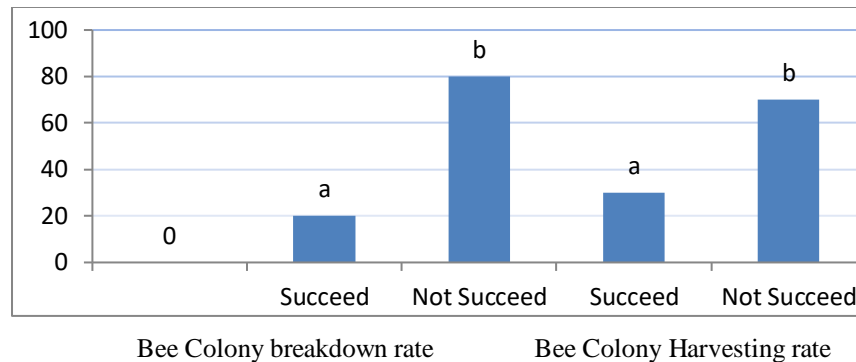


Figure 2. Success Rate of Harvesting and Splitting Bee Colonies (%)

Based on the Fig.2 provided, the success rate of bee colony breaking is 20% and the success rate of harvesting is 30%, while the failure rates of bee colony breaking and harvesting are 70% and 80%, respectively. This shows that the process of breaking the colony and harvesting honey from bee colonies is not always successful in every experiment.

Bee colonies are living organisms that are sensitive to environmental changes and need time to adapt to new environments. Therefore, the success rate of splitting the bee colony and harvesting honey from the bee colony will be influenced by factors such as the environment, season, and the condition of the bee colony itself.

Nonetheless, the success of bee colony breakdown and honey harvesting from bee colonies is very important to ensure the survival of bee colonies and to obtain optimal results from honey production. Therefore, it is necessary to make efforts to increase the success rate of splitting bee colonies and harvesting honey from bee colonies, such as through improving the quality of equipment and better breaking and harvesting techniques. [4,3,9].

*Physical changes*

Table 1. Data on the development of nutritional status

No.	Name	Gender	Development of nutritional status (Body Mass Index/Age)					
			Age (Month)	Hb	height (cm)	weight (kg)	Body Mass Index	nutritional status
<b>initial nutritional status</b>								
1	Nayla Hikami	Female	59	13	97	11.6	12.3	Malnutrition
2	Baiq Gea Ananda	Female	55	11.2	98	12	12.5	Malnutrition
3	Zahwa Hawa Amanda	Female	53	11	94	11	12.4	Malnutrition
4	Patih Noval Arbani	Male	50	13	86	9	12.2	Malnutrition
5	Azka	Male	43	11.6	83	8	11.6	Malnutrition
6	Erina Khairinnisa	Female	18		74	7	12.8	Malnutrition
<b>1st month</b>								
1	Nayla Hikami	Female	60	13.4	98	12.4	12.9	Normal
2	Baiq Gea Ananda	Female	56	13.8	98.8	13.7	14.0	Normal
3	Zahwa Hawa Amanda	Female	54	11.1	95	12.5	13.9	Normal
4	Patih Noval Arbani	Male	51	13.5	87	12.6	16.6	Normal
5	Azka	Male	44	12.2	84	10.4	14.7	Normal
6	Erina Khairinnisa	Female	19		75.8	9.6	16.7	Normal
<b>2nd month</b>								
1	Nayla Hikami	Female	61	13.5	100	13	13.0	Normal
2	Baiq Gea Ananda	Female	57	13.5	100	13.8	13.8	Normal
3	Zahwa Hawa Amanda	Female	55	11.8	100	12.7	12.7	Normal
4	Patih Noval Arbani	Male	52	13.5	90	15.8	15.8	Normal
5	Azka	Male	45	12.5	90	14.8	14.8	Normal
6	Erina Khairinnisa	Female	20		76.5	15.4	15.4	Normal
<b>3th month</b>								
1	Nayla Hikami	Female	62	13.4	105	15	13.6	Normal
2	Baiq Gea Ananda	Female	58	13	100	14	14.0	Normal
3	Zahwa Hawa Amanda	Female	56	12.5	101	13	12.7	Normal
4	Patih Noval Arbani	Male	53	13	93	13.5	15.6	Normal
5	Azka	Male	46	13	95	13	14.4	Normal
6	Erina Khairinnisa	Female	21		77.8	9.5	15.7	Normal

There was an increase in the nutritional status of toddlers after being given trigona honey therapy. Previously, the nutritional status of the toddler was poor, but after receiving Trigona honey therapy, the nutritional status of the toddler became normal. (Table 1)

Results of the nutritional content of Trigona honey showed that the highest mineral content of trigona honey was vitamin C (302.85 ug / g) and the lowest was Zn (0.27 ppm) and the other component consists of a total of 106.0 mg Phenol / 100, the levels of quercetin honey Trigona was 58, 8 mg / 100 g. While vitamin A content (0.50 ug / g) of vitamin E (9.95 ug / g), Ca (217.2 ppm), Mg (162.05 ppm). While the nutritional content of honey higher Trigona Carbohydrates (49.68%) compared to protein (of 0.03%)[14] The results of the analysis of protein content in honey samples showed that forest honey samples had a higher protein content (1.72%) compared to the cultivation samples [15].

The difference in protein content in honey can be caused by differences in the origin of the nectar consumed by bees. Honeybees, besides requiring high protein from pollen, also need ten types of essential amino acids [10]. Trigona honey is a type of honey that comes from trigona bees, which has a higher nutritional content than ordinary bee honey. Some of the nutritional content in trigona honey, such as vitamins, minerals, and antioxidants, can help improve body health and the immune system. The test results showed that in forest honey (37.22%) and cultivated honey (35.18%), these values exceeded the categories stipulated by Indonesian National Standard (SNI) No. 01-3545-2004 maximum 22%. [14,10,3].

#### IV. Conclusions

Based on the data presented, we can conclude that trigona honey therapy shows promising potential in improving the nutritional status of toddlers. The high level of adherence to this therapy by study participants indicates that it is well-received and considered effective.

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