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# Training on Making Lamb Meat Nuggets with the Addition of Moringa Leaves (Moringa Leifra)

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A B S T R A C T

Livestock products are products that have high nutritional value, namely protein, fat, water and micromolecules. One of the livestock products consumed by the public is meat. Meat tends to have a very short time in storage, namely only 1-3 hours before it spoils or becomes contaminated with bacteria. Bacterial contamination is very dangerous for consumers because it can cause several diseases such as diarrhea. Processed livestock products such as nuggets can be preserved using natural ingredients, one of which is Moringa leifra leaves. This plant contains antimicrobial and antioxidant properties which can maintain the quality of the product to remain good or at least extend the life of the product. This horticultural plant is very well known by the public, especially mothers and women who like to cook. Usually, this plant is used as a vegetable. The people in Bulu Cina Village are breeders who sell live, unprocessed sheep. Farmers do not yet know how to develop livestock businesses, such as opening catering or businesses that process sheep meat such as nuggets. Increasing public knowledge about preserving meat nuggets using *Moringa leaves* is very much needed in order to extend and maintain good product quality, especially microorganisms. This activity can be given to women, both teenagers, adults and housewives who are members of the PKK or not.

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## INTRODUCTION

Food is one of the basic needs in life that cannot be forgotten because it plays an important role in human growth and development. The food consumed varies greatly, such as rice, meat, tempeh, tofu, major vegetables, milk and others. All of these food sources have an important role in fulfilling human nutrition, such as carbohydrates, protein, fat, vitamins or minerals. Protein is one of the macromolecules needed in life because it can increase the number of cells, repair damaged cells and tissues in the body so that it can improve human development and growth and can also prevent various diseases such as kwashiorkor, marasmus and others.

Protein macromolecules can be obtained from various food sources such as meat, tofu, tempeh, nuts, fish and others. Meat is a source of protein that comes from animals or what is usually called animal protein. This food can be obtained from cows, buffalo, chickens, goats, sheep, rabbits and quail. Beef is one of the animal proteins consumed by the public.

Meat has high nutritional value such as protein, fat, water and other micromolecules. The high nutritional value of this product makes it easily damaged, especially due to contamination by microorganisms. Microorganisms are the contaminants that most quickly destroy the nutrients in meat. This microorganism can spread through the air, where the meat is placed, touch from the buyer or from the livestock itself. The microorganisms that are of concern in products according to SNI (2008) are *Escherichia coli, Salmonella, Coliform and Staphylococcus aureus*. Even *E. coli* can only be present at less than $10^1$ in meat. The higher the presence of microorganisms in meat, the faster the nutrition of the meat will be damaged. In line with this, the storage process also needs to be paid attention to. Storing livestock products is not the same as vegetable products because of the different nutritional values.

Meat has a high risk of bacterial contamination so good handling is needed to extend the shelf life of meat (Rahayu, 2006). Products that have been contaminated with microbes will have a bad impact, even if the product is processed into processed products such as rendang, beef jerky, meatballs, sausages and others. Microbial contamination of food can cause a decrease in quality and damage to food (Bakara et al., 2014).

The microorganism that often contaminates meat products is Escherichia coli. This bacteria is a commensal bacteria that is widely distributed in the surrounding environment but can also be pathogenic, acting as the main cause of disease and death throughout the world (Tenailon, 2010). Diseases caused by bacterial contamination are pneumonia, urinary tract infections, and wound infections, especially in the stomach (Mardiatin and Purwoto, 2014). Apart from E. coli, another type of bacteria that should not be present in large quantities in food is Salmonella. If infected with this bacterium, it will disrupt human health by entering the small intestine and then entering the circulatory system, causing bacteremia, typhoid fever, typhus, pratyphus, salmonellosis and other organ complications.

On average, livestock products have a short shelf life if left at room temperature compared to storage at low temperatures such as refrigerators and

freezers. Storing meat at low temperatures can inhibit the metabolism of microorganisms. Microorganisms are organisms that can grow optimally at a temperature of 37$^{o}$C. Apart from that, you can also maintain the quality of meat by using natural preservatives, one of which is Batak onions (*Allium chinense* G. Don). It turns out that Batak onions have excellent antioxidant and antimicrobial content so they can be used as a natural preservative that is safe to use and consume. This plant is usually used as an additional ingredient in cooking and is widely available in North Sumatra Province.

This millennial era is a technology-based era, including household electronics. One of the household electronic devices that almost all people have is a refrigerator/freezer. This tool can be used by women to store ready-to-eat food, food ingredients such as vegetables, fish, milk, eggs, meat and others. However, not all people have this object at home, such as in Klambir Lima Village. For people who don't have a refrigerator, after shopping, the meat will be left in plastic, whether tied or not. Treatment like this can invite microbes to grow and will damage the quality of the product, even causing it to rot. An alternative in this case is to use natural ingredients as meat preservatives which can maintain the quality of the meat until cooked.

The lack of knowledge among the public, especially women, about preserving fresh products which can maintain product quality can be helped by providing outreach about natural preservatives, one of which is Moringa leifra leaves. Klambir Lima Village is an area that has people who are active in community activities, one of which is Family Welfare Empowerment (PKK). Members who are members of the PKK are housewives. Apart from that, teenage and adult women also need knowledge about preservation in order to have knowledge about the importance of treating products well. Therefore, this socialization is really needed to achieve the PKK work program, especially in the food sector.

## THEORETICAL REVIEW

### *Meat*

Aging is all animal tissue and all the resulting products processing of these tissues which are suitable for eating and which are not cause health problems for those who eat it, including the liver, kidneys, brain, lungs, heart, spleen, pancreas and muscle tissue (Soeparno, 2005). Aberle,et.al. (2001) said aging as all body tissues which can be used as food, as well as all products that are processed or produced from slaughtered animal tissue. According to Lawrie (2003) states that meat is something that comes from animals including spleen, kidney, brain, other tissues that can eaten. Based on SNI 3932:2008, it is stated that meat is part skeletal muscle from beef carcasses that is safe, suitable and commonly consumed by humans, can be fresh meat, fresh cold/frozen meat.

Definition of meat Fresh according to SNI 3932:2008 is meat that has not been processed or added with any ingredients, while fresh, cold meat is meat that undergoes a cooling process after slaughter so that the temperature the inside of the meat 0 °C and 4 °C. The term meat is generally distinguished from carcass. The difference between meat and carcass lies in the content his bones.

Meat usually does not contain bones. Meanwhile the carcass which has not been separated from the bones/skeleton.

According to Soeparno (2005) the quality of carcasses and meat is influenced by two factors factors, namely before and after cutting. Factors before deductions usually called antemortem which can affect the quality of the meat are genetics, species, breed, type of livestock, age, feed, stress and after slaughtering (post mortem) which affects meat quality among others include withering methods, electrical stimulation, cooking methods, carcasses and meat, additional ingredients include meat tenderizing enzymes, hormones and antibiotics, intramuscular fat or marbling, storage methods, types of muscles meat, and location in a muscle. Overall production process originating from cows is a continuous link in the chain starting from the beginning of the production process, food handling to serving at the table eat. This has not gone unnoticed from manufacturers to consumers consumer. Manufacturers in providing their services will provide good and safe products, while consumers will buy the product which is safe and of good quality for him.

***Nutrition of Meat***

Meat is one of the foodstuffs that contain livestock Highly nutritious nutrients that are suitable for human consumption. Content Meat nutrition consists mostly of water 65-80%, protein (16-22)%, fat (1.5- 13)%, non-protein nitrogen substances around 1.5%, carbohydrates and minerals equal to 1.0% (Cavali et al., 2006). Fresh meat normal pH range: 5.4 to 5.9 (Subagyo, Suwiti, and Suarsana, 2015). The chemical composition of meat consists of 56-72% water, 15-22% protein, 5-34% fat and 3.5% dissolved non-protein substances, including carbohydrates, salt organics, dissolved nitrogen substances, minerals and vitamins. Protein in meat High in complete and balanced essential amino acids needed for growth, development and maintenance processes health. Apart from that, meat also contains energy from intracellular fat in muscle fibers and contains relatively lower cholesterol compared to the brain and viscera. But in general, meat is source of minerals such as calcium, phosphorus and iron as well as vitamin B complex, but low in vitamin C (Afiati, 2015). In contrast to fresh meat, processed meat contains less protein and water, and more fat and minerals. Increase in mineral percentage processed meat caused by the addition of spices and salt, while the increase in calorific value is due to the addition of carbohydrates and protein from grains, flour and skim milk (Soeparno, 2009).

***Nugget***

Nuggets are a food that was first introduced in America States as practical and fast food in accordance with dense community activities (Nurzainah and Namida, 2005). Nuggets

is a processed product from ground beef, added with spices, molded then coated with bread flour on the surface and fried (Syamsir, 2008). Nugget is one form ready-to-eat frozen food products, namely products that have undergone heating until half cooked (precooked), then frozen. This ready-to-eat

frozen product only requires a short frying time 1 minute at 150$^{o}$ C. The texture of the nuggets depends on the source material (Astawan, 2007).

The main ingredient for making nuggets usually comes from ingredients animal foods, namely chicken, beef and fish. Apart from being made from meat and fish, nuggets can also be made from vegetables. Processing vegetables into other preparations can be an effort to increase interest consumers, especially children who don't like vegetables and adds to the nutritional value of the product because it contains vitamins, minerals, and fiber (Alamsyah, 2007).

There are several factors that can influence success This product focuses on the binding ability between particles meat and other ingredients added. Making process nuggets consist of several stages or processes, namely including stages mixing dough, molding dough and steaming. Furthermore steamed nuggets sliced in various types of pieces to suit each person's taste or desire is then coated with coating material and then fried before consumption (Afrisanti, 2010).

***Ingredients for Making Nuggets***

*Binder*

The binder has a higher protein content and can improve fat emulsification compared with ingredients filler. The binding agent in the emulsion dough can function as emulsifying agent (Afrisanti, 2010). Binding agents also work reduces shrinkage during processing time and increases power tie water. Protein in the form of flour is believed to provide contribution to binding properties. Binders are composed according to their origin materials from binding materials originating from animals and plants. Material animal binders include skim milk powder and fish meal (Afrisanti, 2010).

*Filling Material*

Fillers are a source of starch that is added in restructuring products to increase product weight with substituting some meat so that costs can be reduced (Rahayu, 2007). Another function of fillers is to help increase product volume. Starch consists of two fractions that can be separated with water hot. The soluble fraction is called amylose and the insoluble fraction is called amylopectin. The amylose fraction plays an important role in gel stability, because the hydration properties of amylose in starch which can bind water molecules and then forms an elastic mass. This stability can be lost by adding excessive water. Common fillers used in making nuggets is flour (Afrisanti, 2010).

*Spices – Seasonings*

Spices are ingredients that are deliberately added and useful for improving consistency, nutritional value, taste, controlling acidity and alkalinity, stabilizing shape and appearance product (Erawaty, 2001). Making nuggets requires supporting materials namely salt, sugar, garlic and pepper (Aswar, 2005). Salt is a food component that is added and used as a flavor enhancer and preservative. The use of salt is not You can do too much because it will cause clumping (salting out) and the product tastes salty. The salt

concentration added usually ranges from 2 to 3% of the weight of the meat used (Aswar, 2005).

Using sugar and spices can improve the taste and aroma the products produced. Adding sugar can affect the aroma and meat texture and is able to neutralize excessive salt (Buckle et. al, 1987). Garlic functions as an aroma enhancer as well as for improve the taste of the product. Garlic is a natural ingredient added to food to improve taste food and to increase the durability of food ingredients (characteristics fungistotic and fungicidal). The characteristic smell of garlic comes from volatile oil containing sulfur components (*Allium sativum* L.). Pepper or pepper (*Paperningrum*) is often added to the ingredients food. The purpose of adding pepper is to flavor food and extend the shelf life of food. Pepper is very popular because has two important properties, namely a spicy taste and a distinctive aroma. Spicy taste pepper is caused by the presence of piperine and piperanine, as well as chavicia which is a compound of piperine with alkaloids (Rismunandar, 2003).

## METHODOLOGY

The approach method offered to solve women's problems in Klambir Lima Village is to provide service by providing:

a. Lectures and Discussions. Lecture (training) materials are given to participants. After finishing the lecture, it continued with discussion (question and answer). The lecture material is:
    1. Livestock products, especially meat, starting from definition, quality, nutrition and shelf life.
    2. Product preservation technology uses natural ingredients.
    3. Contamination of meat products by microorganisms.
    4. Risk of consuming contaminated food.
    5. *Moringa leaves* (Moringa leifra) as a natural preservative that can extend the shelf life and maintain the nutritional value of meat.
    6. Content of *Moringa leaves* (Moringa leifra).
b. The people of Klambir Lima Village, especially women, after receiving lectures, outreach and training, are expected to be enthusiastic about participating in the implementation of the program carried out by LPPM and the UNPAB community service team.

### Procedure

The work procedure to support the realization of the solutions offered is to first carry out initial observations in the field, namely taking an approach through interviews and finding problem phenomena. After observation and socialization, the problem is assessed and the solution to be offered is found, then the priorities for the implementation stages are set and then the service is carried out by providing counseling and training. Next, carry out an evaluation of women in Klambir Lima Village.

Hands-on practice on how to preserve processed meat products using *Moringa leaves*. The service procedure carried out is making nuggets using the materials provided. When making the nugget mixture, *Moringa leaves* are added as a source of antioxidants.

Women, whether teenagers, adults, housewives who are members of the PKK or not, after receiving lectures and training on technology for processing and preserving meat with *Moringa leaves*, are expected to be enthusiastic about participating in the implementation of the program implemented by UNPAB, especially LPMD as the institution that protects it. Community service and gaining knowledge about technological developments. Furthermore, it is also hoped that the Klambir Lima Village PKK can become a permanent partner of UNPAB in implementing the Community Service program and can become a pilot village for users of preservation technology for livestock products, especially processed meat.

## RESULTS

This community service activity carried out in Klambir V Kebun Village, Hamparan Perak District, Deli Serdang Regency is:

1. The people in Klambir V Kebun village, especially PKK women and not many people are familiar with *Moringa leaves*.
2. PKK mothers don't know the other benefits of *Moringa leaves* apart from cooking.
3. PKK women just learned that *Moringa leaves* can be used as a natural preservative/preservation of fresh meat, especially the extract, so that it can extend the shelf life of fresh meat for people who don't want to cook meat or want to store it in the refrigerator/fridge.
4. PKK women are very enthusiastic about participating in socialization/community service which aims to increase public knowledge, especially PKK women, about using natural ingredients as natural preservatives.

## DISCUSSION

Many people in Indonesia are familiar with *Moringa leaves*. Generally, those who are familiar with this plant are housewives, including mothers who are members of the PKK in an area, including Klambir V Kebun Village, Hamparan Perak District, Deli Serdang Regency, North Sumatra. PKK women generally use this plant as an ingredient for cooking coconut milk vegetable dishes. Until now, *Moringa leaves* have only been used in cooking. Meanwhile, people don't know much about the other benefits of this plant, namely as a natural preservative.Service participants were also very enthusiastic when taking part in socialization activities because they gained new knowledge about preservatives. So far, people only know that preservatives only come from chemicals such as borax and formaldehyde. But no one knows about natural preservatives.

The people invited to take part in the service have different economic backgrounds. There were several participants who did not have a refrigerator/refrigerator at home, so they had problems storing food, especially meat. Usually the meat you buy is not immediately cooked because of the preparation process for other cooking ingredients. This can affect meat quality, especially microbial contamination which results in changes in the flavor and physical appearance of the product.

During the service, the service team explained the benefits of *Moringa leaves*, namely that they function as a natural preservative because they contain antibacterial and antioxidants. This antibacterial and antioxidant content can help the durability or shelf life of meat for longer if stored or left in the open air. Apart from that, it was also explained that livestock products are very easily damaged, especially because of their high nutritional content, especially protein content. The livestock products that are widely consumed by the public are eggs and meat. During community service, it was explained how to use *Moringa leaves* as a natural preservative. This activity can increase the knowledge of PKK women about natural preservatives using Batak onions and participants are very enthusiastic about taking part in this activity.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of community service activities that have been carried out, several conclusions have been obtained, including:

a. The activity went smoothly as seen from the enthusiasm of the community, especially PKK women, in participating in activities regarding the use of Moringa leaves as a natural preservative.
b. Increased public understanding, especially PKK women, about natural preservatives that can be obtained from nearby plants.

The advice that can be given is that more comprehensive and sustainable efforts are needed in carrying out community service related to livestock products and the use of natural ingredients as product or food preservatives.

## FURTHER STUDY

After going through the training phase of making lamb nuggets with the addition of moringa, the next step will focus on more in-depth follow-up research. This research will take us further in understanding the impact of moringa addition on product quality, nutritional value, and consumer acceptance.

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