



# Utilization of Walnut Shell Waste as an Alternative for Making Halal Charcoal Briquettes in Larike Village, Central Maluku

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**Abstract:** Walnuts are a crop of economic value to the people of Maluku. In Larike village, walnuts are only managed for their pulp as a food additive for personal consumption. In addition, walnuts are also sold directly to produce processors who will usually sell them to traders or processors in the island of Java. The processing of walnut meat leaves an environmental problem, namely the shell waste which usually becomes garbage in the environment, while this waste has a hard texture so it is difficult to biodegrade in the environment. To overcome the problem of walnut shell waste, it is necessary to take an innovative step that can add economic value to its utilization. One of them is by making charcoal from walnut shells which can then be used as briquettes which are an alternative energy source (green energy). The solution carried out in this service is to conduct counseling, training, mentoring and product licensing so that the results of the partners can be marketed, so that the proceeds from product sales can meet the goal of increasing the economic level of the partner's family.

**Keywords:** Charcoal; Briquettes; Walnuts; Waste; Shell; Larike.

## Introduction

Walnut fruit is one of the crops that has economic value to the people of Maluku. The walnut is a member of the Bursaraceae tribe that is native to the eastern Malaysian region and is harvested for its buah, especially the inner seed. Its native range is mainly the Moluccas to Vanuatu. There are two species that usually produce walnuts, namely *Canarium vulgare* L. and *Canarium indicum* L. In Maluku, walnuts are very popular with consumers because of their good taste and rich saturated and unsaturated fats (Mailoa & Tulalessy, 2021). Data on walnut seed production is still difficult to find because this crop is a by-product of the forestry sector, but as an illustration, one hectare of land can grow 90 walnut trees. Each walnut tree can produce 50 kg of walnut seeds so that in 1 hectare it can produce 4.5 tons of walnut seeds per year (Djarkasi, 2008).

In Larike Village, West Leihitu Subdistrict, Central Maluku Regency, the utilization of walnut fruit is still

the same as the Maluku community in general, namely in the management of fruit meat only as a food additive. In addition to personal consumption, walnuts are also sold directly to produce processors who will usually sell them to traders or processors in the island of Java. The process of processing walnut meat leaves an environmental problem, namely the fruit shell waste which usually becomes garbage in the environment, while this waste has a hard texture that makes it difficult to biodegrade in the environment.

This walnut shell waste is usually just left by the community in their yards or often dumped on the village shoreline, causing problems during the walnut harvest season. To overcome the problem of walnut shell waste, it is necessary to take an innovative step that can add economic value to its utilization. One of them is by making charcoal from walnut shells which can then be utilized as briquettes. The utilization of briquettes from walnut shells is one way to deal with walnut shell waste that can be used as an alternative energy source (green

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energy). Where at this time there is an increasing phenomenon of energy crisis, global warming so that petroleum reserves are decreasing. Therefore, the utilization of walnut shells is an alternative plant biomass that is renewable energy (Sundari et al., 2021), and walnut shells have a high hemicellulose or cellulose content as well as lignin and extractive substances. The chemical content determines the quality of the briquettes produced in terms of calorific value (Djangu et al., 2018). In addition, using briquettes can replace the need to use fuel oil which is usually used in households where briquettes are relatively cheaper and can be developed in large production quantities and in a short production period (Asmiani et al., 2022). This waste management can also provide additional family economic income for the women's group of majelis taklim in Larike village when marketed. The fairly simple process of making charcoal flour can be done in a conventional way by the women's group of the majelis taklim on the sidelines of their other household tasks.

Briquettes from walnut shells have an ember temperature power of 896.66 °C which was tested to heat 2 liters of water with an ash content of 4.32%, where according to SNI 01-6325-2000 the briquette quality standard of ash content is 8% (Sundari et al., 2021). High ash content has an unfavorable effect on the heating value produced, the lower the ash content, the better the quality of the briquettes produced (Djangu et al., 2018). Comparison of the ember temperatures of walnut shell briquettes, palm fiber sticks, wood sawdust and coconut shell and forest cempaka wood shavings are 896.66 °C, 843.33 °C, 728.75 °C and 674.67 °C, respectively, which are still greater than the ember temperature of walnut shell briquettes. (Sundari et al., 2021). The results of other studies also show that the use of shell charcoal as an alternative biomass energy source along with its use as activated carbon, has been able to reduce the impact of pollution and global warming significantly (Budi, 2017).

Based on the description above, it is necessary to carry out this service because briquettes from walnut shells have the potential to be used as alternative energy fuels (green energy). In addition, making walnut shell briquettes can also solve waste problems in the environment. Another aspect that can be generated from the production of walnut shell briquettes is that it can increase family income or economy and can reduce the cost of household needs of the women of the majelis taklim in Larike village in particular by developing the competence of knowledge and skills of home-scale briquette craftsmen, and can be an alternative energy source for the Maluku community in general.

## Method

The method of implementing activities is carried out through socialization with counseling and FGD (Focus Group Discussion) to partners. In this socialization, an explanation was given about the purpose of utilizing walnut shell waste into charcoal briquettes. Furthermore, training was conducted with a demonstration method of making charcoal briquettes in the presence of partners. The next stage is assistance in making product tests, making PIRT, Halal certification and product marketing.

## Results and Discussion

### *Socialization*

The initial activity which is a socialization activity is carried out by providing counseling and FGD (Focus Group Discussion) on the utilization of walnut shell waste. Because among the people of Larike village, walnut shells usually only become garbage in the village environment, both around the residents' yards and on the edge of the village beach. Even though this walnut shell can be utilized and has a use value if utilized properly. So that in the socialization activity which was held on Saturday, September 7, 2024, the PKM team provided knowledge and transferred knowledge about the use of walnut shells into charcoal briquettes that could be of value. This briefing was given by Team Leader Rahayu, S.Si., M.Sc. In his explanation, the speaker said that the utilization of this waste is very beneficial for the community, in this case specifically for the partners of the women's group in Larike Village, namely helping to overcome environmental problems by processing it into briquette charcoal which can be an alternative energy fuel (green energy) as shown in Figure 1.



**Figure 1.** Socialization activities to partners

Septianti P. Palembang, S.P., M.Si explained that in addition to overcoming environmental problems, the utilization of walnut shells can provide added value in

terms of income for improving the economy of partner families. Because charcoal briquettes have good selling potential in Ambon city and surrounding areas. By producing briquette charcoal, the partner group can utilize non-valuable goods, namely walnut shell waste, into valuable briquette charcoal.

Furthermore, Jabida Latuamury SE, MSA presented an explanation of the production capacity, marketing system and calculation of production financing so as to know the selling price of the product when marketed. Jabida also explains about strategies in terms of marketing and increasing product sales as shown in Figure 2.



**Figure 2.** Delivery of materials to partners

This socialization activity was closed with an additional explanation from Rahayu who explained the importance of products with selling value having Halal certification and a household industry permit, because the products produced are supporting materials in making food products so that the guarantee of halalness is an important concern.

#### *Training on Making Charcoal Briquettes from Walnut Shells*

The training on making charcoal briquettes was given using the demonstration method to the women partners as shown in Figure 3. The purpose of this training activity is to transfer the knowledge of making good charcoal briquettes so that they can produce good products as well. This activity begins with the charcoal burning process, then cooling. Next, the charcoal is ground with a flouring machine and then sifted and ground again. The purpose of grinding twice is to obtain a fine or uniform charcoal powder size so that it can be sieved with a 50 mesh sieve.

The next stage is mixing charcoal powder with tapioca flour until evenly mixed. Then add hot water slowly while continuing to stir until the dough is smooth or not sticky to the stirring rod used. The composition for the dough used during this training demonstration was 1 kg of charcoal powder, added with 350 tapioca

flour and 550 ml of hot water. This composition was obtained from the results of the composition trials carried out previously by the team, so that when demonstrated in front of partners can produce good briquettes.

After the briquette dough becomes smooth, it is then put into an automatic molding machine. Next, briquettes that have been molded to a certain size (cube shape) are then placed into a drying pan and dried in the sun for  $\pm 2$  days. Once fully dried, the briquettes can be packaged according to the size of the packaging to be marketed as shown in Figure 3.



**Figure 3.** (a) Briquette products before drying, (b). Briquette products after packaging



**Figure 3.** Training on charcoal briquette making to partner groups

#### Description:

- Introduction and handover of tools and materials to partners.
- Charcoal briquette making process with partners.
- Charcoal briquette molding process with partners.
- Group photo with the charcoal briquettes.

#### Conclusion

Based on the results of the activities, it was concluded that: (1) Socialization activities have been carried out by providing understanding and transferring knowledge about walnut shell waste which in the understanding of the community is only as waste



in the environment, it can be utilized into briquette charcoal which has economic value; (2) The utilization of walnut shell waste into charcoal briquettes has a selling value that will provide an increase in income for the women of the partner group in Larike village.

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### References

- Asmiani, N., Nawir, A., Az, M. A., Bakri, S., Budiman, A. A., & Yusuf, F. N. (2022). Analisis Pemanfaatan Briket Tempurung Kenari Sebagai bahan Bakar. *Jurnal Geomine*, 10(1), 75-79. <https://doi.org/10.33536/jg.v10i4.1143>
- Budi, E. (2017). Pemanfaatan Briket Arang Tempurung Kelapa Sebagai Sumber Energi Alternatif. *Sarwahita*, 14(01), 81-84. <https://doi.org/10.21009/sarwahita.141.10>
- Djangu, F., Tooy, D., & Rawung, H. (2018). Analisis Pembuatan Briket Bioarang Limbah Tempurung Kenari (*Canarium Indicum*) Dengan Bahan Perekat Tepung Tapioka. *Cocos*, 10(2), Article 2. <https://doi.org/10.35791/cocos.v1i4.22087>
- Djarkasi, G. S. S. (2008). *Karakterisasi dan stabilitas oksidatif minyak biji kenari*. [http://etd.repository.ugm.ac.id/home/detail\\_pencarian/49310](http://etd.repository.ugm.ac.id/home/detail_pencarian/49310)
- Mailoa, M., & Tulalessy, A. H. (2021). The Effect of Immersion Time and Drying Method on The Colour of *Canarium Nuts* (*Canarium vulgare* Leenh). *Tropical Small Island Agriculture Management*, 1(2), Article 2. <https://doi.org/10.30598/tsiam.2021.1.2.77>
- Sundari, S., Nurhasanah, N., Papuangan, N., Husen, I., & Mas'ud, A. (2021). Pelatihan Inovasi Teknologi Briket dari Tempurung Kenari Program Kemitraan Masyarakat Kelurahan Tarau di Pulau Ternate. *Jurnal Abdidas*, 2(6), 1281-1288. <https://doi.org/10.31004/abdidas.v2i6.464>