Jurnal Pertanian Terapan of JURNAL ROCE (AGROSCIENCE)
https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

RESPONSE OF LOCAL CANDLENUT GRAIN WITH DIFFERENT DRYING DURATION TO GRAIN YIELD

RESPONS GABAH KEMIRI LOKAL DENGAN DURASI PENJEMURAN YANG BERBEDA TERHADAP HASIL GABAH

Maghfirah[1], Mulyanti[2*], Lukman Martunis[2] , Imelda[2]

[1]Agroindustry, Politeknik Indonesia Venezuela
[2]Plantation Management, Politeknik Indonesia Venezuela

*Email Koresponden: mulyanti@poliven.ac.id

Abstract

Candlenut is a plant that has many uses and can be utilized as a basic ingredient for kitchen spices and pharmaceutical ingredients. The increasing demand for candlenuts from other countries makes farmers in Indonesia increasingly active in making candlenuts as the main crop Candlenut seeds have very high benefits and selling value if they have gone through a good and correct peeling process. This study aims to determine the effect of the length of time drying candlenut seeds processed with a peeling machine on the yield of candlenut grain. This research was conducted in Seulimum Village, Seulimum District, Aceh Besar in April 2024. This study used a non-factorial Randomized Block Design (RBD) of 4 treatments and 6 replications resulting in 24 experimental units. The parameters observed were the percentage of intact nuclei (%) and the percentage of broken nuclei (%). The results showed that the test treatment of the length of time drying candlenut seeds with sunlight with different intervals of the number of days did not have a significant effect on the percentage of intact candlenuts, and the percentage of broken nuclei.

Keywords: *Drying Duration, Grain Yield, Pecans, Drying Machine*

Abstrak

Kemiri merupakan tanaman yang banyak memiliki kegunaan dan dapat dimanfaatkan sebagai bahan dasar bumbu dapur dan bahan farmasi. Meningkatnya permintaan kemiri dari negara lain membuat petani di Indonesia semakin giat menjadikan kemiri sebagai tanaman utama Biji kemiri memiliki manfaat dan nilai jual yang sangat tinggi apabila sudah melalui proses pengupasan yang baik dan benar. Penelitian ini bertujuan untuk mengetahui pengaruh lama waktu penjemuran biji kemiri yang diproses dengan mesin pengupas terhadap hasil gabah kemiri. Penelitian ini dilaksanakan di Desa Seulimum Kecamatan Seulimum Aceh Besar bulan April 2024. Penelitian ini menggunakan Rancangan Acak Kelompok (RAK) non faktorial dari 4 perlakuan dan 6 ulangan sehingga menghasilkan 24 satuan percobaan. Parameter yang diamati adalah Persentase inti utuh (%) dan Persentase inti pecah dua (%). Hasil penelitian menunjukkan bahwa perlakuan uji lama waktu penjemuran biji kemiri dengan sinar matahari dengan interval jumlah hari yang berbeda tidak memberikan pengaruh yang nyata terhadap persentase kemiri utuh, dan persentase inti pecah dua.

Kata Kunci: Durasi Penjemuran, Hasil Gabah, Kemiri, Mesin Pengering

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

INTRODUCTION

Candlenut *(Aleurites moluccana* Willd*)* is a plant from the *Euphorbiceae* family. Candlenut originally came from Hawaii and then spread to West Polynesia and then to Indonesia and Malaysia. In Indonesia, candlenuts have long been planted, both for commercial purposes and substituents to support people's daily lives, especially for the people of eastern Indonesia (Krisnawati *et al*., 2011).

Candlenut is a plant that has many uses and can be utilized as a basic ingredient for kitchen spices and pharmaceutical ingredients. The increasing demand for candlenuts from other countries has made farmers in Indonesia increasingly active in making candlenuts the main crop (Tridge, 2019). Candlenut seeds have very high benefits and selling value if they have gone through a good and correct peeling process (Angraeni *et al.*, 2019). The physical characteristics of the hazelnut seed coat are very hard and have different thicknesses from one another (Argo *et al*., 2018).

The process of separating candlenut seed meat from the shell is still done manually by prying, this is done to get more whole seeds. The number of whole seeds produced greatly affects the selling value of the candlenuts. For candlenut seeds that are destroyed, the selling value will also be reduced. (Renny *et al*., 2022) The thing that needs to be considered in the post-harvest process of candlenut is how to produce and maintain high-quality candlenut seeds after the breaking process.

The process of breaking candlenuts is growing, starting from breaking candlenut shells in a simple way to the creation of several diesel-powered to electric-powered candlenut breaking machines. According to Sinaga (2016), a simple candlenut shell breaker that utilizes a rubber tire that is tied and forms a space on the wood as a candlenut holder and a stone as a hitting pad is only able to break 9-10 kg of candlenuts per day with a wholeness rate of only 40-60%. Meanwhile, to get a good quality candlenut kernel, it must be accompanied by good and correct post-harvest handling.

The performance of the tool and the quality of hazelnut shell stripping results with mechanical tools are influenced by several factors, namely drying temperature, drying time, freezing temperature, freezing time, soaking temperature, soaking time, hazelnut type, the diameter of the slamming anvil and Engine Rotation Speed (RPM) (Siallagan *et al*., 2012; Angraeni *et al.*, 2019).

According to Murad *et al.*, (2015) stated that drying candlenuts can be done by direct drying using sunlight and artificial (mechanical) drying. Drying candlenuts using direct sunlight takes 3-7 days, while the capacity of manually peeling the skin is 5-6 kg per day, with a maximum quality of whole seeds produced of 40%.

Direct drying using the sun is very dependent on the weather, if the weather is sunny then drying can take place well. Meanwhile, if the weather is cloudy or rainy, drying cannot be done. Mechanical drying (artificial drying) using additional heat provides several advantages including not depending on the weather, the capacity of the dryer can be selected as needed, does not require a large area, and drying conditions can be controlled (Murad *et al.*, 2015). The results of

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

Sinaga's research (2010), showed that the drying temperature had a very significant effect on all parameters observed, namely the percentage of intact core, percentage of broken core, percentage of crushed core, percentage of sticky core, and water content of hazelnut core. This study aims to determine the effect of the length of time drying hazelnut seeds processed with a peeling machine on the yield of hazelnut round grain.

RESEARCH METHODS

Place and Time of Research

This research was conducted in Seulimum Village, Seulimum Sub-district, Aceh Besar in April 2024.

Tools and Materials

The tools that will be used in this research are candlenut breaking machines, baskets, freezers, scales, cameras, notebooks, and pens. While the materials used are candlenuts.

Research methods

This study used a non-factorial Randomized Block Design (RBD) with 4 treatments and 6 replicates so that 24 experimental units were obtained, with the order of treatment as follows:

K_1 = 2 days drying
K_2 = 3 days drying
K_3 = 4 days drying
K_4 = 5 days drying

Procedure Implementation

Candlenut materials were obtained from local candlenut farmers in Seulimum Village, Seulimum District, Aceh Besar Regency. Candlenuts obtained with various sizes need to be sorted to separate from dirt and gravel, as well as soil, after sorting, the drying process is then carried out. Candlenuts that have been sorted and dried in the sun are weighed according to the needs of the research treatment, carried out before the candlenuts are frozen in the freezer. After stripping the candlenut shell, weighing is also carried out to determine the weight of the whole candlenut core and the halved candlenut core. The drying process of candlenuts is done naturally, namely by drying directly under the sun. Drying is carried out according to treatments namely 2 days, 3 days, 4 days, and 5 days, and the duration of drying for 8 hours every day if it does not rain. Candlenut seeds that have been dried (dried in the sun) are immediately frozen by putting the dried candlenuts into the freezer at 0°C for 12 hours. The candlenuts are inserted into the candlenut crusher through a funnel and inserted gradually to avoid the accumulation of raw materials in the intake channel. Candlenuts that are still in the form of logs enter the shell-breaking drum, the candlenut material will be ejected and will be crushed by the pressboard. Furthermore, the crushed candlenut fruit will come out through the outlet funnel. After the

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

breaking process is complete, the separation of candlenuts from the shell fragments is done manually.

Parameters observed

The results of the candlenut shell cracking were then observed and the parameters observed were the percentage of intact nuclei (%) and the percentage of broken nuclei (%).

RESULTS AND DISCUSSION

Percentage of Intact Core

Sun drying of candlenuts with different day intervals did not have a significant effect on the percentage of intact candlenuts. The average percentage of intact nuclei from all treatments both from replicates 1-6 was obtained at 7.45%. The average percentage of the intact core can be seen in Table 1 below.

Table 1. Average Percentage of Intact Nuclei

TREATMENT	REVIEW						Total	Average
	I	II	III	IV	V	VI		
K_1	4,75	4,75	0,00	9,00	8,50	3,30	30,30	5,05
K_2	7,00	10,00	10,00	8,50	8,75	10,25	54,50	9,08
K_3	9,50	3,00	3,25	13,75	6,50	5,00	41,00	6,83
K_4	3,25	12,00	9,75	4,25	8,00	8,00	45,25	7,54
Total	24,50	29,75	23,00	35,50	31,75	26,55	171,05	28,51
Average	6,13	7,44	5,75	8,88	7,94	6,64	42,76	**7,13**

The Table above shows that the highest average percentage of intact nuclei was obtained in treatment K_2 (3 days drying) at 9.08% and the lowest was obtained in treatment K_1 (2 days drying) at 5.05%. The percentage of intact nuclei obtained from the ANOVA table is still in the low category because the results of the data obtained have no real effect. The low average percentage of intact nuclei from all treatments is due to the incomplete drying process so the water content in hazelnut seeds is still high. The small percentage of intact nuclei is also caused by the lack of expansion in the hazelnut skin area as a result of a large amount of water absorption into the skin or the hazelnut meat during the cooling process in the freezer for 12 hours. Although the drying was carried out by the treatment, the intensity of the sun could not dry the candlenut seeds (Angraeni *et al*., 2019).

Supported by the opinion of Argo and Asdin (2018), stating that drying with sunlight the percentage of whole candlenuts produced is only a little (1.5%). The small percentage of whole candlenuts is caused by the lack of expansion in the skin area as a result of the large amount of water absorption into the skin or the candlenut meat during the soaking process for three days at the end of each drying. The heat from candlenuts in sun drying is less than that received by drying using a drying machine.

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

In line with the statement of Asdin (2008), drying with sunlight for 3 consecutive days obtained a very intact core of 1.5% or 0.5 kg. This is because during drying on the first and second days some of the outer skin of candlenuts has cracked, resulting in the third day after drying causes expansion to occur evenly. In addition, the small number of intact kernels can also be caused by the lack of constancy in the process of entering the material into the hopper. In addition to drying temperature and time, the integrity of the broken candlenut seeds is also influenced by the quality of the candlenut, moisture content, hulling skills, and pretreatment such as freezing temperature and freezing time (Argo *et al*., 2018; Siallagan *et al*., 2012). Other factors that also determine the yield of whole kernels are hazelnut type, hazelnut shape, hazelnut size sorting, and machine rotational speed.

Percentage of Core Halves

Sun drying of candlenuts with different number of days intervals did not have a significant effect on the percentage of broken cores. The average percentage of two broken nuclei from all treatments both from replicates 1-6 was obtained at 9.68%. The percentage of broken nuclei can be seen in the Table 2 below.

Table 2. Average Percentage of Halved Cores

TREATMENT	REVIEW						Total	Average
	I	II	III	IV	V	VI		
K_1	3,00	3,50	0,00	9,00	8,50	8,00	32,00	5,33
K_2	9,50	9,50	10,25	9,75	7,25	8,50	54,75	9,13
K_3	7,75	8,50	7,75	3,25	3,00	5,50	35,75	5,96
K_4	8,25	72,75	2,75	7,75	8,50	9,75	109,75	18,29
Total	28,50	94,25	20,75	29,75	27,25	31,75	232,25	38,71
Average	7,13	23,56	5,19	7,44	6,81	7,94	58,06	**9,68**

The Table above shows that the highest percentage of broken nuclei was obtained in treatment K_4 (5 days drying) at 18.29% and the lowest was obtained in treatment K_1 (2 days drying) at 5.33%. The percentage of two broken nuclei obtained from the ANOVA table is in the high category because the results of the data obtained do not have a significant effect. The cause of the broken core is caused by uneven expansion in the hazelnut skin and uneven sun intensity (cloudy weather).

In line with the results of research by Argo and Asdin (2018), drying with sunlight produces a higher percentage of halved cores, which is 12.7%. This is due to the heat received by candlenuts in sun drying is smaller. Supported by the opinion of Asdin (2008), that drying with sunlight obtained a greater percentage of halved cores, namely 10.1% (3.5 kg). This can occur due to the expansion evenly on the candlenut soaked or cooled (frozen), so that when the candlenut is inserted into the breaking machine and glued to the wall of the machine resulting in the core of the candlenut immediately splits into two.

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

CONCLUSION

Based on the results of the study, it can be concluded that the test treatment of the length of time for drying candlenut seeds with sunlight with an interval of different number of days does not have a significant effect on the percentage of whole candlenuts, and the percentage of broken nuclei. The best treatment for the percentage of intact nuclei was obtained in treatment K_2 (3 days drying) at 9.08%, and the best treatment for the percentage of broken nuclei was obtained in treatment K_4 (5 days drying) at 18.29%.

ACKNOWLEDGEMENT

We would like to express our thanks to the academic community of Politeknik Indonesia Venezuela and the PENA Foundation along with the chairman and member authors who have contributed to the publication of this scientific work.

REFERENCES

Angraeni, Y., Setiawati, C., Nurmawan, M.F., and Haryati, N.A. (2019). Effect of drying temperature and time on the yield of mechanically broken whole candlenuts. Journal of Industrial Research and Development. 9(2), 105-110

Argo, B.D., and Asdin, S.H.S. (2018). Effect of Drying Method on the Characteristics of Candlenut (*Aleurites Moluccana. L* Willd) Peels. Journal of Tropical Agricultural Engineering and Biosystems. 4. (2), 103-109

Argo, B.D., H.S, S., Asdin, A., (2018). Effect of drying method on the characteristics of hazelnut (*Aleurites moluccana. L* Willd) peels. J. Agricultural Engineering. Trop. and Biosist. 4, 103-109.

Asdin. (2008). *Drying and splitting study of candlenut (Alueurites moluccana. Lwilld) using rotary type drying machine and candlenut splitting machine*. (Thesis. Brawijaya University Malang)

Iskandar, R., Supardi, S., Harisudin, M., (2016). Candlenut (Aleurites moluccana) efficiency analysis and marketing strategy in Alor regency. Am. Sci. Res. J. Eng. Technol. Sci. 26, 101-121.

Krisnawati, H., Maarit, K., Kanninen, M., 2011. Aleurites moluccana (L.) Willd. : ecology, silviculture and productivity, I. ed. Center for International Forestry Research, Bogor, Indonesia.

Murad, Sukmawaty, Sabani, R., and Putra, G., M., (2015). Drying Candlenut Seeds in a Furnace Model Batch-type Dryer Based on Candlenut Shell Fuel. Scientific Journal of Agricultural Engineering and Biosystems. 3(1), 122-127.

Putri, R.E., Sari, R.P., Hasan, A. (2022). Analysis of the Effectiveness of Pecan Breakers in Solok Regency, West Sumatra. Journal of Rona Agricultural Engineering. 15 (2). 82- 94

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 2, No. 1, Thn. 2025
https://doi.org/10.71275/roce.v2i1.72

Siallagan, A., Y., Daulay, S., B. and Harahap, L., A., (2012). Pecan (*Alleuirites mollucana*) Shell Splitting using Ripple Mill System with Various Soaking Temperatures. Journal of Agricultural Engineering. 1(1), 70-76.

Sinaga, R. (2016). Physical and Mechanical Characteristics of Candlenut (Aleurites moluccana Wild.) JTEP Journal of Agricultural Engineering. 4 (1), 97-106.

Tridge, (2019). Candlenut suppliers, wholesale prices, and global market information - Tridge URL https://www.tridge.com/intelligences/candlenut (accessed 10.23.19).