

# The Time Effect Of Extraction With Natural Dyes Morin Jackfruit Wood Powder By Using Some Variation of Solvent

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## ARTICLE HISTORY

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## ABSTRACT

The aim of this study is to obtain a dye source which is can be degraded easily. The majority of natural dyes extracted from plants is easily degraded dye. Plants that can be used as a coloring agent such as jackfruit wood (*Artocarpusheterophyllus*) taken from the morin containing a yellow dye. This study aims to find the best extraction time of morin from jackfruit sawdust using some solvent (Ethanol, Hexane and Acetone). The research was carried out in chemical laboratories in PT Sanova. From the research that has been done, found the best extraction time for 2hours with a yield of 8.36% morin.

**Keywords:** *environment, jackfruit, morin, waste*

## 1. INTRODUCTION

Research on morin compound found in jackfruit wood have ever been made and research with the title "the making of natural coloring Substances Yield Morin with Extraction Method" was performed by many researcher in the world (Handayani, 2014; Nisa and others, 2015; Redha, 2013). On the research conducted, applied color substances extraction results morin to the fabric, and the results can be said to be successful. Therefore we would like to develop this research to be more perfect and fast can be directly used by the wider community as a comparison with synthetic colours which had previously existed in the market.

In accordance with the research we have taken, namely "the effect of the time the extraction of Natural Dye Substances Morin In Jackfruit Wood Powder with the variation of organic solvents (ethanol, acetone, Hexane)", then we are more focused towards the number of hours that each extracted Morin had specified earlier.

In General compounds extraction can use morin two (2) organic solvents namely Acetone and ethanol, because on the previous research of extraction is performed using reagents Acetone, then we try to make variations of solvents (ethanol, acetone and hexane) as well as we finding out where the most solvent yield

within 1-3 hours (Damodaran and others, 2015; Madrugá and others, 2014; Saha and others, 2012; Sun and others, 2015).

Jackfruit wood contains the tribe Moreceae with the scientific name *Artocarpusheterophyllus* are. This plant comes from the southern part of India which later spread to other tropical areas including Indonesia. In some countries the jackfruit has a few names such as jackfruit (United Kingdom), jackfruit (Malaysia), Kapiak (Papua New Guinea), liangka (Philippines), peignai (Myanmar), miizhnang (Laos), khanun (Thailand), and the mit (Vietnam). Whereas in Indonesia jackfruit also has different names in several areas including langge (Indonesia), anane (Ambon), lumasa/malasa (Lampung), and krou or nanal (Irianjaya).

Jackfruit plants is one of the plants of tropical plantations results which have many benefits. The leaves of the plant can be used as anti diabetic drugs because of jackfruit leaf extract gives hipoglikemi effect that is a condition when the sugar levels in blood below the normal levels (Chandrika). In addition jackfruit tree leaves can also be used to unleash breast milk, ulcers (external drug), and wound (external drug) (Kasiri and Safapour, 2013; Zheng and others, 2014). Unripe jackfruit meat (tewel) used as vegetable food ingredients containing albuminoid and carbohydrates. While the jackfruit seeds can be processed into flour

which is used as raw material for the food industry (ingredient meal mixture)(Naufalin and others, 2014; Rui-zhen and Yang-zong, 2013).

Jackfruit wood is considered superior to teak wood furniture for manufacturing, building construction, masts, poles for horse and cattle enclosure, paddle, gadgets, and music. The Latex of jackfruit skin has also been used as a drug fever, anthelmintic. Jackfruit tree can be used as a traditional medicine (Biworo and others, 2015; Kasiri and Safapour, 2013).

## 2. METHODS

### 2.1. Raw Materials

The scientific classification of the plant this research (jackfruit) is:

Kingdom	: <i>Plantae</i>
Divisio	: <i>Magnoliophyta</i>
Class	: <i>Magnoliopsida</i>
Ordo	: <i>Rosales</i>
Family	: <i>Moraceae</i>
Genus	: <i>Artocarpus</i>
Species	: <i>Artocarpusheterophyllus</i>

Some variation of solvent is used in this research, such as ethanol, acetone, and hexane.

### 2.2. Research Place

The research have been performed at the Laboratory of the University of Mercu Buana. Research and BATAN, Serpong. This study using extraction and distillation equipment.

## 3. RESULT AND DISCUSSION

Research conducted with variable time extraction of 1, 2 and 3 hours. Research results by using 2 grams of jackfruit wood powder, with some solvent that is ethanol, Acetone and hexane in which each volume 150 ml obtained average results yield morin as table 4.1, 4.2 and 4.3 table table (analysis done repetition for 3 times). As seen below:

**Table 1.** The mean average Time Variables Influence – Extraction against Yield Morin (heavy ingredients ± 2 grams, volume 150 ml Ethanol).

Extract Time (Hour)	Weight Example (gr)	Weight of Morin (ethanol) (gr)	Yield (%)
1	2.0081	0.1393	6.94
2	2.0037	0.1675	8.36
3	2.0311	0.1643	8.09

As shown above, the maximum time of jackfruit wood dust extraction occurs in the 2nd hour this is due to the nature of the solvent (ethanol) as to the nature of the compound will be extracted.namely has the nature of polar and has a high dielectric constant of the solvent

can be easily and faster release or pull compound morin of the other compounds.

**Table 2.** The mean average Time Variables Influence – Extraction against Yield Morin (heavy ingredients ± 2 grams. volume 150 ml of acetone).

Extract Time (Hour)	Weight Example (gr)	Weight of Morin (acetone) (gr)	Yield (%)
1	2.0109	0.0692	3.44
2	2.0021	0.1094	5.46
3	2.0331	0.1202	5.91

Acetone is an aprotic polar solvents. Although these solvents are polar but its polarity is not as strong as ethanol or can be the dielectric constant of acetone is not greater than the maximum yield Ethanol thus obtained in the extraction time is 3 hours in the 3rd hour. But because of the nature of the polar acetone.the yields obtained are still quite a lot if we compared with the non-polar solvent.

**Table 3.** The mean average Time Variables Influence – Extraction against Yield Morin (heavy ingredients ± 2 grams. volume 150 ml Hexane solvent).

Extract Time (Hour)	Weight Example (gr)	Weight of Morin (hexane) (gr)	Yield (%)
1	2.0112	0.0390	1.94
2	2.0077	0.0513	2.56
3	2.0080	0.0629	3.13

Hexane is belong in non-polar solvents which certainly has a dielectric constant which is very small, so the ability to extract the compound can be said to be very weak. Can be seen from the results obtained yield although the yield could still be extracted but not extract as much of the previous solvent (ethanol and acetone), which tend to be polar.

The research results obtained the influence of extraction time.and type of solvent is very closely related to the formation of morin. In previous research.particle size and type of solvent which gave the highest result was on a particle size of 60 mesh with Ethanol solvent type. From the results of research was developed by looking at the condition of the extraction time variation that was needed.

Based on the results. It is clear that many organic solvents yield morin in a span in 1-3 hours is ethanol.if compared with the other two solvents to only get about 3-5% for Acetone and 1-3% for Hexane. Acetone get sediment morin most around 6-8%.but if using a solvent of ethanol with a span in 1-3 hours.as seen in the graph of the yield morin obtained the longer will be increasingly reduced and it happened From those results showed that the addition of the extraction time is not necessarily able to give you more precipitate morin. This is due to the different capabilities of a solvent in extracting.depending on the level of the moderately from the solvent and the nature of the compound will be extracted.the more polar the faster it will be in the extract. can be seen on the results of yield to the three solvents (ethanol. acetone. and hexane).

Maximum time can be seen extracting Ethanol solvent use morin occurs in the hours of the 2nd and 3rd hour yield obtained will back down due to the contained of morin in jackfruit wood powder already starts to run out due to the results of the extraction yield morin in the 2nd hour.

Morin produced has the following characteristics:

- ♣ shaped clumps of solids.
- ♣ The texture is a bit rough and hard

#### 4. CONCLUSION

Based on the results obtained, it can be concluded that:

1. From the results of research of jackfruit wood powder 2 grams in 150 ml of the solvent (ethanol, acetone and hexane), turns out to be the most effective Ethanol solvent that can be used in extracting the jackfruit wood powder because by using a solvent Ethanol only took up in 2 hours to get the most yield morin, whereas other solvents takes more than 3 hours.
2. Within 2 hours of extraction jackfruit wood powder as much as 2 grams of solvent variation with the use of as many as 150 ml turn out from research results in the get the most yield morin on Ethanol solvent with a total yield of morin 8,36%, solvent Acetone with yield morin of 5.46% and solvent Hexane with yield morin as much as 2.56%.

#### 5. REFERENCES

- Biworo A., Tanjung E., Iskandar K., Suhartono E. 2015. Antidiabetic and Antioxidant Activity of Jackfruit (*Artocarpus Heterophyllus*) Extract. *Journal of Medical and Bioengineering* Vol. 4, No. 4.
- Damodaran A., Mansour H., Lessard L., Scavone G., Babu A.S. 2015. Application of composite materials to the chenda, an Indian percussion instrument. *Applied Acoustics*, Vol. 88, pp. 1-5.
- Handayani T. 2014. Pembuatan Permen Jelly Dari Ekstrak Daun Jambu Biji (*Psidium Guajava L.*).
- Kasiri M.B., Safapour S. 2013. Natural dyes and antimicrobials for textiles. *Green Materials for Energy, Products and Depollution*: Springer, pp. 229-286.
- Madruga M.S., de Albuquerque F.S.M., Silva I.R.A., do Amaral D.S., Magnani M., Neto V.Q. 2014. Chemical, morphological and functional properties of Brazilian jackfruit (*Artocarpus heterophyllus L.*) seeds starch. *Food chemistry*, Vol. 143, pp. 440-445.
- Naufalin R.N., Yanto T., Sulistyningrum A. 2014. Types and concentration affect of natural preservatives on the quality of palm sugar. *Jurnal Teknologi Pertanian*, Vol. 14, No. 3.
- Nisa F., Kasmui K., Harjito H. 2015. Uji Aktivitas Antioksidan Pada Modifikasi Senyawa Khrisin Dengan Gugus Alkoksi Menggunakan Metode Recife Model 1 (RM1). *Jurnal MIPA*, Vol. 38, No. 2, pp. 174-182.
- Redha A. 2013. Flavonoid: struktur, sifat antioksidatif dan peranannya dalam sistem biologis.
- Rui-zhen L., Yang-zong L. 2013. Determination and Analysis of the Content of Organic acids, Fat and Total Flavonoids in Hainan Jack fruit Peel. *Journal of Qiongzhou University*, Vol. 5, pp. 009.
- Saha P.D., Chakraborty S., Chowdhury S. 2012. Batch and continuous (fixed-bed column) biosorption of crystal violet by *Artocarpus heterophyllus* (jackfruit) leaf powder. *Colloids and Surfaces B: Biointerfaces*, Vol. 92, pp. 262-270.
- Sun Y., Yang J., Wang H., Zu C., Tan L., Wu G. 2015. Standardization of leaf sampling technique in jackfruit nutrient status diagnosis. *Agricultural Sciences*, Vol. 6, No. 02, pp. 232.

Zheng Z.-P., Xu Y., Qin C., Zhang S., Gu X., Lin Y., Xie G., Wang M., Chen J. 2014. Characterization of antiproliferative activity constituents from *Artocarpus heterophyllus*. *Journal of agricultural and food chemistry*, Vol. 62, No.24, pp. 5519-5527.