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ANALYSIS OF POTASSIUM (K) AND IRON (Fe) ON ORIGINAL HONEY OF WETAR ISLAND ILPUTI VILLAGE, SOUTHWEST MALUKU

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ABSTRACT

This study aims to determine increased understanding of the concept of science through the integration of Honey is produced by honey bees using plant flowers. Honey also has color, aroma and taste varies depending on the type plant. Honey can be used for relieve fatigue and tiredness, can also used to smooth the skin as well as hair growth. This analysis shows that the mineral content of potassium (K) in honey is 0.067 $mgL/$ or 0.00000268 % for repetition 1, content the potassium mineral (K) in the honey sample was 0.020 mg/L or 0.0000008 % for replication 2, and the potassium mineral content (K) in the honey sample was 0.222 $mg\ L/$ or 0.00000888 % for replication 3. From the results of analysis of the mineral iron (Fe) content in honey samples amounting to 8,395 mg/L or 0.03354% for replication 1, content analysis The iron mineral (Fe) in the honey sample was 8.417 mg/L or 0.000336% for repetition 2, and analysis of the mineral content of iron (Fe) in the honey sample of 0.406 mg/L or 0.000336% for repetition 3.

Keywords: *potassium, ıron, mineral, honey.*

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INTRODUCTION

Honey is not only a sweetener or food flavoring agent, but is also often used as medicine. Honey can be used to relieve fatigue and tiredness, and can also be used to smooth skin and hair growth (Aprilyani, 2020). Honey is produced by bees using plant flowers. The use of honey has started since ancient times. At that time, honey was the only type of sugar or sweetener that was known, apart from functioning as medicine. If honey can be used for treatment and supplement for those who are dieting, apart from that, honey also contains monosaccharides consisting of glucose and fructose, as well as sucrose in low concentrations. Therefore sucrose is known as a source cause of dental caries, while honey is known to contain low levels of sucrose, we are starting to think about the possibility of using an alternative material that can be used as a substitute for sucrose, namely honey (Asridiana, 2021). Honey has different colors, aromas and tastes, depending on the types of plants that grow around honey bee farms (Cholidina, 2020). For example, mango honey (slightly sour taste), cucumber flower honey (very sweet taste), kapok or randu honey (sweet taste, more sticky and slightly savory), longan honey (sweet taste, more sticky and sharper aroma). Apart from that, rambutan fruit honey, calliandra honey and rubber honey are also known (Cholidina, 2020).

Essential minerals are minerals that are needed by living creatures for the physiological processes of living creatures to enable the work of enzymes or the formation of organs, non-essential minerals are metals whose role in the bodies of living creatures is not yet known and their content in tissues is very small. Honey contains essential minerals such as potassium, iron, zinc, magnesium, chlorine, phosphorus and sodium. Apart from containing these minerals, honey also contains Vitamins A, B1, B2, B3, B5, B6, C, D, E, K, beta corotene, flavonoids, iodine, venolic acid, mild acid, nicotinic acid (Rahmawati, 2021). Because it has quite high economic value and contains unique and complex substances, honey is often adulterated or water and

other substances are added to it. On the market, there is no guarantee of the authenticity and quality of honey, on the other hand, there are suspicions of adulterated honey. The government has issued an Indonesian industry standard (SII 01566-77) regarding the quality and testing methods for honey. In essence, this standard is still a consensus standard, the implementation of which still requires further development, especially the consequences for quality requirements. This will greatly affect the quality of honey (Muryanti, 2021).

Research conducted by Antary (2013), proved that the calcium content in unbranded honey on the market is higher than the sodium content. In the literature it is explained that one of the parameters determining the quality of honey is that the sodium and calcium content in honey should be 4:1, but research results show that the calcium ratio is greater than the sodium ratio found in unbranded honey on the market. This indicates that the non-branded honey samples circulating in the market have added fructose. Potassium is mainly found in cells, as much as 95% of potassium is in the intracellular fluid (Hanifah, 2020). Potassium plays a role in maintaining fluid and electrolyte balance and acid-base balance. In the body, potassium plays a role in cell metabolism and nerve cell function. Potassium concentrations that are too high or too low can cause serious problems, such as abnormal heart rhythms or stopping the heartbeat. Potassium stored in cells helps maintain a constant concentration of potassium in the blood. Potassium balance is maintained by adjusting the amount of potassium intake in food and the amount of potassium that is removed. Real honey from the forest usually has a lot of foam, which is an indicator of the fermentation process in honey. This is caused by the high water content of honey. The high water content in honey can increase the growth of yeast from the Zygosaccharomyces genus so that honey is easily fermented (Ai Aulia, 2021). Therefore it is necessary to have a pasteurization process to reduce yeast. The characteristics of real honey can be seen from the content of glucose, fructose, sucrose, water content, pH, color and aroma. Aroma can also be used as a medium to determine whether a honey product is genuine or fake. Genuine honey has a distinctive aroma and smell like honey from rambutan flowers, kapok or longan. This is different from fake honey which is completely odorless. The development of honey is currently undergoing many processes in packaging so that it is feared to reduce the value of honey quality, honey quality and the properties contained in honey. Variation in water content in honey is caused by several things including air humidity, type of nectar, production process, and storage (Sudibyo, 2019).

Honey has been used as a food and medical product since ancient times. Honey itself is produced by the Apis mellifera bee, from flower nectar or from tree and plant exudates that can be used as a natural sweetener. Honey was also an important food for homo sapiens from its earliest and most ancient cultures and was used for nutrition as well as medical aid (Aksara, 2020). Honey contains important elements such as calcium, phosphorus, iron, sodium, potassium, and also compounds such as water, protein, carbohydrates, vitamins. All of these important elements show that honey has nutritional and healing properties and is a matter of the medical world. Because the nutritional value of honey is 303 kcal/100 g of honey, making it very suitable for human consumption (Aksara, 2020). Besides containing protein, this honey also contains mineral elements as well, namely potassium and iron. The results of observations in Wetar Village, Southwest Maluku Regency, produce a lot of honey, but so far the mineral content of potassium (K) and iron (Fe) cannot be known.

METHOD

This research is a descriptive exploratory study aimed at determining the mineral content of potassium (K) and iron (Fe) in native honey on Wetar Island, Ilputi Village, Southwest Maluku Regency.

Honey sample preparation stage

The honey sample used in this research came from Wetar Island, Ilputi Village, in a quantity of 25 mL. If the sample does not contain lumpy parts, then the sample can simply be shaken or stirred well. If it contains lumpy parts, the sample is heated in a closed container over a water bath at a temperature of 60-65^{0}C for 30 minutes. During heating the sample is shaken or stirred from time to time and after melting completely, it is cooled and used for analysis (Antary, 2013).

Determination of Potassium (K) and Iron (Fe)

25 mL of honey sample was crushed dry by ashing. To the digestion results, 100 mL of HNO3 (nitric acid) was added, then heated until the volume was half of the previous volume and then transferred into a 25 mL volumetric flask. Then 2.5 mL of standard potassium (K) solution (2.5 mg/L) and 2.5 mL of iron (Fe) standard (10 mg/L) were added respectively through a burette and then added distilled water up to the mark. . Then filtered with Whatman filter paper by removing some of the first filtrate to wet the filter paper. The filtered solution is ready to be tested using the AAS method at the wavelength of each mineral (Antary, 2013).

Measurement of sample solutions with an atomic absorption spectrophotometer

Prepare the atomic absorption spectrophotometer properly. Install a potassium (K) cathode lamp for potassium determination, an iron cathode lamp for iron determination, a potassium cathode lamp for

potassium determination, and a magnesium cathode lamp for magnesium determination. Then measure the absorbance of the sample with each of the two content calibration curves (Antary, 2013).

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DISCUSSION RESULT

Potassium (K) Calibration Curve

The potassium calibration curve is obtained by measuring the absorbance of the standard solution containing the potassium mineral at each wavelength. From the results of measuring the calibration curve for potassium mineral content, the regression line equation is obtained, namely: $Y = 0.43537X - 0.42425$ for potassium. Based on the curve obtained, there is a linear relationship between concentration and absorbance, with a regression coefficient (r) for potassium of 0.9995. Next, the samples were analyzed using the ASS method, after the regression value was known, using the equation $Y = ax + b$ the potassium concentration in each sample was seen in table

Table 1 Concentration of Potassium (K) Levels

Treatment	Mineral	Absorbansi	Consentration K (mg/L)	Consentration K (mg/kg)	Persen (%)
Treatment 1	K 1	0.0719	0,067	0,026	0,000 00268
Treatment 2	K 2	0.0515	0,020	0,008	0,000 0008
Treatment 3	K 3	0.0521	0,222	0,088	0,000 00888

The results of this analysis indicate that the mineral content of potassium (K) in the honey sample is 0.067 mg/L or 0.00000268 % for repetition 1, the mineral content of potassium (K) in the sample honey of 0.020 mg/L or 0.0000008 % for repetition 2, and the mineral content of potassium (K) in the honey sample is 0.222 mg/L or 0.00000888 % for 3 repetitions

Iron (Fe) Calibration Curve

The calibration curve for iron is obtained by measuring the absorbance of the standard solution containing the iron mineral at each wavelength. From the measurement results of the calibration curve for the iron mineral content, the regression line equation is obtained, namely: $Y = 0.11642X - 0.085754$ for iron. The iron solution calibration curve can be seen in Figure 4.2. Based on the curve obtained, there is a linear relationship between concentration and absorbance, with a regression coefficient (r) of iron of 0.9989.

Table 2 Concentration of Iron (Fe) Levels

Treatment	Mineral	Absorbansi	Consentration K (mg/L)	Consentration K (mg/kg)	Persen (%)
Treatment 1	Fe 1	0.9861	8,395	333,5	0,0335 4
Treatment 2	Fe 2	0.9887	8,417	3,36	0,0003 36
Treatment 3	Fe 3	0.9874	0,406	3,36	0,0003 36

The results of the analysis of the mineral iron (Fe) content in the honey sample were 8.395 mg/L or 0.03354% for repetition 1, the analysis of the mineral iron (Fe) content in the honey sample was 8.417$/L$ mg or 0.000336% for replication 2, and analysis of the mineral iron (Fe) content in the honey sample was 0.406 mg/L or 0.00034224% for replication 3. Honey from Wetar Island, Southwest Maluku, known as Wetar Honey, is forest honey taken directly from natural forests, namely from beehives that have trees. The honey bee nests are taken by the community by climbing and cutting the beehives, then separating the liquid honey from the wax, and filling it in packaged bottles. The Sion honey business group is one of the community groups that harvests and sells forest honey (M Sahureka, 2019). Native Forest Honey from Wetar Island, Southwest Maluku. Native Forest Honey from Wetar Island Southwest Maluku Fill one bottle 600 ML (weight depends on honey thickness). The weight of one bottle averages 2 1.5 kg including wooden packing. Includes wooden packing. The packaging uses a plastic bottle of mineral water which was deliberately bought new for the honey container. This honey is harvested from residents on Wetar Island, Southwest Maluku Regency. It takes 2 days to reach the nearest town (Kupang) by pioneer ship. To test if the honey is real or not, please put it in the freezer, if it is frozen then the honey is fake or has been mixed with other ingredients.

If you put real honey in the freezer, it usually only thickens. And real honey is also still liked by ants, indeed sometimes there is honey that ants don't visit at all.

The thickness of honey does not describe the authenticity of honey, because the thickness of honey depends on the season when it is harvested and the type of flower that is used as the honey material. Honey production and marketing activities are still carried out in a simple way with manual equipment and marketing with a short distribution channel, namely from producers to final consumers. This is due to the distance and the difficulty of access for the people to the provincial capital and district capitals, who have to use pilot boats for several days to travel. So sometimes the honey that has been taken in large quantities is only for self-consumption or given as souvenirs and only a small amount can reach the market in the district capital or provincial capital. One type of bee that can produce forest honey is Apis dorsata, which is better known as the giant honey bee that lives in forests. Due to limited knowledge, especially regarding bee biology and honey quality requirements, the collection technique carried out by the Hiay village community is still very simple. In addition, in practice, honey farmers often burn and destroy combs, which can disrupt the development of honey bee populations. The honey bee hives in Hiay village are unique because most of these beehives hang from the branches and low branches of trees. There are also people who take it without having to climb a tree because it is not too high.

Honey mineral content of potassium (K) is greater than the honey mineral content of iron (Fe). This can be seen from each absorbance value and regression value. Apart from that, there are also several factors that cause differences between the mineral content of potassium (K) and iron (Fe) in honey samples, including climate, topography of farming patterns, and the length of storage of honey samples to be analyzed, differences in the type and origin of nectar-producing flowers, so the higher the minerals produced in honey and vice versa (Melaputri, 2021). According to Maryani (2021), the mineral content in plants also varies, this depends on several factors, including: genetics, agricultural practices, variations in mineral content in the soil, pH, as well as environmental factors and soil maturity. The limits for potassium (K) and iron (Fe) mineral levels are not listed by the SNI National Standards Agency regarding honey, because these two mineral contents are needed by the body. The content of potassium (K) and iron (Fe) is needed by all ages, from infants to the elderly. Potassium plays an important role in transmitting nerve impulses to muscle nerves and also in the brain's ability to concentrate (Santoso, 2022). Iron is present in all cells of the body which plays an important role in various biochemical reactions. In addition to the formation of red blood cells, iron is also needed to transport oxygen throughout the body's tissues. Foods that contain iron include meat, fish, eggs, nuts.

Based on the results of determining the levels of potassium (K) and iron (Fe) minerals in table 4.1 and table 4.2, honey samples contain more potassium (K) minerals than iron (Fe) minerals. The differences that occur can be influenced by several factors such as where the plants grow, plant fertility, treatment of plants and climate (Rosmarkam and Yuwono, 2011). The data obtained was then calculated by the percentage reduction in levels of each mineral potassium (K) and iron (Fe) in the honey samples (calculations can be seen in Appendix 1 and Appendix 2). The results of this research can be used as a source of knowledge and learning for the whole community in the form of leaflets, which are a form of conveying information to the public in general. Leaflets are small sheets of paper that contain printed messages to be disseminated to the public regarding information or events. Using leaflets can make it easier for the public to understand the contents of the research that has been carried out.

CONCLUSION

Mineral content of potassium (K) in the honey sample was 0.067 mg/L or 0.00000268 % for replicate 1, the mineral content of potassium (K) in the honey sample was 0.020 mg/L or 0.0000008 % for replicate 2, and the mineral content of potassium (K) in the honey sample was 0.222 mg/L or 0.00000888 % for replicate 3. From the results of the analysis of the mineral iron (Fe) content in the honey sample of 8.395 mg/L or 0.03354% for replicate 1, the analysis of the mineral content of iron (Fe) in the honey sample was 8.417 mg/L or 0.000336% for replicate 2, and analysis of the mineral content of iron (Fe) in the honey sample was 0.406 mg/L or 0.000336% for replicate 3.

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