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Analysis of Mineral Content of Traditional Processed Community Salt in Kanatang District, East Sumba Regency, Indonesia

Umbu Paru Lowu Dawa[1], Dewi Setyowaty Gadi[1], Irwan Umbu Borang[1] and Donny Mercys Bessie[2]

[1]Fisheries Technology Study Program, Faculty of Fisheries and Marine Science, Artha Wacana Christian University, Kupang, Indonesia
[2]Aquatic Resources Management Study Program, Faculty of Fisheries and Marine Science, Artha Wacana Christian University, Kupang, Indonesia

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ABSTRACT

Salt farmers in Kanatang District, East Sumba Regency generally produce salt by cooking using firewood in a furnace. The purpose of this study were to determine the technique of making salt, and to know the mineral content of salt produced in Kanatang District, East Sumba Regency. This research has been conducted for 3 months, in the Exacta Laboratory of Artha Wacana Christian University for water content testing and calculation of salt yield. For the testing of NaCl content, minerals (potassium, magnesium, and calcium), heavy metals (lead and cadmium) and iodine were conducted at the Indo Genetech Saraswati Laboratory, Bogor. The research method were qualitative and quantitative descriptive method. The data were statistically analyzed by t-student and the t-value to compare t_{-table} data of $t_{-arithmetic}$ and comparative descriptive. The results of this study showed that water content ranged from 83 - 85%, the yield ranged from 52.11 - 56.83%, NaCl content ranged from 86.24 - 87.12%, iodine ranged from 0.75 - 0.99 mg/Kg, and the minerals which is potassium ranging from 194.01 - 194.09 mg/100 g, magnesium ranging from 501.32 - 675.14 mg/100 g, calcium ranging from 244.27- 535.94 mg/100 g and heavy metals, lead and cadmium were not detected. The conclusion of this study showed that the traditional salt that is produced traditionally in Kanatang District, East Sumba Regency the mineral content (magnesium, potassium, and calcium) was obtained by the high mineral content.

Key words : *Salt traditional, Iodine, Minerals, NaCl, Kanatang District*

Introduction

Production of people's salt becomes the main livelihood during the dry season. Salt production is very helpful for the people's economy (Apriliana, 2013). Community livelihoods are often related to the environment around the community itself, the natural environment provides possibilities for work communities who can or can utilize the natural surroundings. One job that utilizes nature is salt farmers, with using the help of sunshine salt farmers make salt. The making of people's salt generally does not use equipment or high technology, salt farmers need sunlight assistance and the process of making salt is still using traditional methods. Salt farmers in Kanatang District, East Sumba Regency generally produce salt by cooking using wood fuel in a furnace fire. Seawater that is accommodated in a trapped pool is lifted and filtered in an inverted triangular pyramid-shaped container. The pyramid filter has already been filled with soil which also contains salt granules. The filtered water is cooked until it becomes salt. The purpose of this study was to analyze the mineral content of people's salt produced by the community in Kanatang District, East Sumba Regency.

Materials and Methods

Research Procedure

Salt farmers in Kanatang District, East Sumba Regency produce salt traditionally with raw materials. Land that has been scratched and collected was raised to a filter of 400 kg and sea water that has been accommodated in a trap pool of 400 L, the filtering process takes 1 hour, the filtered water was cooked using a container formed from stainless material for ± 8 hours, the salt crystals from cooking are removed and put in a place of draining the salt and drained for ± 2 hours, the drained salt was immediately packaged using a plastic bag with a capacity of 50 kg and the salt was ready to be distributed/marketed. The method used in testing NaCl, minerals (magnesium, potassium and calcium), heavy metals (lead and cadmium) and iodine was a comparative descriptive method which is a method used to compare research data obtained with existing facts (INS 3556- 2016 and INS 4435-2017) and explain the relationship between one factor and another (Sugiyono, 2008) while the method used for testing water content and yield uses statistical analysis of t-student by comparing t-table and t-count data.

Results and Discussion

Water content

The average water content in traditional salt produced in the District of Kanatang, East Sumba Regency was highest in group I (with an average water content in salt was 8.5%. While the average in group II with an average 8.3%. Group I and group II were collection of salt cooking households in the same area. This group is distinguished only by the people in the group. Profile of the average water content in traditional salt produced in the District of Kanatang, East Sumba Regency from the two groups of people's salt production and INS can be seen in Figure 1.

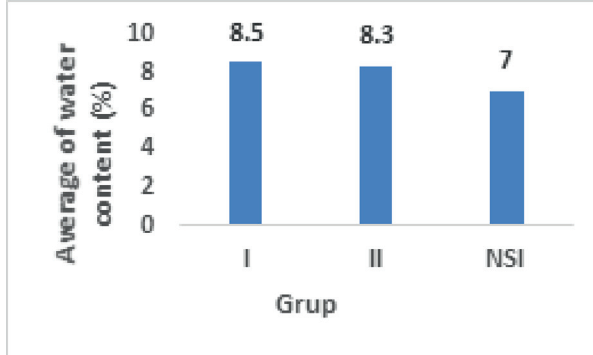

Fig. 1. Profiles of Average Water Content (%) in Traditional Produced Common Salt in Kanatang District, East Sumba Regency of the Two Groups of Salt Production and INS (3556-2016 and 4435-2017).

Figure 1 showed the average of water content in traditional salt produced in the Subdistrict of Kanatang, East Sumba Regency of the two salt production groups the people produce water content high from iodized consumption salt quality requirements (INS 3556-2016) and raw material salt quality requirements for iodized consumption salt (INS 4435-2017) with a maximum water content value of 7%. The results of t-count test show that t-count > t-table means there is a difference in the average of the water content traditionally produced from both groups of people's salt production. This is because traditional salt produced in Kanatang Subdistrict, East Sumba Regency, from the two groups producing common salt uses seawater raw materials with different salinity, group I uses seawater raw materials with 35 ppt salinity and group II uses materials seawater standard with 28 ppt salinity. Arwiyah *et al.* (2015), state that the higher salinity of sea water the higher water content contained in the salt produced. Saksono (2002) stated that the influence of magnesium levels on water content increase magnesium compounds in salts such as $MgCl_2$ which has the ability to absorb very large water so that the ability to adopt water vapor from the air increases so that the salt is at high humidity and will increase the amount water in salt.

Yield

The average of yield was highest in group I with an average of 56.83%. While in group II with an average of 52.11%. Profile of the yield average can be seen in Figure 2.

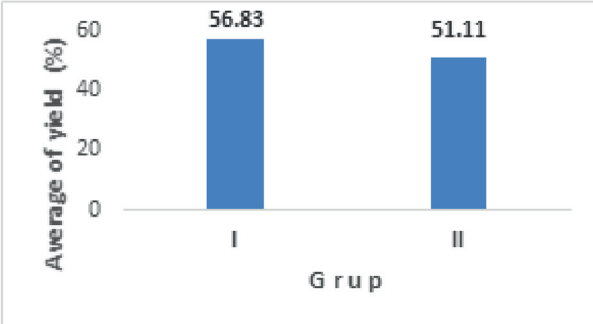

Fig. 2. Profile of the yield Average (%) Traditional Produced Salt in Kanatang District, East Sumba Regency of the Two Small Salt Production.

Figure 2 showed the average of yield in traditional salt produced in the sub-district of Kanatang, East Sumba Regency, producing small scale salt yield an average of 4.72%. The difference between average of yield from the two groups salt production is presumed to be due to the water content of the raw material, land used in the production of community salt. According to Marunis (2012), the difference in the value of yield is greatly influenced by the water content of food. The t-test results show that t-count > t-table means there was a difference in the average of yield in traditional salt produced. This is presumably because traditional salt produced in Kanatang from the two groups salt production has different locations for extracting seawater and soil raw materials 8 hours until it becomes a salt crystal.

NaCl levels

The average of NaCl levels in in group I with average of 86.24%. While the average in group II was 87.12%. Profile of the average NaCl of traditional salt produced in the sub-district of Kanatang, East Sumba Regency can be seen in Figure 3.

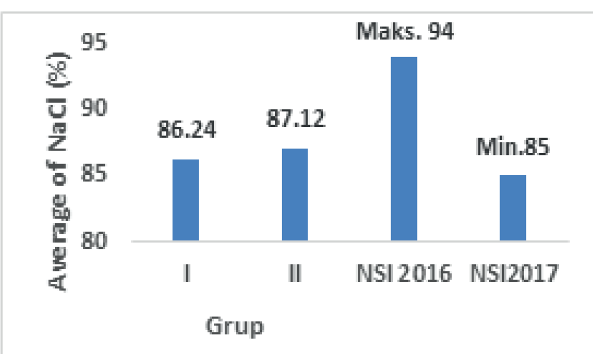

Fig. 3. Profile of the Average of NaCl Levels in Traditional Salt Produced in Traditionally in the District of Kanatang, East Sumba Regency of the Two Groups of Salt Production and INS

Figure 3 showed the average value of NaCl levels in traditional salt produced in the District of Kanatang, of the two groups salt production has not met the requirements for the quality of iodized consumption salt (INS 3556-2016) with a minimum NaCl content of 94%, while the quality requirements for raw material salt for iodized consumption (INS 4435-2017) traditional salt produced traditional are classified as Q3 salt (low quality salt) with a minimum NaCl content of 85%. Arwiyah *et al.* (2015), state that the quality of salt depends on the content of NaCl in the salt itself and the content of NaCl depends on the location of seawater extraction which can affect the quality of the salt produced.

Iodine

The average of iodine content in group I with average of 0.75 mg/kg. While the average in group II was 0.99 mg/kg. A profile of the average of iodine content in traditional salt produced in Kanatang District from the two groups of people's salt production and INS 3556-2016 can be seen in Figure 4.

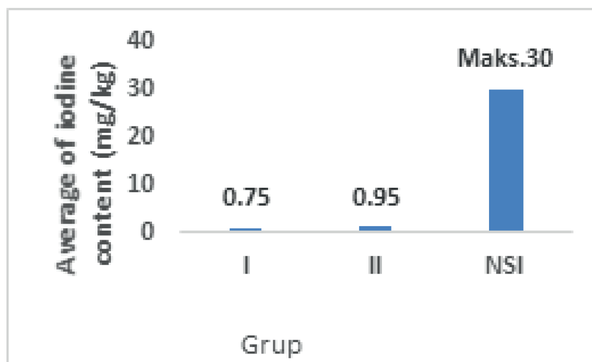

Fig. 4. Profile of the Average of Iodine Levels (mg/kg) in Traditionally Produced Community Salt in Kanatang District, East Sumba Regency of the Two Groups of Salt Production and INS 3556-2016

Figure 4 showed the average of iodine content in traditional salt produced in the district of Kanatang, of the two groups of people's salt production does not meet the quality requirements of iodized consumption salt (INS 3556-2016) with iodine content as KIO3 of at least 30 mg/ kg. The low levels of iodine (KIO3) of the two groups of community salt production is thought to be caused by heat temperature, duration of heating and storage conditions, store salt in plastic bags and open spaces exposed to direct sunlight. Based on the statement of Krisyanella *et al.* (2017), temperature and storage conditions are one of the factors that influence the stability of KIO3 from salt. Storage conditions are far from a heat source, the stability of KIO3 in salt can be maintained.

Mineral content (potassium, magnesium and calcium)

The mineral content of magnesium ranges from 501.32- 675.14 mg/100 g, potassium mineral ranges from 194.01-194.09 mg/100 g and calcium minerals range from 244.27- 535.94 mg/100 g. Profiles of mineral content (magnesium, potassium and calcium) in traditional salt produced in the Kanatang District, East Sumba Regency, from the two groups of people's salt production can be seen in Figure 5.

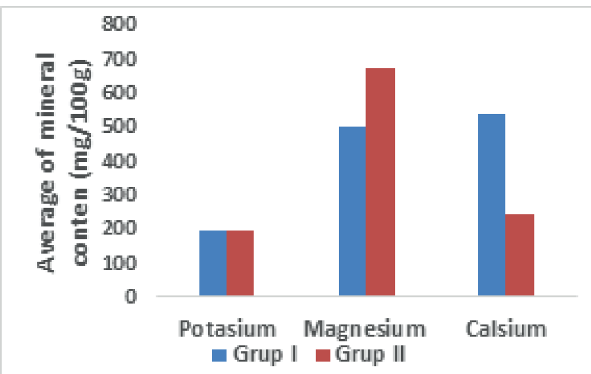

Fig. 5. Mineral Content Profile (potassium, magnesium and calcium) in Traditional Produced Community Salt in Kanatang District, East Sumba Regency of the Two Groups of Salt Production.

The highest potassium mineral content in group I, which was 194.09 mg/100 g and the lowest potassium mineral in group II, which was 194.01 mg/100 g, for the highest magnesium mineral in group II, which was 675.14 mg/100 g and the lowest magnesium minerals in group I, namely 501.32 mg/100 g and for the highest calcium minerals in group I, which was 535.94 mg/100 g and the lowest calcium minerals in group II, which was 244.27 mg/100 g. The high mineral content of calcium in group I salt was thought to be due to the salt water Concentration which was still low or still below the standard of 25-29^{o} Be and is also caused by the binding of chloride (Cl^-) by calcium (Ca^+) thereby releasing sodium (Na^+). According Effendy *et al.* (2010), states that the concentration of salt water must be between 25-29^{o} Be, if the concentration of salt water has not reached 25^{o} Be, calcium will settle much in the salt crystal produced. While the high mineral content of magnesium in group II people's salt was thought to be affected by salt water concentrations that are too high from the standard of 25-29^{o} Be and was also caused by the binding of chloride (Cl^-) by magnesium (Mg^+) thus releasing sodium (Na^+). Effendy et al (2010), stated that the concentration of salt water must be between 25-29^{o} Be, if the concentration of brine is more than 29^{o} Be, magnesium will settle to a lot of the salt crystal produced.

Heavy Metals (Lead and Cadmium)

The content of heavy metals (lead and cadmium) in two groups of people's salt production is not detected by heavy metals (lead and cadmium). This was thought to be caused by the place of processing/ production of community salt in Kanatang District, East Sumba Regency, of the two groups of people's salt production is still clean and free from pollution. In addition, the location of processing/ production of community salt in the District of Kanatang, East Sumba Regency of the two groups of community salt production is far from residential areas and factories. Based on the statement of Amin *et al.* (2011) *in* Ismarti *et al.* (2015), that the levels of heavy metals dissolved in seawater are highly dependent on the state of these waters. More and more human activities both on land and on the beach will affect the presence of heavy metals in sea water. Garno (2001) *in* Ismarti *et al.* (2015), stated that the concentration of heavy metals in aquatic environments increases with the proximity of waters in industrial dense areas.

Conclusion

The mineral content (magnesium, potassium and calcium) of traditional salt produced in Kanatang District, East Sumba Regency was obtained by the high mineral content.

References

Anonymous, 2016. Iodized Salt Consumption. INS 3556: 2016. National Standardization Agency (NSA), Jakarta. 17 things.

Anonymous, 2017. Salt for Raw Materials for Iodized Consumption Salt. SNI 4435: 2017. National

Standardization Agency (NSA), Jakarta. 17 things.

Apriliana, 2013. *The Impact of the Community Salt Business Empowerment Program on Household Welfare of Salt Farmers in Karawang Regency.* Thesis Department of Resource and Environmental Economics Faculty of Economics and Management. Bogor Agricultural University, Bogor: 5-6.

Arwiyah, Zainuri, M. and Efendy, M. 2015. Study of NaCl Content in Raw Water and Salt that is Produced as Well as Productivity of Salt Land Using Different Salt Table Media. Trunojoyo Madura University Marine Sciences Study Program. *Marine Journal.* 8 (1): 3-4.

Effendy, M., Zainuri, M. and Hafiluddin, 2010. Intensification of People's Salt Land in Sumenep Regency. Madura: 27.

Ismarti, Amelia and F. Ramses. 2015. Pb and Cd Heavy Metal Content in Sediments and Shells in Bata Waters m. Batam: 6-7.

Krisyanella, Meinisasti, R. and Khasanah, H.R. 2017. Analysis of Content and Effect of Storage Conditions on Iodine Levels Often Used by Communities in Bengkulu City. Bengkulu. *Journal of Pharmaceutical Science and Technology.* 19 (1): 65-66.

Martunis, 2012. Effect of Temperature and Drying Time on Quantity and Quality of Potato Starch of Granola Varieties. Aceh. *Indonesian Agricultural Technology and Technology Journal.* 4 (3): 27-28.

Saksono, N. 2002. The Effect of Salt Washing Process on the Composition and Stability of Iodized Salt Consumption. *Makara Teknologi.* 6 (1): 7-16

Sugiyono, 2008. Qualitative Quantitative Research Methods and R&D. Bandung: Alfabeta. 146 things.