Proximate Analysis of Fisheries Dried Products from Mamuju Traditional Market Post-Earthquake Disaster

Eka Saputra¹, Wahyu Isroni², Arief Rubiana Basarah³, Sapto Andriyono¹,³

¹Department of Marine, Faculty of Fisheries and Marine, Universitas Airlangga, Surabaya 60115 Indonesia
²Department of Aquaculture, Faculty of Fisheries and Marine, Universitas Airlangga, Surabaya 60115 Indonesia
³Study program of Fisheries Product Technology, Faculty of Fisheries and Marine, Universitas Airlangga, Surabaya 60115 Indonesia

³Corresponding author: saptoandriyono@fpk.unair.ac.id

Abstract. The earthquake in West Sulawesi that occurred in the last few months has disrupted several fishing facilities and activities. Public buildings and facilities were damaged, which caused deep trauma to the communities in Mamuju and Majene. This research was conducted during the recovery of post-earthquake conditions in Mamuju, West Sulawesi. Proximate analysis was carried out on three traditional processed products of the Mamuju community, which can be found in the traditional market of the Mamuju Seaport in the form of 2 dried anchovies and one dried shrimp product. The test results on the three products showed that the protein content was 43.22-44.03% and fat 2.92-3.14%, which indicated the quality of the processed product was quite good. Furthermore, the dried shrimp product contains protein, 37.0% and 0.39%, respectively. This fishery product is quite potential for preparing nutritious food ingredients, but product packaging is still minimal and allows for a faster quality deterioration process. In addition, government support through related agencies in the form of assistance in improving the quality of processed products in Mamuju must be increased. The fishery resources in West Sulawesi is generally very potential to be developed as a source of income for regional development in the future.

1. Introduction
The presence of natural disasters in Indonesia has become a list of disasters that occur every year, such as earthquakes, volcanic eruptions, and floods. One of the natural disasters that have occurred recently in West Sulawesi is a tectonic earthquake that rocked the Mamuju Majene area and its surroundings. Two fairly large earthquakes 5.9 and 6.2 SR rocked the Mamuju and Majene areas, West Sulawesi in 2 consecutive days. The cause of this earthquake is strongly suspected to be the activity of the Mamuju thrust and as a result, around 300 houses spread across 16 sub-districts were seriously damaged. Another impact, there is a fairly strong trauma to the people of Mamuju so that economic activity in this area was stopped for a few weeks. The sector that is quite affected is the fishery sector which is one of the leading sectors in the development of the West Sulawesi region.

Mamuju Regency is one of the regions in Indonesia which has an ocean area of 1,635 km2 with a beach length of 254 km. With the proportion of the ocean area, the potential for fisheries also has the potential to
be developed. The fisheries sector’s contribution can be seen from the indicator of Gross Regional Domestic Product (GDP) at Current Prices in 2020 at current prices reaching 4.33 trillion rupiahs or 37.26 percent of total GRDP according to BPS Mamuju 2021. It is hoped that the large fishery potential in the fisheries sector in this province can be managed properly.

One of the fisheries sector developments in this region is to support efforts to develop processed products made from fish products. In addition to being an effort to fulfill vegetable protein that is good for health, fishery products are products that can lift the regional economy because fishery products can become superior products for non-oil exports. Some of the fishery products found in traditional markets after the earthquake in Mamuju Regency include dried fish products such as wet anchovies, dried anchovies, and rebon shrimp. This product has the advantage of being easy to process and also being marketed at a very affordable price. Currently, marketing and production need serious attention so that the production of these processed products can be developed better. In this study, we only want to convey the nutritional value of 3 traditional fishery products that are sold commercially after the earthquake disaster. This still limited production gives a signal that the development potential is still wide open, and the revival of the processed fishery sector can continue to be carried out to explore the potential of other fishery products in Mamuju Regency in meeting domestic and export-oriented needs.

2. Material and Method
This research was carried out in February 2021 in Mamuju Regency which was carried out by collecting samples of traditional processed products from the local fish market in Mamuju Regency. Three traditional processed products have been collected including wet anchovies, dried anchovies, and rebon prawns. A number of proximate parameters were carried out to test the nutritional content of 3 traditional processed products, including water content, ash content, carbohydrates, protein, fat, and crude fiber. Determination of the water content in the sample was carried out according to the [1] method by using a direct measuring device (Moisture Analyzer). The moisture content of the sample is determined by increasing or decreasing the percentage indicated by the temperature compensator with the scale read at the time of sample measurement. In measuring the ash content in the sample, it is determined by weighing the remaining minerals as a result of burning organic matter at a temperature of around 550°C [1].

Another parameter is carbohydrate analysis using the by-difference method in proximate analysis calculated based on = 100% - (water content + ash content + fat content + protein content) [1]. Meanwhile, the determination of protein content was carried out using the Kjeldahl method according to AOAC 2007. Determination of protein content of the Kjeldahl method is divided into three stages, namely the stages of destruction, distillation, and titration. Determination of fat content is carried out using the Soxhlet method [1]. The fat is extracted with diethyl ether or other fat solvents. After the solvent is evaporated, the fat can be weighed and the percentage calculated. The last parameter is the determination of the crude fiber content of the sample which is carried out by counting the residue from the sample after being treated with boiling acid and alkali and consisting of cellulose with a small amount of lignin and pentosane [2]. In this study, anchovy products will be tested for proximate levels consisting of protein, crude fat, water, ash, crude fiber content, Nitrogen Free Extract (NFE), as well as metabolizable energy (ME).
3. Results and Discussion

3.1. Proximate Analysis

The results of the proximate test products are shown in Table 1.

Table 1. Result of Proximate Analysis of Dried Fish Products in Mamuju.

| No. | Sample Code | Water Content (%) | Ash (%) | Protein (%) | Fat (%) | Crude Fiber (%) | NFE | ME       |
|-----|-------------|-------------------|--------|-------------|---------|-----------------|-----|----------|
| 1   | TR          | 16.39             | 11.06  | 43.22       | 3.14    | 0.97            | 25.11 | 2596.60  |
| 2   | TB          | 17.76             | 13.08  | 44.03       | 2.92    | 1.13            | 21.06 | 2455.86  |
| 3   | UR          | 19.20             | 11.87  | 37.00       | 0.39    | 0.26            | 31.28 | 2412.57  |

3.1.1. Water Content. The water content indicates the amount of water contained in the product. As listed in Table 1, the water content of TR, TB, and UR were 16.39%, 17.76%, and 19.2% respectively. The water content of the three products can be said to be in accordance with SNI 2721-1:2009 regarding dried salted fish, which is a maximum of 40%. In a similar study, the water content of various types of dried salted fish in Indonesia ranged from 8.28% to 37.28% [3].

3.1.2. Ash Content. Ash content is known as mineral elements or organic substances. Ash is one of the components in food, this component consists of minerals such as calcium, phosphorus, sodium, and copper [4]. As listed in Table 1, the ash content of TR, TB, and UR were in a range of 11.06%, 13.08%, and 11.87% respectively. The ash content of the three products are in accordance with the majority of anchovy products in Indonesia. Ash content in research by [5] [6] ranged from 0.15 – 19.87%.

3.1.3. Protein Content. Protein content is a chain of amino acids needed by the body. Protein has an important role in growth [7]. As listed in Table 1, the ash content of TR, TB, and UR were 43.22%, 44.03%, and 37%. The protein content of the three products can be classified as high protein products. Similar
products in previous studies, the protein content contained in dried salted fish products is 24.53% to 28.58% [5].

3.1.4. Crude Fat Content. Fat content is a more effective source of energy than carbohydrates. One gram of fat or oil can provide 9 kcal of energy. Fat also acts as a source of calcium and energy [7]. As listed in Table 1, the ash content of TR, TB, and UR were 3.14%, 2.92%, and 0.89%. This level is not much different from the research of [5] and [8] which ranged from 1.58 – 8.11%. Fats are a type of lipid consisting of trimesters of glycerol and fatty acids or triglycerides.

3.1.5. Crude Fiber Content. Crude fiber content measured in TR, TB, and UR obtained from the Mamuju Traditional Market were respectively 0.97%, 1.13%, and 0.26%. The crude fiber content in the three products can be classified as fish with below standard fiber content. In the research of [4], The crude fiber content in carbohydrates obtained from Toniku Village ranged from 1.22% to 1.48%. Crude Fiber is the residue of acid-base boiled sample which represents the less readily digestible carbohydrates, mostly cellulose and some lignin.

3.1.6. Nitrogen Free Extract. The Nitrogen-Free Extracts of from TR, TB, and UR obtained from the Mamuju Traditional Market were 25.22%, 21.06%, 31.28%, respectively. Non-Nitrogen Extract Materials contain starch, hemicellulose, lignin, pectin, and other substances [9]. Nitrogen-Free Extract represents the non-structural carbohydrates such as starches and sugars and is found by difference.

3.1.7. Metabolizable Energy (ME). ME on samples of TR, TB, and UR obtained from the Mamuju Traditional Market were 2596.60, 2455.86, 2412.57 gr/Cal, respectively. Metabolizable Energy (ME) is the net energy that remains after loss of fecal and urine energy and is the energy available for growth or reproduction and to support metabolic processes such as work (mobility) and respiration (thermoregulation, maintenance metabolism, HIF) [10].

4. Conclusions

It could be concluded that the dried fish products from Mamuju has high potential to be value added product. This study suggested that further developments needs to be done in order to obtain products that have a high selling value also contains high nutrition.

5. References

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