The fish oil obtained can be further processed into biodiesel or can be used for soap making materials. According to Widianto and Utomo (2010), several studies related to the manufacture of biodiesel from fish oil have been carried out, including the manufacture of biodiesel from salmon oil which produces an amendment of up to 99%, and the manufacture of biodiesel from lemuru fish oil through an esterification reaction and continued transesterification. The biodiesel produced has quality according to the required SNI 04-7128-2006 biodiesel standard. The data on the quality of the lemuru oil biodiesel is presented in Table 1.

According to Wahyudi *et al.* (2016) the technique of making biodiesel from fish oil is as follows: Fish oil is put into the dryer and then the heater and temperature control are passed and followed by turning on the circulation pump and vacuum pump. Fish oil that has been reduced in moisture content is entered into the degumming reactor. The heater and stirrer are turned on. After the temperature reaches 90° C the time begins to be calculated and the process is stopped after 20 minutes. The result of the gumming process is continued with the esterification process. The esterification process lasts for 60 minutes with a temperature of 70° C, with a sulfuric acid catalyst. The results of the esterification process are continued with the trans-esterification process using a KaOH catalyst at a temperature of 60° C for 60 minutes. The biodiesel obtained is then purified in a vacuum dryer.

Table 1. Quality of Lemuru Fish Oil Biodesel Compared to SNI Standard 04-7128-2006

Test Parameter	Result	Standard	Unit
Density at 40° C	0,8735	0,850 – 0,900	g/mL
Water and sediment	< 0,05	Maks. 0,05	% v
Saponification	182,16	-	Mg KOH/g
Total acid	0,188	Maks. 0,8	Mg KOH/g
Glycerol-free	0,0051	Maks. 0,02	% w
Total glycerol	0,138	Maks. 0,24	% w
Ester	98,51	Min. 95	% w
Flash point	166	Min. 100	°C

Source : Utomo *et al.* (2009) in Widianto & Utomo (2010).

Biodiesel can be applied as a substitute for environmentally friendly fuels. This fuel can be used directly in diesel engines with less pollution than other fuels.

According to Ibrahim et al (2005), fish oil can be used for soap making. If fat is mixed with alkaline compounds, a saponification reaction will occur and produce soap bubbles (Maghami *et al*. 2015)

How to make soap products from fish oil is carried out with the following stages (Aprianti *et al*. 2019): Fish oil is mixed with a solution of Potassium hydroxide (KOH) with a mixture ratio of 1: 3. The mixture is

then heated for 15 minutes at a temperature of 70° C and stirred evenly continuously. The soap that is formed is then separated and shaped according to the cooled one.

Utilization of Fish Heads into Peptons

Pepton is a material used as a source of nitrogen in microbial growth media (Saputra and Nurhayati 2013). Pepton is extracted by hydrolysis of proteins from foodstuffs. The need for pepton in Indonesia averages 5 million kg per year, with a value of USD 20 million. Pepton is used in laboratories and biotechnology industries, such as food, pharmaceuticals, and medicines. The need for peptones is met through imports at very expensive prices and tends to increase every year (Atma *et al.* 2018).

The protein contained in fish heads varies in quantity depending on the type of fish. The protein contained in the fish head can be hydrolyzed into peptones.

According to Shirahigue *et al.* (2018), the manufacture of peptones from the head of fish is carried out as follows: Kepala fish is mashed and then put into beaker glass. After that, 10% of aqueous is added followed by the addition of 5% propyanic acid until a pH value of 4 is obtained. Next stirred until homogeneous. The next treatment is incubation at a temperature of 40° C using waterbath for 120 hours. After the incubation period is over, it is then censored at a speed of 5000 rpm for 20 minutes. The centrifuge results obtained 3 sample phases, namely solid phase, aquoeous phase and oil phase. The sample taken is aqueous phase, then dried with a spray dry to obtain peptone powder.

The results of research by Pratomo *et al.* (2020) showed that peptones obtained from the head of kurisi fish (Nemipterus sp.) have a total protein value of 8.12%, a total N value of 1.3% and dissolved protein of 3.68 g / L. To produce 1 kg of peptones, 70 kg of kurisi fish head waste is needed hydrolyzed using propionic acid.

Extracting Gelatin from Fish Heads for Masks (Cosmetics)

Gelatin is a polypeptide obtained naturally from the process of heat denaturation and collagen hydrolysis of skin, bone and fish tissue (Bhernama *et al.* 2020). Collagen is a protein found in the skin, bones and scales of fish. According to Jaya *et al.* (2022), gelatin is a water-soluble polymer, able to form colloids and thicken the solution so that it can be used as a gelling and stabilizer.

The head of the fish consists mainly of muscle tissue (meat), bones, gills, skin and eyes. The bones or tenngkorak of the fish's head can be extracted for gelatin. The use of fish heads as raw materials for making gelatin can effectively increase the selling value of waste and can reduce the impact of environmental pollution due to the disposal of fish processing waste.

Extraction of gelatin from fish heads can be done as follows (Mardiyah 2017): Fish heads are degreased using hot water at a temperature of 80° C for 20 minutes. The degreased fish head is separated by the meat part, so that all components of the fish head except the meat can be extradited. It was then soaked into a 3% HCl for

48 hours at a ratio of 1:3 (w/v). Then filtering is carried out using a filter cloth, and the residue (ossein) obtained is washed to a neutral pH. Furthermore, ossein is weighed and added 1:3 (w/v) aqueducts for the gelatin extraction process. Gelatin extraction was performed on a waterbath with a temperature of 75° C for 5 hours. Then filtering is carried out, the obtained filtrate is dried in a cabinet dryer at a temperature of 40° C for 48 hours. Furthermore, the obtained gelatin is starched and packaged until it is ready for use.

Various studies on the extraction of gelatin from fish heads have been widely carried out. Mardiyah (2017) has distracted the gelatin of the head of the kurisi fish through an acidic process. The results of his research obtained gelatin amendments from kurisi fish heads by 4.92%, water content of 8.23%, ash content of 0.85%, protein content of 88.54%, fat content of 0.13%, gel strength of 311.01 g.bloom, viscosity of 5 cP, pH of 5.43, gel temperature of 10.12° C and melting temperature of 20.37 °C. Arnesen and Gildberg (2006) reported that cod liver heads have the potential to be used as raw materials for making gelatin because they have a fairly high amount of amendments of 12%. Khairi *et al.* (2011) informed that the gelatin yield produced from catfish and mackerel heads was 8.4% and 3.7%, respectively.

The application of gelatin in the non-food industry is very wide, one of which is being a cosmetic ingredient such as masks. Gelatin has the physical properties of being transparent, tasteless and solid in shape so it is very suitable for use as a basic material in making masks (Suryati *et al.* 2017).

Masks are beauty products that function to keep facial skin healthy and moisturized. Face masks circulating in the market are available in various types, namely powder masks, cream masks, gel masks (peel off), paper masks, homemade masks (Mardhiyani and Islami 2022). Gel mask (peel off) is a type of mask that is currently widely used because it is in accordance with the times, which is not "complicated" to use (Jaya *et al.* 2022).

Peel off face mask is a type of mask that consists of an elastic material so that it is easy to use and the process of removing it. This peel off mask is applied to the face by applying it so that it forms a thin layer, namely a transparent film layer. The mask can be peeled off after 15-30 minutes of use. The use of natural ingredients in the manufacture of peel off masks can have a positive effect on facial skin compared to the use of synthetic materials that allow causing side effects on facial skin (Sulastri & Chaerunisaa 2018).

The formulation of the peel off face mask is as follows: Fish gelatin 2 grams, corn starch 1.5 grams, polyvinyl alcohol (PVA) 2 grams, propillin glycol 2 grams, niapagin 0.04 grams, ethanol 96% 2.5 grams and aquadest 20 grams. The ingredients are mixed until a homogeneous mixture is obtained.

CONCLUSION

The use of fish heads into non-food products from various studies that have been carried out in Indonesia is the processing of fish heads into flour for feed ingredients, the use of fish heads for organic water, the extraction of oil from fish heads for biodiesel and soap, the use of fish heads into peptones, e gelatin extraction from fish heads for masks (cosmetics). The utilization of fish heads into non-food products is aimed at increasing the added value of fish heads and reducing the negative impact of fish processing waste.

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