

## Usaha pengayaan kandungan asam lemak esensial dari minyak ikan lemuru (*Sardinella* sp) secara Enzimatis = Enzymatic enrichment of essential fatty acids of lemuru fish (*Sardinella* sp.) oil.

Wawan Kosasih, author

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### Abstrak

Ikan Lemuru (*Sardinella* sp) adalah salah satu kelompok ikan yang memiliki kandungan protein tinggi dan kandungan minyak ikan yang banyak, tersebar luas di perairan Jawa Timur, terutama di Banyuwangi. Penelitian ini bertujuan untuk pengayaan omega-3 minyak ikan Lemuru melalui reaksi enzimatik, sehingga akan meningkatkan nilai ekonomi dari minyak ikan lemuru yang selama ini di Muncar (sentra produksi minyak ikan) dimanfaatkan sebagai campuran pakan ternak dan ikan. Minyak ikan Lemuru dilakukan pemurnian dengan menggunakan bentonit dan karbon aktif. Minyak ikan sebelum pemurnian dan sesudah pemurnian ditentukan kualitasnya dengan cara analisa angka asam lemak bebas, angka asam, angka peroksida dan angka iodnya menggunakan metode titrimetri, sedangkan pemucatan warna (bleaching) ditentukan menggunakan nilai absorbansinya menggunakan spektrofotometer. Pengayaan omega 3 minyak ikan cara hidrolisis dengan bantuan enzim lipase komersial dilakukan sebanyak 1 gram minyak ikan menggunakan tabung reaksi dan 160 gram menggunakan reaktor 1 L. Reaksi enzimatik dilakukan dengan variasi suhu (45-55), waktu (6-24 jam), konsentrasi enzim (500, 1000, 1500 dan 2000 unit) dan agitasi (50-150 rpm). Kandungan asam lemak omega 3 dari minyak ikan yang telah dihidrolisis dengan enzim lipase ditentukan menggunakan Gas Chromatography (GC). Hasil pemurnian menggunakan karbon 3% dapat menurunkan angka peroksida sampai nol dan menurunkan nilai absorbansi yang sebelumnya 0,883 menjadi 0,559 pada 440 nm. Hasil GC menunjukkan bahwa kondisi optimum untuk reaksi enzimatik adalah waktu reaksi 24 jam, konsentrasi enzim 1000 unit dan temperatur optimum 50oC. Reaksi enzimatik menggunakan lipase komersial dapat meningkatkan kadar omega-3 minyak ikan Lemuru yang sebelum reaksi enzimatik ALA 0,110, EPA 0.089 dan DHA 0.01 % setelah reaksi enzimatik berturut turut menjadi menjadi 1,059 (12 kali), 1,61 (18 kali lebih) dan 0.352 % (35 kali lebih). Reaksi enzimatik minyak ikan Lemuru dengan cara rancangan RSM-Box Behnken mendekati sebenarnya sampai lebih dari 95%, dengan kondisi optimum rancangan temperature, waktu dan agitasi berturut-turut 45oC, 24 jam dan 150 rpm.

.....Lemuru fish (*Sardinella* sp.) is a group of fish that has a high protein and oil content. It is widespread in East Java waters, especially in Banyuwangi. The present study was aimed to enrich the omega-3 lemuru fish oil through enzymatic reactions so that it would increase the economic value of lemuru fish oil, which has been used as the mixture of animal and fish feed in Muncar (fish oil production center). Lemuru fish oil was refined using bentonite and activated carbon. The quality of fish oil before and after

purification was determined by analyzing the free fatty acid number, acid value, peroxide value and iodine value using the titrimetric method, while bleaching analysis was determined by absorbance value using a spectrophotometer. The enrichment of omega-3 from fish oil by enzymatic hydrolysis using commercial lipase enzymes was carried out in the amount of 1 gram of fish oil using a test tube and 160 grams using a 1 L reactor. Enzymatic reactions were carried out with variations in temperature (45-55°C), time (6-24 hours), concentration enzymes (500, 1000, 1500, and 2000 units), and agitation (50-150 rpm). The omega-3 fatty acid content of fish oil that has been hydrolyzed with lipase was determined using gas chromatography (GC). The result of purification using 3% carbon could reduce the peroxide value to zero and the absorbance value from 0.883 to 0.559 at 440 nm. The GC result showed that the optimum conditions for the enzymatic reaction were 24 hours, 1000 units of enzyme concentration, and 50°C. The enzymatic reaction using commercial lipases could increase the omega-3 levels of lemuru fish oil. It was found that before enzymatic hydrolysis, the concentration of ALA, EPA, and DHA were 0.110%, 0.089%, and 0.01%, respectively. After the enzymatic reaction, the level of ALA, EPA, and DHA became 1.059% (12 fold), 1.61% (18 fold), and 0.352% (35 fold), respectively. The enzymatic hydrolysis of lemuru fish oil by using Behnken RSM-Box design approach was true to more than 95%, with the optimum design conditions of temperature, time, and agitation were 45°C, 24 hours and 150 rpm, respectively.