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Nanocalsium Characterization of Cakalang Fish Bone Flour (Katsuwonus Pelamis L)

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Abstract :- Bone of Cakalang fish (Katsuwonus pelamis L) from the results of Cakalang fish preparation waste has the potential to be used as a nanocatalyst made from raw Cakalang fish bone meal. The purpose of this research is to make nanocalcium from Cakalang fish bone meal and characterize chemical, physical, size and morphology. Making nanocalcium Cakalang fish bone meal using precipitation method. Nanocalcium yield by immersion of Cakalang fish bone meal for 24 hours is 40%. The results of chemical analysis of nanocalcium water content were 3.99%, 85.72% ash content and pH value 8.34. The results of AAS nanocatalytic analysis of Cakalang fish bone meal contain mineral components namely calcium (Ca) 2,935%, iron (Fe) 0,016%, potassium (K) 0,002%, magnesium (Mg) 0,528%, manganese (Mn) 0,014%, zinc (Zn) 0.0089%, phosphorus (P) 6.841%. Nanocalcium has a white degree of 76.36%. The size of the nanoparticles from the Cakalang fish bone meal ranged from 53.78 to 71.68 nm.

Keywords *:- Ilabulo Crackers, Skipjack Fish (Katsuwonus Pelamis L), Nanocalsium, Bone Meal, Characterization.*

I. INTRODUCTION

Fish bone waste contains minerals in the form of inorganic salts namely calcium phosphate, creatine phosphate and hydroxyapatite [Ca10 (OH) 2 (PO4) 6] which are crystalline forms attached to fibrillar collagen (Kim and Mendis, 2006; Phiraphinyo et al. 2006; Malde et al.2010; Huang et al.2011). Fish bones can be used to meet calcium intake for the body, especially in supporting motor function. Calcium deficiency in body growth can cause disrupted bone growth, osteoporosis and osteomalasia (Nieves 2005).

Generally, the calcium found in fish bone flour is still in the form of macrocalcium which is still not optimally absorbed by the body. Calcium deficiency has an impact on various complaints on the bones, teeth, blood, nerves and body metabolism (Tongchan et al. 2009). Nano technology is made to reduce particle size so that it is more easily absorbed by the body. The size of the nanoparticles ranges from 1-100 nanometers (Greiner 2009); the size of the nanoparticles ranges from 200-400 nm (Muller and Keck (2004); nanoparticles measuring 10-1000 nm (Mohanraj and Chen 2006).

II. MATERIAL AND METHODOLOGY

The raw material used is waste of Cakalang fish bone (Katsuwonus pelamis L). The tools used are Atomic Absorption Spectrophotometer (AAS) brand Perkin Elmer Aanalyst 100 types of flame emission, LW Scientific brand type UV-200-RS spectrophotometer, Scanning Electron Microscopy (SEM) brand JSM-35C, whiteness meter Kett Electric brand Laboratory type C-100.

Chemical composition of Cakalang fish bone meal with proximate analysis (AOAC 1995), precipitation method of precipitation method with immersion time for 24 hours (Suptijah 2009 with modification), and nanocalcium yield calculated and analyzed by AAS and spectrophotometer (APHA 2005). After that nanocalcium was analyzed using SEM, white degree and pH level. This study consisted of three stages, namely: 1) Bone Preparation of Cakalang fish, 2) Nanocalcium extraction of Cakalang fish bones, 3) Physical and chemical characterization of nanocalcium Cakalang fish bone meal.

III. RESULTS AND DISCUSSION

➢ *Yield*

The yield of Cakalang fish bones which were soaked with HCl for 24 hours was 40%. The 24-hour Litopenaeus vannamei shrimp shell yield was 11.76% (Suptijah et al. 2012).

➢ *Nanocalsium Chemical*

Analysis Nanocalsium chemical composition was compared with Cakalang fish bone meal and included water content, ash content and pH in the bones of Cakalang fish (Table 1).

Parameter	Nilai (% bb)	
	Nanocalsium	Bone Skewers of Skipjack Fish
Water content	3,99	8,78
Ash content	85,72	58,84
Ph Level	8,34	5,21

Table 1:- Chemical Composition of Skipjack Fish Bone (Katsuwonus Pelamis L)

Nanocalsium water content was lower than still in the form of Cakalang fish bone meal which was 3.99%. The shrimp shell water content of Penaeus notabilis is 13.3% (Emmanuel et al. (2008). Nanocalsium ash content was higher (85.72%) because the mineral content was higher than that of Cakalang fish bone meal. The pH level showed that the nanocalcium was higher (8.34) from the Cakalang fish bone meal (5.21). Calcium oxide (CaO) as a constituent

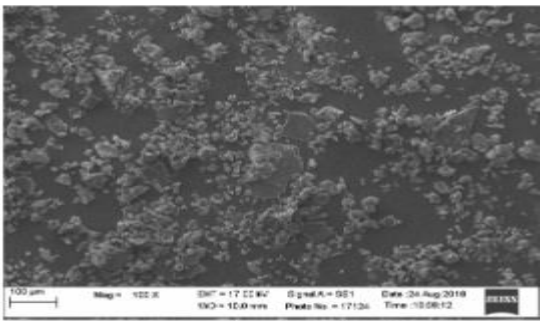
of nanocalcium is a white powder with a pH of 12.6 (Estrela and Holland 2003). Mineral Composition of Nanocellium Bone of Skipjack Fish (Katsuwonus pelamis L) Results of the analysis of Atomic Absorption Spectrophotometer (AAS) and spectrophotometer obtained by nanocalcium have macromineral content of Ca, Fe, K, Mg, Mn, Zn and P.

Mineral Components	Mineral Content (%)	
	Nanokalsium	Bone Skewers of Skipjack Fish
Ca	2,935	1,643
Fe	0,016	0,014
K	0,002	0,00025
Mg	0,528	0,157
Mn	0,014	0,022
Zn	0,0089	0,0082
P	6,841	9,0300

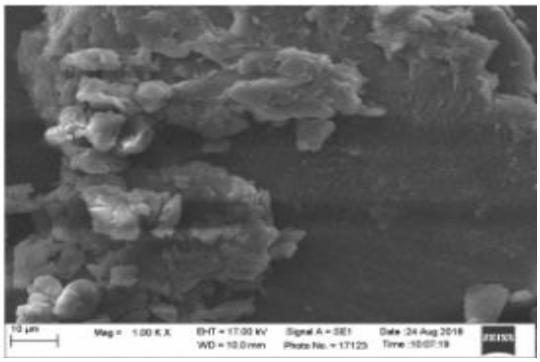
Whiteness	Repetition	Sample (%)	Average%)
Nanokalsium	1	76,32	76,37
	2	76,25	
	3	76,54	

Table 2:- Nanocalsium Mineral Levels and Bone Flour of Skipjack Fish (Katsuwonus pelamis L)

The value of the white nanocatalytic degree of the Cakalang fish bone was influenced by the mineral components it contained (Table 3). The highest mineral component after phosphorus (P) is calcium which affects the white degree. The value of the white degree in nanocalcium is influenced by the white calcium content (Estrela and Holland 2003). However, the higher mineral phosphorus (P) content (6.841%) is thought to decrease the value of the nanocalcium white degree. the value of the white nanocellium degree of vannamei (Litopeneus vannamei) shrimp shell was 87.56% (Suptijah et al. (2012).Nanococcal Bone (SEM) Scanning Electron Microscopy Analysis(Katsuwonus pelamis L)The results of Scanning Electron Microscopy (SEM) analysis of nanocatalytes of 5,000x magnification skeletal fish bones showed that nanocellium had a nano size between 53.78 - 71.68 nm (Figure 1). Cakalang fish bone nanocalcium is classified as nanoparticles because according to Greiner (2009) statement, 1 - 100 nm and Muller and Keck (2004) nanoparticles are 10 - 1000 nm in size.



(A)



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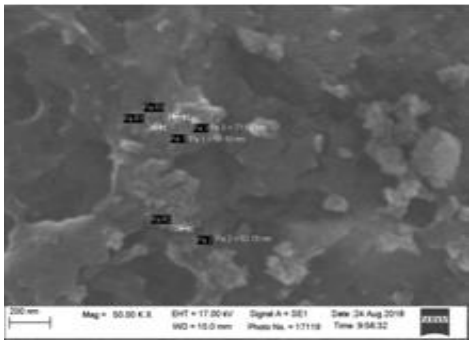
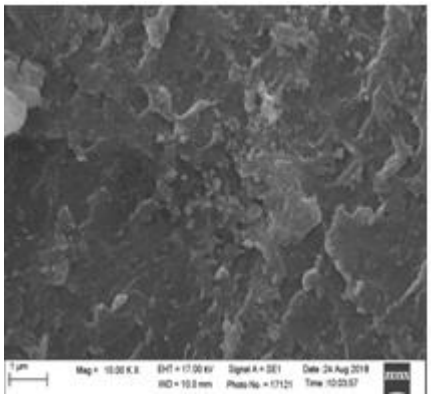


(C)



(D)

Fig 1:- Result SEM (Scanning Electron Microscopy) enlargement100x(a),1000x(b)5.000(c) dan 10.000x(d)

IV. CONCLUSION

Nanocalcium has 40% yield for 24 hours, 3.99% water content, 85.72% ash content and pH value 8.34. Mineral levels of nanokalsium were phosphorus (P) 6.841% respectively calcium (Ca) 2.935%, Magnesium (Mg) 0.528%, Manganese (Mn) 0.014%, iron (Fe) 0.016%, potassium (K) 0.002% and zinc (Zn) 0.0089%. 76.36% Nanocellium whiteness. Nanocalsium including nanoparticles is 53.78 - 71.68 nm.

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