

## Chemical Composition and Amino Acid Profile of Channidae Collected From Central Kalimantan, Indonesia

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**Abstract.** Family channidae occurs abundantly in Central Kalimantan, cheap price, has high albumin level, and benefits in wound healing process and post-surgery. So far, general public knows channidae as snakehead, *Channa striata*, but there are several members of this family that have not been used as high fish albumin yet. Based on proximate analysis, the highest protein level was recorded in common snakehead (*Channa striata*), 20.83%, the lowest fat and water content were recorded in giant snakehead (*Channa micropeltes*), 0.22%. The highest albumin level was recorded in Toman (*channa micropelthes*), 8.26 % in filtrate and 3.50 in flesh, respectively, and the highest zn was also found in Toman (*channa micropelthes*), 2.59%. As a whole, there are 14 amino acids distributed among members of family channidase

Key-Words : *Famili Channidae, proximate, albumin, amino acid profile, Zn*

### 1. Introduction

Fisheries potency as high nutritive food materials and having great benefit for health has been known. Snakehead fish (*Channa striata*) is one of freshwater fish possessing albumin content useful for human health, wound healing [1] [2]. Human need for the snakehead fish (*channa striata*) both as food and high albumin source is increasing and useful as a substitute of human serum albumin (HSA) that is still recently relatively expensive [2] [3] [4]. To meet this need, there is necessary to have efforts to find other fish alternatives. So far, other members of the snakehead having wound healing ability have not been known yet [4] [5]. For Central Kalimantan people, snakehead (*channa striata*) is believed to be able to give fast effect in healing process after post-baby born. Central Kalimantan possesses very large fisheries potency of family channidae consisting of several species, Toman (*channa micropelthes*), Kerandang (*channa pleurophthalmus*), Mihau (*Channa maculata*), Kihung (*channa lucius*), and Gabus (*channa striata*) [6]. In previous study, total albumin level of *Channa striata* was 6.10% [7]. However, there has been no study on proximate composition, albumin level, Zn and amino acid profile of Toman (*channa micropelthes*), Kerandang (*channa pleurophthalmus*), Mihau (*Channa maculata*), Kihung (*channa lucius*), and Gabus (*channa striata*) in Central Kalimantan. This study was aimed at knowing the chemical composition, albumin and amino acid profile.

### 2. Materials and Method

Fish used were Toman (*channa micropelthes*), Kerandang (*channa pleurophthalmus*), Mihau (*Channa maculata*), Kihung (*channa lucius*), and Gabus (*channa striata*) each of which is 500g/ind. obtained from fish merchants in Palangka Raya, Central Kalimantan.

Method used was in lined with standard [8]. Albumin analysis was carried out in clinical laboratory using *Brom cressol green* method, zn level with AAS method, and amino acid profile was determined by High performance liquid chromatography (HPLC) merk Shimadzu LC10.

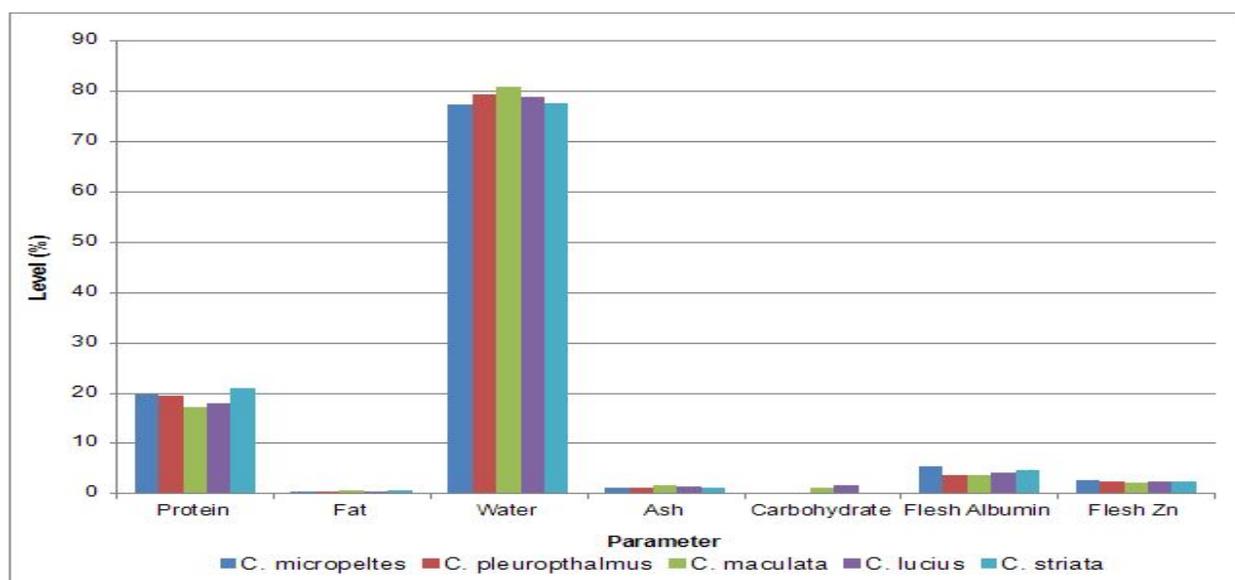
### 3. Results and Discussion

#### 3.1. Chemical Composition

Chemical composition of family Channidane collected from Central Kalimantan is given in Table 1.

**Table1.** Chemical composition of family Channidae from Central Kalimantan (%)

Species	Protein	Fat	Water	Ash	Carbohydrate	Albumin	Zn
<i>C. micropeltes</i>	19.69	0.31	77.42	1.18	0	5.35	2.59
<i>C. pleurophthalmus</i>	19.5	0.22	79.21	1.07	0	3.5	2.35
<i>C. maculata</i>	17.22	0.65	80.95	1.55	1.03	3.62	2.01
<i>C. lucius</i>	17.98	0.37	78.87	1.31	1.47	4.04	2.33
<i>C. striata</i>	20.83	0.49	77.64	1.04	0	4.53	2.43



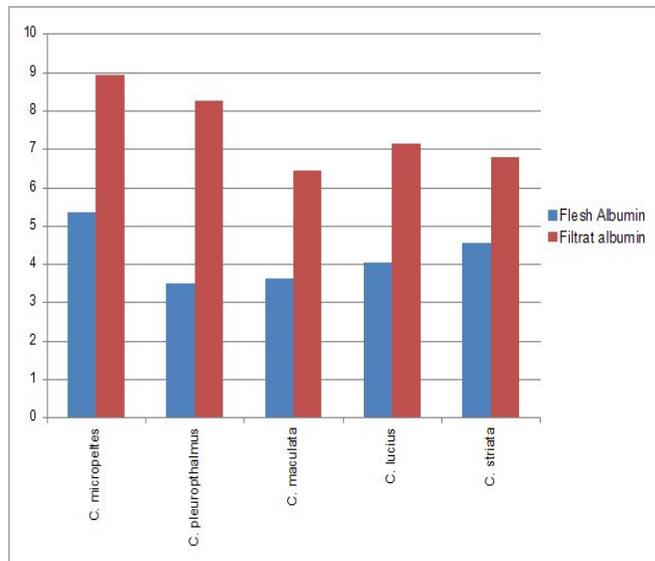
Based upon the chemical analysis, the five members of family Channidae showed that Gabus (*channa striata*) had highest among Channidae members, 20.83 % and the lowest occurred in Mihau (*Channa maculata*), 17.22%. It could result from much higher water content, 80.95%, was found in Mihau (*Channa maculata*) compared with Gabus (*channa striata*) 77,64% and the other three species. For fat, Mihau (*Channa maculata*) possesses the highest content, 0.65 % and the lowest was recorded in Kerandang (*channa pleurophthalmus*), 0.22 %. [9] [10] uttered that water content and fat highly affect protein level in food product in which protein level will be higher if both water content and fat level are lower. Furthermore, Mihau (*Channa maculata*) had the highest ash level (1.55 %) among members of family Channidae. [11] claimed that protein level is different among fish and it is needed by cells to grow and maintain the cell membrane [12]. Albumin and Zn levels were the highest in Toman (*channa micropelthes*), 5.35% and 2.59%, respectively. Beside albumin, *Channa striata* contains minerals, such as Zn. Other function of zinc is to maintain the immune system and as body defense potential mediator against infections beside taking important role in many organ functions, for instance, visual integrity from metabolic interaction between zinc and vitamin A. It works also as co-factor in many metabolic enzymes.

### 3.2. Filtrate and Flesh Albumin Level of channidae

Extraction of Gabus with vacuum extractor will result in flesh filtrate and residue. To obtain the albumin, extraction was conducted using vacuum extractor. The extraction of *Channa striata* could be defined as materials (liquid) or tissues released from the body during processing and through the filter [13]. The albumin of family channidae obtained is given in Table 2

**Table 2.** Filtrate and flesh albumin (%)

Species	Filtrate Albumin	Flesh Albumin
<i>C. micropeltes</i>	8.93	5.35
<i>C. pleurophthalmus</i>	8.26	3.50
<i>C. maculata</i>	6.42	3.62
<i>C. lucius</i>	7.12	4.04
<i>C. striata</i>	6.78	4.53



Among species, the highest filtrate and flesh albumin level was recorded in Toman (*channa micropelthes*), 8.93%, and 5.35%, respectively. Based on the albumin analysis, it is apparent that there is a big difference between filtrate albumin level and flesh albumin level, in which much higher albumin level in the filtrate than that in the flesh could result from that filtrate albumin is the entire albumin level in the flesh released in filtration process, while albumin in the flesh is not entirely released. Found that there are three types of proteins contained in fish, soluble protein (easily released through filtration), connective tissue stromal protein, and sarcoplasmic contractile protein as a liquid between the myofibril, High protein level is usually followed with high albumin [14]. Nevertheless, in gabus (*channa striata*), it did not happen, while higher albumin level in Toman (*channa micropelthes*) occurred also at low protein level condition, that with its solubility, globular protein could be separated into several parts, albumin, globulin, glutenin, histon and protamin [15]. Albumin is soluble in the water and coagulated by heat. Thus, despite high protein level, it is may not be total albumin so that high protein level occurs in Gabus (*channa striata*), but the highest albumin level was recorded in Toman (*Channa micropelthes*) [16] [17].

Protein quality contained in the five fish studied will be highly determined by the types of amino acids. It is mono molecule of protein possessing important role in living organisms. In general, amino acid could be categorized as essential amino acid, those that cannot be produced by the body itself and could be gained from food materials, and non-essential amino acid, those produced by the body [18] [19].

### 3.3. Amino Acid Profile

Amino acid contents of the filtrate obtained from the five members of family Channidae are shown in Table 3.

**Table 3.** Amino acid profile filtrate of family Channidae

Amino Acid	<i>C. micropelthes</i> (%)	<i>C. pleurophthalmus</i> (%)	<i>C. maculata</i> (%)	<i>C. lucius</i> (%)	<i>C. striata</i> (%)
Essential					
Histidine	1,67	1,19	1,12	1,41	1,67
Arginine	4,37	3,91	3,63	4,17	4,65
Methionine	2,11	2,02	1,60	2,17	1,89
Valine	6,71	6,17	5,59	6,31	6,26
Phenylalanine	5,44	5,80	5,93	5,40	5,18
Isoleusine	5,04	4,78	4,82	4,92	4,46
Leusin	8,79	8,80	8,88	8,57	8,59
Lysine	3,67	4,05	4,24	3,78	4,04
Non Essential					
Aspartic	10,84	10,91	10,55	10,73	10,90
Glutamic	10,24	10,35	9,29	9,24	9,40
Serin	5,58	5,33	5,31	5,19	5,75
Glysin	10,33	10,31	10,53	10,23	12,49
Alanin	10,28	10,46	12,73	11,03	10,77
Tyrosin	2,28	1,99	1,98	2,41	2,43

Table 3 shows that the highest histidine is recorded in Toman (*channa micropelthes*) and Gabus (*channa striata*), 1.67 %, arginin in Gabus (*channa striata*), 4.65 %, methionine in Kihung (*channa lucius*), 2.17 %, valin in Toman (*channa micropelthes*), 6.71 %, phenylalanin in Mihau (*Channa maculata*), 5.93 %, isoleusin in Toman (*channa micropelthes*), 5.04 %, leusin in Mihau (*Channa maculata*), 8.88 %, and lysine in Mihau (*Channa maculata*), 4.24 %, respectively.

In non-essential amino acid, Table 2 shows that the highest aspartic dan glutamic amino acids occur in Kerandang (*channa pleurophthalmus*), 10.91 % and 10.35 %, respectively, serin and glisin in Gabus (*channa striata*), 5.75 % and 12.49 %, respectively, alanin in Mihau (*Channa maculata*), 12.73%, tirosin in Kihung (*channa lucius*), 2.41 %.

As a whole, Gabus (*channa striata*) possesses 5 types of the highest amino acids, two of the essential one, histidine and arginin, three of the non-essential one, serin, glisin and tyrosin. Mihau (*Channa maculata*) has 4 high amino acids, three of the essential one, phenylalanin, leusin, and lysine, and one of the non-essential one, alanin. Kerandang (*channa pleurophthalmus*) has 2 highest amino acids of the non-essential one, aspartic and glutamic. Kihung (*channa lucius*) has only one highest essential amino acid, methionine, and Toman (*channa micropelthes*) has 3 essential amino acids, histidine, valin, and isoleusin. Therefore, the highest essential amino acids were recorded in toman, in which leusin is the highest essential amino acid found and the most common is recorded in protein and absolutely needed for children growth as brain function trigger and for adults in nitrogen equilibrium regulation, muscular degradation prevention and skin and bond wound healing process [20] [21] if alanin content in non-essential amino acid is the highest.

#### 4. Conclusion

This study showed that among the members of family channidae, the highest protein level was recorded in Gabus (*Channa striata*), the highest fat level, water content, and ash were found in Mihau (*Channa maculata*), while the highest carbohydrate was found in kihung (*Channa lucius*). The highest albumin level was recorded in Toman (*channa micropelthes*), 8.26 % in filtrate and 3.50 in flesh, respectively, and the highest zn was also found in Toman (*channa micropelthes*), 2.59%. As a whole, there are 14 amino acids distributed among members of family channidase, in which each snakehead species has its potential in metabolic processes. Therefore, chemical composition and protein profile of other members of channidae could contribute to fish-derived traditionally medicinal development.

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