Journal of Fish Health Vol. 2 (1) – June 2022
https://doi.org/10.29303/jfh.v2i1.3103

CHEMICAL COMPOSITION OF THE SNAILS OF BARKGONG *Strombus luhuanus* FROM SULI WATERS, CENTRAL MALUKU

Absalom Luturmas[1*], Maureen M. Pattinasarany[1], and La Ode Alirman Afu[2]
[1]Faculty of Fisheries and Science Marine, Pattimura University, Ambon
[2]Faculty of Fisheries and Marine Sciences, Halu Oleo University, Kendari

*Correspondence:
appleuturmas2018@gmail.com

Received : 2022-06-20
Accepted : 2022-06-23

Keywords :
Strombus luhuanus, composition chemical, proximate, amino acid, fatty acid.

ABSTRACT

Strombus luhuanus is a gastropod that is commonly found in Maluku and is very popular with the local community because it has a high nutritional content. Lives in colonies and is abundant in shallow intertidal and subtidal areas at a depth of about 20 m. The aim of the study was to determine the composition of proximate, amino acids and fatty acids that have the potential as bioactive compounds in the field of pharmacology. The results of the proximate study of fresh meat of Strombus luhuanus contained 79.78% water content, 0.89%, ash 15.64% protein, 0.96% fat, 2.73% carbohydrates. Amino acids found included glutamic acid, aspartic acid, leucine, arginine, lysine, glycine, alanine, threonine, valine, serine, isoleucine, proline, phenylalanine, tyrosine, cystine, methionine, histidine and tryptophan. Fatty acids consist of saturated fatty acids and unsaturated fatty acids.

INTRODUCTION

Strombus luhuanus is a gastropod with wide distribution and can be found in various places on the tropical water. Maluku people know the genus Strombus including *S. luhuanus*, as *a bias net*. *Therefore, S. luhuanus* could be found in some places in Maluku, such as Buru island, Ambon island, and Lease islands (Uneputty, 2005, 2006; Uneputty et al., 2018; Haumahu and Uneputty, 2021). *S. luhuanus* is generally found colonized and is abundant in shallow intertidal and subtidal areas until a depth of about 20 m, with associated sandy habitat with reef coral, between seagrass and fracture coral. Haumahu (2011) informed that the genus Strombus could be found in ecosystems field seagrass and reef coral with muddy and rough substrate sand.

One area found bias net *S. luhuanus* is the country of Suli on the island of Ambon. The people of the Suli country generally utilize bias net as a source of animal protein fish substitute, especially moment occur deficiency fish supply in the market. People believe that snail contains high protein, whereas the shell is used for decoration. Gastropod is often taken when the water recedes in large amounts because, of course, there is colonized and abundant. The proximate analysis could give information about crude protein, fat, and carbohydrate content. Protein comprises good amino acids, essential amino acids, and non-essential amino acids. Essential amino acids are known amino acids that the body cannot synthesize, so they

need to supply food sources of protein from outside. On the contrary sour non-essential could be produced by the body. Therefore, the analysis profile of amino acids will give information about the composition of good amino acids, essential amino acids, and non-essential amino acids by the general function of proteins and amino acids as source energy for the growth, repair, and maintenance of cells. Fatty acids work as a source of energy.

Although the use of *S. luhuanus* is big enough as a source of animal protein, there is not yet much information about its nutritional content, even though this species could be economically important. On the island Bintan, province of Riau Archipelago, snail bark *S. canarium* is generally utilized as an appetizer on the dish origin sea (seafood). Snail bark is nutritious, adds lust eat, and improves vitality. Snail gong S. *canarium* has been successfully processed and made as *seasoning* naturally (Viruli, 2011). For Public Caribbean, family Strombidae is a source of food and economy are important and become source fishery second biggest after lobster (Appeldorn, 1994). For that critical study about content chemistry, profile amino acids and fatty acids net *S. luhuanus* to get resource this could manage with wise.

METHODOLOGY

Time and Place of Research

Study this held for 30 days. Cost net *S. luhuanus* was collected from the waters of the State of Suli, Central Maluku district then conducted analysis proximate in the laboratory.

Research Tools and Materials

The research tools are 1 set of equipment dive, clamp, and bottle sample. Materials used in research this is *S. luhuanus.*

Procedure Research

Taking sample conducted with method diving at a depth of 8-12 m. *S. Luluanus* fresh then brought to the laboratory for testing proximate, analysis amino acids and fatty acids. Analysis proximate done covers water level with use method gravimetry, grade ash with method cremation in a furnace with temperature up to 600 °C, crude protein content use method Kjeldahl and rate crude fat with method extraction socket and methylation whereas carbohydrate based on different components of a fatty acid sample determined with using gas chromatography. Composition sample amino acids determined using HPLC, UPLC, or LC-MS/MS.

RESULT

Composition Proximate

Analysis proximate bias net Fresh *S. Luluanus* can be seen in Table 1 below this.

Table 1. Proximate fresh meat *S. luhuanus*

Proximate	Water content	Ash	Protein	Fat	Carbohydrate
% (w/w)	79.78	0.89	15.64	0.96	2.73

Amino Acid

Analysis common amino acids net Fresh *S. Luluanus* can be seen in Table 2 below this.

Table 2. Composition fresh meat amino acids *S. luhuanus*.

Amino acids	**cost net *S. luhuanus* (mg/kg)**
Sour Glutamate	24,258.52
Sour Aspartate	14,159.58
Leucine	13,080.97
Arginine	11,426.14
Lysine	10,199,70
Glycine	9,715.43
Alanine	9578.00
Threonine	7,555.45
Valin	7139.26
serine	6,929.06
Isoleucine	5,929.45
Proline	4,736.75
Phenylalanine	4,671.99
Tyrosine	3,958,40
sistine	2160.97
Methionine	2,050.73
histidine	1,548.80
Tryptophan	955,78

Fatty Acid

Analysis common fatty acids net Fresh *S. Luluanus* can be seen in Table 3 below this.

Table 3. Composition common fatty acids net Fresh *S. luhuanus* (%).

Symbol	**Fatty Acid**	**Percentage**
C 12:0	Sour lauric	0.0083
C 14:0	Sour myristate	0.0472
C 15:0	Sour pentadecanoate	0.0119
C 16:0	Sour palmitate	0.2030
C 17:0	Sour heptadecanoate	0.0226
C 18:0	Stearic Acid	0.1437
C 20:1	Sour eicocenoate	0.0027
Total SFA		**0.2594**
C 15:1	Sour pentadecenoate	0.0067
C 16:1	Palmitoleic acid	0.0159
C 17:1	Sour heptadekenoate	0.0691
C 18:1w9C	c- Acid oleate	0.0622
MUFA total		**0.1539**
C 18:2w6C	c- Linoleic acid	0.0491
C 18:3w3	Sour linolenic	0.0114
C 20:3w6	Sour eicosatrienoate	0.0061
C 20:2	Sour eicosadienoate	0.0141

C 20:4w6	Sour arachidonic	0.1962
C 20:5w3	Sour eicosapentaenoate	0.0401
C 22:6w3	Sour docosahexaenoate	0.0448
Omega 3 fatty acids		0.0963
Omega 6 fatty acids		0.2514
Omega 9 fatty acids		0.0622
DHA		0.0448
EPA		0.0401
A A		0.1962
Total PUFA		**1.0528**

DISCUSSION

Table 1 shows that content highest in meat bias fresh net is water content that reaches almost 80%. Bia protein content net *S. Luluanus* fresh enough tall ie 15.64%. Bia protein content net more low compared with protein levels in snails bark *S. canarium* by 19.77% (Viruly, 2011) but still more tall compared with protein content in shellfish hair *Anadara antiquata* (Abdullah et al., 2013). height protein content in bia net more confirm potency bias net as source of animal protein sea other than fish. Different protein content between species need seen by carefully because properties of proteins that do not stable as well as could changed with change condition environment and age (Georgiev et al., 2008).

Fat content and content ash meat bias net Fresh *S. Luluanus* is very low that is not enough than 1%. Fat is source energy main for organisms. According to Feeley et al. (1972), low-fat fish in general have high water content and produce colored meat white. Fatty fish keep fat in the tissue the meat that causes the meat colored yellow, gray or red young (Gurr, 1992). Low fat content in bia net *S. luhuanus* will produce quality more flour good and not easy broken (Viruly, 2011).

Carbohydrates, which count based on difference component more, more tall the content is in net Fresh *S. luhuanus* compared to snails bark *S. canarium*. According to Grigorakis (2007) some reason difference composition proximate because there is difference composition feed, consumption energy, habit meal, availability food in nature, and the area arrest.

Protein composed from amino acids. With so at high protein content so will the more many amino acids contained in it (Lyraz, 1990). Test common amino acids net *S. luhuanus* show that the protein in this species arranged of 18 types amino acids consisting of of 9 essential amino acids and 9 non - essential amino acids. Composition common amino acids net *S. luhuanus* obtained in the study this could seen in Table 2. Essential amino acids bias net *S. luhuanus* consecutive from the highest to the lowest is lysine, leucine, threonine, valine, isoleucine, phenylalanine, methionine, histidine and tryptophan. While those belonging to non- essential amino acids consecutive from the highest to the lowest is sour glutamate, acid aspartate, arginine, glycine, serine, proline, tyrosine and cystine. Tryptophan is amino acids with content Lowest which is 955.78 mg/kg so that is limiting amino acid in bia net. histidine

is second amino acid lowest. However Thus, histidine is known is functional amino acids for stimulate growth and for repair damaged network.

Sour glutamate and acid aspartate are 2 non-essential amino acids found in in amount big on bia net *S. luhuanus*. Content sour glutamate bias net *S. luhuanus* is 6 times more tall compared content glutamic acid in snails bark *S. canarium* (4.1 mg/g; Viruly, 2011). Glutamate and glutamine shape about 20% of the amino acids in plant and animal proteins (Wu, 1988) so that no surprising when found in amount large in animals. Glutamic acid alone make up 17.3% of amino acids in normal net *S. luhuanus*.

Sour aspartate and alanine make up 10% of amino acids in plant proteins nor animal. at bia net *S. luhuanus*, amino acids aspartic and alanine shape up to 16.95% amino acids. Aspartate and alanine reported is the main precursor glucogenic and is a substrate important energy for fish. Besides that, aspartate is very important for synthesis purine nucleotides in all type cells (Mommsen et al., 1980). Alanine is the largest amino acid in snails bark however alanine no largest amino acid in bia net *S. luhuanus*. Content alanine bias net (9.5 mg/g) almost same with content alanine on the snail barking (8.5 mg/g) however have different percentage on composition amino acids of each species.

Leucine is the essential amino acids present in amount big on body bias net. Leucine together isoleucine and valine make up 18.7% of the common amino acids net *S. luhuanus*. This thing in line with Nakashima et al., (2007) who stated that leucine together isoleucine and valine make up 18-20% of amino acids in animals nor plants. More continued the researchers this state that leucine categorized as as stimulating amino acids muscle protein synthesis and inhibits proteolysis in mammals, although not yet reported in animals aquatic.

Arginine content in bia net is quite large. Arginine is reported to stimulate the release of various hormones, such as insulin and growth hormone, and glucagon. Arginine is a potential activator of insulin release rather than glucose in fish (Mommsen et al., 2001).

Some amino acids such as glycine, alanine and arginine are known to enhance the taste of food. Addition Glutamic acid in food could increase taste of food (Yamaguchi and Ninomiya, 2000). Viruly (2011) made flavoring (natural seasoning) from barking snails. Glutamic acid, arginine, glycine and alanine are the amino acids present in amount big on meat bias net. This thing could indicates that bias net potential big made flavoring.

Comparing the amino acid content of different species can be biased. This is because each species has different physiological processes. In addition, age, fishing season and stages in the life cycle of organisms can be the cause of differences in amino acid content (Litaay, 2005).

Composition common fatty acids net Fresh *S. Luluanus* can be seen in Table 3. Fatty acids contained in meat bias net could grouped on saturated fatty acids (*SFA*) and unsaturated fatty acids divided saturation on fatty acids not fed up monounsaturated fatty acid (*MUFA*) and nonunsaturated fatty acids fed up double (*Poly Unsaturated Fatty Acid/PUFA*). Total SFA fatty acids were 0.2594 %, total MUFA fatty acids were 0.1539 % and total PUFA was 1.0528%. Analysis result show that bias net have content PUFA acid more tall from content SFA and MUFA acids.

The value of the percentage of SFA contained in the bia net Fresh *S. luhuanus is*

dominated by acid palmitate (C16:0) of 0.2030%. On the other hand, saturated fatty acids with score percentage smallest is sour lauric (C12:0). A number of study show that sour palmitate is the most saturated fatty acids found compared other fatty acids in ingredients animal like in clams hair *Anadara antiquata* (Abdullah et al., 2013) with score percentage by 0.02%, in rabbits sea *Dolabella auricularia* (Manullang et al., 2016) with score presentation sour palmitate by 21.87%. (Mateos et al., 2010) report score presentation content sour abalone palmitate (*Haliotis* sp) that is by 57.60%. Difference score percentage sour palmitate is highly dependent of species, availability feed, age and size. Sour palmitate could increase risk atherosclerosis, cardiovascular, and stroke are lots of saturated fatty acids found in ingredient food. Content sour lauric C12:0 in meat *fresh S. luhunuas* in study by 0.0083%. Sour lauric many used in field pharmacology as antibacterial, antiviral and antiprotozoal. For guard health body man so sour lauric change form Becomes monolauin (Wibowo, 2006).

highest MUFA fatty acids in the study this that is sour heptadekenoate (C 17:1) was 0.0691%, whereas score Lowest that is sour pentadecenoate (C15:1) by 0.0061%. Highest PUFA fatty acids that is omega 6 fatty acids by 0.2514% and the lowest that is sour eicosatrienoate by 0.0061%. Simopoulos, (2002) report that MUFA and PUFA play role important in reduce disease cardiovascular disease, type 2 diabetes inflammation, and disorders autoimmunity. This thing because there is possibility fatty acid suppress inflammation with hinder track biosynthesis leukotrienes that is non fatty acids fed up contain carbon released during the inflammatory process and eicosanoids proinflammatory other (Wu et al., 2021) .

The results of the EPA and DHA analysis have score the percentages are 0.0401% and 0.0448%, respectively. EPA and DHA play a role important in health as well as is component structural biggest in membrane phospholipids that regulate fluidity membranes and ion transport (Chapkin et al., 2008) . According to study (Sidhu, 2003), consuming food results rich sea non fatty acids fed up plural, namely EPA and DHA can be lower risk disease heart coronary, lower hypertension, diabetes, and relieve symptom inflammation joints (*rheumatoid arthritis*).

CONCLUSION

Cost net *S. luhuanus* have high protein content however low fat content. Essential amino acids bias net *S. luhuanus* is lysine, leucine, threonine, valine, isoleucine, phenylalanine, methionine, histidine and tryptophan. Whereas non- essential amino acids is sour glutamate, acid aspartate, arginine, glycine, serine, proline, tyrosine and cystine. Tryptophan is amino acids with content Lowest so that is limiting amino acid in bia net. Hi this show potency bias net as source of animal protein. Net fees are also suspected strong potential as natural seasoning ingredients. cost net have content non- fatty acids more saturated tall compared with saturated fatty acids. Saturated fatty acids found in bia net Fresh *S. luhuanus is* dominated by acid palmitate (C16:0) followed sour stearate (C18:0). Non- fatty acids fed up more dominated by non-fatty acids fed up double compared with non- fatty acids fed up single.

ACKNOWLEDGMENT

The author thanks to various parties that have helped in completing this research.

REFERENCES

Amri K. (2003). *Intensive Windu Shrimp Cultivation.* Jakarta: Agro Media Library.

Briggs M, Smith, SF, Subasinghe R and Phillips M. 2004. Introduction and Movement of *Penaeus vannamei* and *Penaeus stylirostris* in Asia and The Pacific. RAP Publication 2004/10: 136-140.

Cowan M. (1999). Plant Products as Antimicrobial Agents, Clin Microbiol Rev, *12* (4). 564-582.

Effendi I. (2004). *Introduction to Aquaculture.* Self-Help Spreader. Jakarta.

Effendi M I. (1979). *Fisheries Biology Methods.* Bogor: Dwi Sri Foundation Publisher.

Felitra. (1999). Identification of Pathogenic Bacteria (*Vibrio* sp) in Nongsa Batam Waters, Riau Province. *Indonesian Journal of Nature, 11* (1). 22-33.

Jayasree, Janakiram L, P and Madhavi R. (2006). Characterization of *Vibrio* spp. Associated with Diseased Shrimp from Culture Ponds of Andhra Pradesh (India). *Journal of the World Aquaculture Society, 37* (4). 523 pp.

Lavilla-Pitogo, C. R; GD Lio-Po; ER Cruz-Lacierda; EV Alapide-Tendencia; LD De La Pena. (2000). Disease of Peneid Shrimps in the Philippines. 2nded., Southeast Asian Fiheries Development Center, Philippines., 96 p

Lightner DV and Bell T A. (1998). A Handbook of Normal Penaeid Shrimp Histology. Baton Rouge, La World Aquaculture Society, *7* (1). 1114.

Madduliri Suresh, Rao KB and Sitaram B. (2013). *In Vitro* Evaluation of Five Indegenous Plants Extract Against Five Bacterial Pathogens of Human. *International Journal of Pharmacy and Phrmaceutical Science, 5* (4). 679-684

Maryani DD and Sukenda. (2002). Role of Leaf and Fruit Extract of Mangrove *Sonneratia caseolaris* (L) against *Vibrio harveyi* bacterial infection in tiger prawns (*Penaeus monodon* FAB). *Indonesian Journal of Aquaculture, 1* (3). 129-138.

Nasi L, Prayitno SB and Sarjito. (2001). Study of Bacteria that Cause Vibriosis in Shrimp Biomolecularly. Diponegoro University.

Parenrengi A, Tenriulo A and Tampangallo B R. (2013). Transgenic Windu Shrimp Penaeus Monodon Challenge Test Using Pathogenic Bacteria *Vibrio harveyi. Indonesian Aquaculture Conference.* Maros Brackish Water Cultivation Research and Development Center, South Sulawesi.

Poeloengan M and Pratiwi P. (2012). Antibacterial Activity Test of Mangosteen Peel Extract (*Garcinia mangostana* Linn). *Health Research and Development Media, 20* (2). 65-69.

Rahayu M (1999). Plants Resources of South-East Asia. 1st ed. Vol. 12. Prosea Foundation by Backhuys Publishers. Wegeningen. 408- 409 pp.

Ridwan Y and Ayunita Y Q. (2007). Phytochemical and Anthelmint Activity Against Chicken Tuperworm of Painted Nettle (*Coleus Blumei* (Benth) Varietes *In Vitro, 14* (1). 17-21.

Ridwan Y, Satrija, Darusman LK and Handrayani F. (2010). Effectiveness of Miana Leaf Extract Anticestodes (*Coleus blumei* Bent) against *Hymenolayer microstoma* Worms in Mice. *Journal of Animal Science and Technology, 33* (1). 6-11.

Robinsom T. (1995). *High Plant Organic Content.* Publisher: ITB. Bandung.