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<http://www.ijhmcr.com>**ORIGINAL ARTICLE****INTERNATIONAL JOURNAL
OF HEALTH MEDICINE AND
CURRENT RESEARCH****IDENTIFICATION OF NITRIC OXIDE COMPOUNDS IN LAOR (Polychaeta) METHANOL
EXTRACT IN TAGALAYA VILLAGE TOBELO HALMAHERA UTARA VILLAGE****Desy Irene Dutu^{1*}, Arend L. Mapanawang¹, Silvester Wungow¹**¹ Pharmacy Program Of Sekolah Tinggi Ilmu Kesehatan Makariwo Halmahera (STIKMAH) - Tobelo**ARTICLE INFO****ABSTRACT****Article History:**Received 17th April, 2020.

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Laor (Polychaeta) GC-MC Nitric Oxide

Correspondence to Author:*Desy Irene Dutu**Student Program of Pharmacy,
Sekolah Tinggi Ilmu Kesehatan
Makariwo Halmahera (STIKMAH) -
Tobelo

Background: Laor (Polychaeta) is a typical biota of Maluku waters. Which appears every year in March or April and Laor is proven to be rich in protein. Nitric Oxide is a chemical compound that is important for the transport of electrical signals in cells, and functions in physiological and pathological processes. Likewise, this compound can cause blood vessel dilation or in medical terms it is called a strong vasodilator so that it can reduce blood pressure.

Research Objectives: The purpose of this study was to identify Nitric Oxide (NO) compounds contained in Laor by using maceration methods to extract bioactive compounds present in Laor and gas chromatography-spectrometer (GC-MS) mass as a method to identify Nitric Oxide compound.

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This type of research: the experimental research conducted at the STIKMAH Laboratory (Makariwo Halmahera College of Health Sciences)

Results: The results showed that Laor contained amino acid compounds namely L-Tryptophan, L-Arginine, L-Aspartic acid, L-Cystine, L-Gultamic Acid, Glycine, L-Histidine, L-Isoleucine, L- Leucine, L-Lysine, L-Methionine, L-Phenylalanine, LProline, L-Serine, L-Threonine, L-Tyrosine, L-Valine, L-Glutamine, L-Hydroxy Proline and L-Asparagine.

Conclusion: From the results of the study it can be concluded that in Laor (polychaeta) Nitric Oxide (NO) compounds are not contained. but the results of the research show that in Laor only contained amino acid compounds especially LArginine which can synthesize Nitric Oxide (NO) compounds from Nitric Oxide Synthase (NOS).

INTRODUCTION

Indonesia as an archipelago has a coastline of around 81,000 km of increase and a very wide sea area. This makes Indonesian waters have a great potential of marine natural wealth with a high level of biodiversity, in which there are various types of marine organisms. Utilization of marine organisms is not only limited as food, but also as a source of natural ingredients that have the potential as a raw material for medicine.¹

With the increasingly development of technology and knowledge, it is very possible in the world of medicine also experienced various changes and progress.²

Laor or sea worm (Polychaeta) is one of the typical biota waters of Maluku. In March or April, on a full moon night or a few days afterwards, this biota experiences swarming, an event when sea worms of a certain type swarm in abundant quantities around the surface of the water to mate externally. At that time, using a traditional seser, these animals were usually

caught by local residents on nested beaches to be used as traditional food.¹

In some developed countries, sea worms (Polychaeta) have become export commodities that are able to increase the country's foreign exchange sources. British countries, such as sea worms (Polychaeta) of the type *Nereis virens* (Nereidae) are sold commercially to several other countries as natural feed for some types of marine biota. The typical British sea worms are proven to be rich in protein so that they are good for fish and crustaceans growth³

Nitric Oxide, also known as nitrogen monoxide, is a very important intermediate in the chemical cycle in the body. In humans, Nitric Oxide compounds are chemical compounds that are important for the transport of electrical signals in cells, and function in physiological and pathological processes. Likewise, this compound can cause blood vessel dilation or in medical terms is called a strong vasodilator so that it can reduce blood pressure

Several studies have shown that endothelial-dependent vasodilation disorders occur in hypertensive patients, because endothelial function is related to the bioactivity of Nitric Oxide (NO) which depends on its interaction with reactive oxygen species (ROS), especially superoxids. NO reaction with superoxid will produce peroxynitrit (ONOO-) which is a reactive nitrogen species. This peroxynitrite will oxidize BH₄ (pteridine tetrahydro biopterin) which is a cofactor for Nitric oxide synthase (NOS). This situation will result in NOS to produce superoxide instead of producing NO, as a result NO synthesis decreases. A decrease in NO levels causes the endothelial relaxation process to be disrupted resulting in hypertension.⁴

Based on research conducted by Mandel. et al found that consumption of 3.3 kg of watermelon on subjects could increase plasma concentrations of citrulline and arginine. Citrulline is a non-essential amino acid that is

thought to affect VO₂max. Citrulline is an effective precursor in the synthesis of arginine, where arginine plays a role in producing Nitric Oxide (NO) by the enzyme NO synthase. Nitric Oxide acts to increase blood flow. Increased blood flow causes an increase in oxygen supply and more nutrients to the muscles, so VO₂max increases. Citrulline can be found in a number of foods such as watermelon, beef, dark chocolate, legumes, beans, and fish. ⁵

Considering the potential of Nitric Oxide as a compound that can reduce high blood pressure and levels of protein in laor or sea worms (Polychaeta), it is necessary to research the identification of Nitric Oxide compounds in laor or sea worms (Polychaeta) with the GC-MS method (Gas chromatography-mass spectrometry)

RESEARCH METHODS

Materials and tools

The material used in this study is laor (Polychaeta) obtained from Tagalaya Village, Tobelo Utara District, North Halmahera and methanol as a solvent.

The tools used in this research are sifter, refiner, GC-MS, aluminum foil, stirring rod, funnel, erlenmeyer, measuring cup, beaker, scissors, filter paper, to label paper, rotary evaporator, gram scale and maceration container.

Work procedures

Laor (Polychaeta) taken from Tagalaya Village, Tobelo Utara District, North Halmahera. Laor is taken and cleaned and then dried by smoking until it is completely dry and gets the simplicia from Laor. Laor which has been dried is chopped into small pieces to make a bowl by using a smoothing tool to make Laor powder. The powder obtained is put into a container. Next, pour the methanol solvent and run for 5 days while stirring every day after that the solution. Laor is filtered to separate filtrate and residue. The filtrate is

taken then evaporated using a rotary evaporator until it gets a thick extract from Laor.

RESULTS AND DISCUSSION

Results

The Laor sample (Polychaeta) was obtained from Tagalaya Village, Tobelo North Halmahera District in May 2019. Laor was taken from the sea at 6:00 in the morning. Laor is then cleaned after that Laor is weighed with a wet weight of 500 grams. Next Laor is inserted into the leaves which are usually used for the drying process. After it is put into the leaves, it is then smoked for one day until it is completely dry until a simplicia is obtained from Laor, then weighed with a weight of 200 grams.

Laor (Polychaeta) weighing 200 grams is chopped into small pieces and then ground using a smoothing tool to get Laor powder. Then partly taken from the 200 gram powder weighing 30 grams and dissolved into a methanol solvent in the ratio of 1:10 (1 gram sample in 10 ml of methanol) for 5x24 hours while stirring every day and after 5 days the Laor solution is filtered to separate the filtrate and residue. The filtrate is extracted and evaporated using a rotary evaporator to obtain the Laor thick extract. Laor viscous extract was tested using a gas chromatography-mass spectrometer (GCMS) tool to identify Nitric Oxide compounds

GC-MS Test Results on Methanol Extract

Laor (Polychaeta)

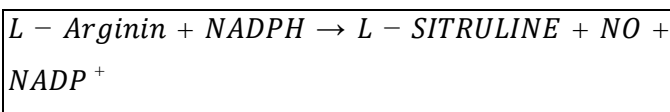
Nama	Trace	RT	Area	IS Area	Response	Detecti	Conc	% Der
L-Triptophan	205.2							
L-Arginine	175							
L-Aspartic acid	134	2.36	3219.390		3219.390		bb	
L-Cystine	241	2.43	31794.234		31794.234		bb	
L-Gultamic Acid	148	3.08	2335.345		2335.345		bb	
Glycine	76	3.08	145.352		145.352		bb	
L-Histidine	156							
L-Isoleucine	132	6.58	127.298		127.298		bb	
L-Leucine	132							
L-Lysine	147							
L-Methionine	150	4.80	118.122		118.122		bb	
L-Phenylalanine	166							
L-Proline	116	3.08	17167.576		17167.576		bb	
L-Serine	106	2.79	12376.460		12376.460		bb	
L-Threonine	120							
L-Tyrosine	182	4.51	1346.305		1346.305		bb	
L-Valine	118							
L-Glutamin	146.95							
L-Hidroksi Prolin	132.1							
L-Asparagin	133.12	2.36	9752.278		9752.278		bb	

Table 1. Results of Mass Gasspectometer Chromatography Tests

Discussion

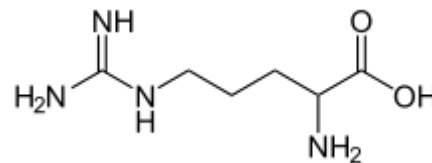
Laor is a seasonal marine biota that usually occurs in May each year, Laor (Polychaeta) also appears on the surface in the morning and does not appear during the day, so Laor must be taken in the morning. The sample used in this study is Laor. Laor was taken in the morning at 6:00 am using a tool that is a fine net or commonly referred to as kofo by residents of Tagalaya Village.

Based on the results of the gas chromatography-mass spectrometer (GC-MS) test of the Laor viscous extract in Fig. 1 and Table 2 show that Laor does not contain Nitric Oxide (NO) compounds. But from the GCMS test results in Laor contained amino acid compounds namely L-Triptophan, L-Arginine, L-Aspartic acid, L-Cystine, L-Gultamic Acid, Glycine, L-Histidine, L-Isoleucine, L-Leucine, L-Lysine, L-Methionine, L-Phenylalanine, LProline, L-Serine, L-Threonine, L-Tyrosine, L-Valine, L-Glutamine, L-Hydroxy Proline, L-Asparagine and all of the amino acid compounds are wrong. one amino acid compound that can synthesize Nitric Oxide compounds is L-arginine. Nitric oxide (NO) is synthesized by nitric oxide synthase (NOS) from L-arginine. After being sentenced Nitric oxide (NO) undergoes diffusion from endothelial cells to vascular smooth muscle cells and causes an increase in intra cellular cyclic guanosine monophosphate (cGMP). This increase in cGMP will trigger the relaxation of vascular smooth muscle of this biosynthetic reaction as follows: ¹²



L-Arginine is a basic amino acid that is needed for protein synthesis and serves as a precursor for the

synthesis of creatine, agmatine, urea, polyamine, proline, glutamate, and nitric oxide. L-arginine can reduce blood pressure, reduce blood clots and strokes, reduce cholesterol and triglycerides, and improve diabetes and sexual function through its role as a precursor for nitric oxide derived from endothelium. ¹³



Gambar 4. Struktur L- Arginine (C6H14N4O2)

According to research Figueroa (in Nisa, 2012) said that the content of watermelon amino acids can improve arterial function and reduce blood pressure in the aorta. Watermelon can reduce blood pressure because it contains potassium, vitamin C, carbohydrates, lycopene which functions to improve the work of the heart and citrulline which is able to encourage blood flow throughout all parts of the body and give an arfosidiak effect, watermelon contains many benefits, such as lycopene which contains anti-oxidants and arginine. ¹⁴

Based on research conducted by Utami Paramita et al (2016) it turns out that the fish also contains 9 essential amino acids namely, histidine, arginine, threonine, valine, methionin, isoleucine, leosin, phenylalanin, lysine. While the 8 types of nonessential amino acids are aspartic acid, glutamic acid, serine, glycine, alanine, proline, tyrosine, and cysteine. So in selung there are 17 types of amino acids, both essential and nonessential amino acids

Besides fish seluang also one type of fish that is commonly consumed by the people of Indonesia. South Sumatra makes fish one of the typical foods that are widely consumed in several types of dishes and

seluang fish contain 5.3 grams of carbohydrates, 3.2 grams of fat, 80 mg of calcium, and 4.7 mg of iron.

CLOSING

Conclusion

From the results of the study it can be concluded that in Laor (polychaeta) Nitric Oxide (NO) compounds are not contained but the results of the study show that in Laor only contained amino acid compounds especially L-Arginine which can synthesize Nitric Oxide (NO) compounds from Nitric Oxide Synthase (NOS).

REFERENCES

1. Mapanawang A.L . et al. Identification Of The Compounds That Contained In Extracting Methanol Laor (Polychaeta). International Journal of Health Medicine and Current Research (IJHMCR), 2018; Vol 3 (01): 835840, DOI:10.22301/IJHMCR.25283189.835.
2. Mapanawang A L. Riset Di Bidang Kesehatan: Yayasan Medika Mandiri. 2016
3. Masipagunung A. Identification Of Decosaenoic Acid Compound Contained In Metanol Laor (Polychaeta) Extract. International Journal of Health Medicine and Current Research (IJHMCR), 2017; Vol 2 (02): 474-478, DOI: 10.22301/IJHMCR.2528-3189.474.
4. Astustui P.et al. Kadar Radikal Superoksid (O₂-), Nitric Oxide (No) Dan Asupan Lemak pada Pasien Hipertensi Dan Tidak Hipertensi. Jurnal Gizi Indonesia, 2014; Vol 3 (1) : 90-95
5. Widyastuti N, Setiawan M I. Pengaruh Pemberian Jus Semangka Kuning (*Citrus Lanatus*) Terhadap Komsumsi Oksigen Maksimal (Vol₂MAX) Pada Atlet Sepak Bola. Journal Of Nutrition College (JNC), 2016; vol 5 (02):64-70
6. Mapanawang A L. Identification Of Decosaenoic Acid Compound Contained In Methanol Laor (Polychaeta) Ekstrak. Journal of Health Medicine and Current Research (IJHMCR), 2017; Vo 2, issue 02: 447-478, DOI: 10.22301/IJHMCR.2528-3189.474
7. Kambey I N. et al. Effect Of Laor Consumption (Polycheta) On Reduced Blood Sugar Levels In Diabetes Mellitus In Wosia Village, Central Tobelo North Halmahera. International Journal of Health Medicine and Current Research (IJHMCR), 2018; Vol 3, Issue 02: 925929, DOI: 10.22301/IJHMCR.25283189.925
8. Anonim. Farmakope Indonesia, Edisi III, Departemen Kesehatan Republik Indonesia, Jakarta: 1979; 9:28
9. Syamsuni H.A. Ilmu Resep, EGC. Jakarta: 2006; 39:242-243, 249-250
10. Kamelia. Mengenal instrumental GC-MS. 201
11. Budiadji A F, Mapanawang A L, Internasional Journal of Health Medicine and Current Research (IJHMCR), 2016; Vol 1 Issue 01:47- 51. DOI: 10.22301/IJHMCR.2528-3189.48
12. Danuyati I. et al. Hubungan Kadar Nitrit Oksida (NO) Dalam Darah Terhadap Resiko Lejadian Diabetes Millitus Tipe 2 dengan Hipertensi Di RSUP NTB. Jurnal Kesehatan Prima, 2014; Vol 8 (01):1207-1215
13. Holecek M and Sispera L. Effects Of Arginine Supplementation On Amino Acid Profiles In Blood And Tissues In Fed And OvernightFasted Rats. Journal Nutrients, 2016;vol 8 issue 04 : 1-11
14. Nurleny. Pengaruh Jus Semangka Terhadap Penurunan Tekanan Darah Pada Penderita Hipertensi Di Wilayah Kerja Puskesmas Nanggalo. Jurnal Akademika Baiturrahim,2019;Vol.8. 01:40-49
15. Utami P. Pengaruh Metode Pemasakan Terhadap Komposisi Kimia Dan Asam Amino Ikan Seluang (*Rasbora argyrotaenia*). Jurnal Teknologi Hasil Perikanan.2016;Vol. 5 (01):73-84.
