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CHARACTERIZATION AND IDENTIFICATION OF ACTIVE COMPOUND OF OCELLATED SNAKEHEAD (*CHANNA PLEUROPHTHALMUS* BLKR) WASTE CHARCOAL POTENTIAL AS ANTIALLERGY DRUG

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ABSTRACT: Natural resources potentials, such as animals or plants, have been utilized as a traditional herb and can be benefitted for human health and to support the government program in medication to be back to nature. The body parts often used for the traditional drug are meat, horn, tail, feather, nail, fat, bile, and shell. The animal's potential to develop as medicine meets the following criteria: easily found, available in high numbers, and able to cure severe disease, and has economic value. In Central Kalimantan, one of the allergy treatment hereditarily practiced is the utilization of charcoal of inedible body parts of ocellated snakehead *Channa pleurophthalmus* Blkr, such as head skin, scale, and fins. This study was carried out to know the charcoal characteristics of ocellated snakehead (*Channa pleurophthalmus* Blkr) body parts in relation to its potential as an anti-allergic drug. The examination covered chemical composition, water content, rendement, charchoal absorbability, *in-vivo* test on a male rat, and pyrolysis-GC/MS (Py-GC/MS)-based active compound identification. Results showed that the charcoal was dominated by 55.547%-67.744% carbon. The lowest water content, 1.614%, the highest rendement, 3.7612%, and the highest absorbability, 757.14 mg/g, were recorded in the caudal fin. The Py-GC/MS analysis found the active compound of Hexadecanenitrile in the caudal fin charcoal. This compound is believed to be an anti-allergy.

INTRODUCTION: Indonesia possesses very diverse living natural resources that are an unlimited source of chemical compounds in types and numbers. Biodiversity can be defined as chemical diversity that yields chemicals for human needs, such as drugs, insecticides, cosmetics, and other beneficial raw materials of organic compound synthesis [1].

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The potential of natural resources as medicinal materials has been hereditarily used as a traditional herb. It is expected to be able to utilize in community health development.

Even advances in modern science and technology are able not to replace the role of traditional medicines, and nowadays, the government is encouraging the treatment back to nature [2]. The use of natural material has a constructive therapeutic effect with a minimum side effect so that natural materials are believed to be relatively safer than chemicals or synthetic materials distributed in the market [3]. The animal used as a source of traditional medicine is usually the dead one [4]. The body parts commonly taken as traditional medicine are meat, horn, bone, tail, feather, nail, fat, bile, and shell [5]. Animal's potential to be developed as medicine have several criteria, such as easily found, high availability in nature, can cure severe illness, and good economic value [6].

The recent allergic treatment has benefited highly numerous synthetic drugs, such as antihistamin group. These drugs, unfortunately, hold undesired side effects, and therefore, the use of natural materials for disease treatments needs to be developed. The allergic reaction or hypersensitivity is an unreasonably immunologic reaction in humans that have been previously sensitized with antigen that results in an excessive reaction as inflammation or tissue damage. In normal conditions, body defense mechanisms, either humoral or cellular, are dependent upon the B cell and T cell activation [7, 8, 9]. In fast hypersensitivity or anaphylaxis reactions, immunoglobulin E (IgE) plays the role [10, 11]. This reaction is indicated with a sudden response in several minutes after exposure to the antigen that releases the mediators in the cell, such as histamine, bradykinin, arachidonic acid, and prostaglandin. The release of mediators causes allergic rhinitis, asthma, atopic dermatitis, and shortness of breath [12, 13].

Allergy is a condition caused by specific immunology reactions caused by allergens. Allergen can be as dust particles, plant powder, drug, or food that work as antigen to stimulate the immune response. The term "allergic reaction" is used to show the reaction involving the immunoglobulin E (lgE). The allergic mechanism is dominated by the mast cell exposed to the allergen and then releases the antibody-enzyme IgE. The release of IgE will trigger the degranulation and the release of histamine, leukotriene, and other mediators that then yield the allergic reaction. The immunoglobulin E is produced in great numbers when the allergen attaches to the lymphocyte, B cell [14].

Pyrolysis GC/MS (Py-GC/MS) is one of the techniques used to prove the material identity or to identify the single fragments in order to obtain structural information [15]. To develop the volatility of the polar fragment, various methylated solvents can be added to the sample before pyrolysis. Dry samples were inserted into the injector at fast heating of 600-650 °C. Py-GC/MS can be used to characterize most of the materials, including dissoluble and complex material and even pre-treatment samples, such as polymer, plastic, rubber, paint, stain, resin, coating, cellulose, wood, textile, oil, and others.

Ocellated snakeheads C. pleurophthalmus become a phenomenon in Central Kalimantan because the unused parts of the fish body can be benefitted as a traditional drug to treat human's allergy. Many fishes living in the peatland have bioactive compounds, and some are also useful for medication besides their ecological roles and biodiversity control in the peatland [16]. The treatment is performed by roasting the fish body to charcoal and smearing on the itchy parts or the lump on the skin.

So far, the charcoal potential of unused *C. pleurophthalmus* body parts as anti-allergy has not been studied, so that the scientific information on their bioactive compounds is poorly available. This study is aimed to characterize and identify the charcoal of the unused body parts of *C. pleurophthalmus* as anti-allergy using GC-MS pyrolysis and male rats (Mus musculus Balb/c) as experimental animals.

MATERIALS AND METHODS: This study was carried out for 6 months, from December 2018 to May 2019. Wastes of ocellated snakehead *Channa pleyrophthalmus*, such as caudal fin, anal fin, dorsal fin, scale, head skin, pelvic fin, and pectoral fin) were collected from the collector merchants in Kereng Bengkirai Port of Sebangau Lake, Central Kalimantan. Other materials prepared were distilled water, aluminium foil, iodine (I2), Na2S2O30.1 N, 1% amylum, and helium (Hc) gas. The equipment used were oven, desiccator, analytic balance, disk, flask, flask clipper, Erlenmeyer, cuvette, furnace, Frontier-PY 2020D pyrolyzer, Agilent-6890 GC, Agilent-5973 MS, Agilent HP 5MS capillary column of 60 m long, 0.25 mm diameter and 0.25 um film.

Data Analysis: Chemical composition data were presented in Table, while the charcoal water content, rendement, and absorbability of *C. pleurophthalmus* waste were demonstrated in the form of the figure.

These data were descriptively analyzed in order to gain the best charcoal. The best charcoal of the previous assessment was tested in vivo on the male rat at the doses of 10%, 15%, and 20%; then the active compound was identified using qualitative Py-GCMS analysis based on the Chem Stationlibrary database.

Research Procedure: Fresh samples of *C. pleurophthalmus* wastes, such as caudal fin, anal fin, dorsal fin, scale, head skin, pelvic fin, and pectoral fin, were collected, each of which was prepared as much as 100 g.

The samples were dried under the sun for 2-3 days up to getting constant weight, then roasted to charcoal in the modified oven at 200 ºC for 30 days. The charcoal was grounded and filtered through 80 mesh sieve to obtain fine powder charcoal.

Water Content Analysis: Water content was analyzed following the method of AOAC [17]. A porcelain cup was dried in the oven at 105 ºC for 1 hour, then put into a desiccator for approximately 15 min., left to be cool and weighed (A). Five grams of sample were prepared and put into the cup (B), dried in the oven at 105 ºC for 5 h or up to obtaining a constant weight, put into the desiccator, left to cool, and weighed (C). Water content was obtained a follows:

$$\text{Water content (\%)} = (B-C)/(B-C) \times 100\%$$

Where A = empty cup weight, B = weight of cup with fresh sample (g) and C =weight of cup with dry sample (g).

Rendement Measurement: Rendement was measured following AOAC [17] by comparing between the weight of charcoal and the initial weight of sample and expressed in percent.

$$\text{Rendement (\%)} = \text{(Dry sample)}/\text{(Fresh sample)} \times 100\%$$

Charcoal Absorbability: The absorbability determination was intended to know the charcoal ability to absorb the colorful solution [18]. As much as 0.4 g of dry sample was put into an Erlenmeyer covered with aluminium foil, added with 40 ml of 0.1 N I2, and stirred for 15 min., then filtered. As much as 10 ml of filtrate was titrated with 0.1 N $Na_2S_2O_3$ up to turning to light yellow color, then added with several drops of 1% amylum and titrated up to blue color disappears. Similar action was also done for the blank. The absorbability was calculated as follows:

$$\text{Iodin absorbability (mg/g)}\hat{} =((10\ (V \times N)/0.1)\text{x}\ 12.69 \times 5)/W$$

Where V= $Na_2S_2O_3$ volume (mL), N = normality of $Na_2S_2O_3$, 12.69= amount of iod equivalent with 1 mL of 0.1 N $Na_2S_2O_3$, W= sample mass (g)

***In-vivo* Test:** This test employed 15 two-month male rats *Mus musculus* Balb/c with a mean weight of 30 g. All rats were sensitized with ovalbumin (OVA) Egg White at the dose of 500 mg/kg body weight.

Charcoal therapy of the best waste, based on chemical composition, water content, rendement, and absorbability, was given at the dose of 10%, 15%, and 20% to 5 groups of male rats and the immunoglobulin (IgE) level was measured using Elisa reader.

Py-GC/MS Identification: Chemical identification of the charcoal utilized a Py-GCMS chromatography with helium (He) gas as mobile phase [18]. As much as 27.8 mg of charcoal powder sample was inserted into a cuvette, then put into Py-GCMS heated at the programmed temperature, gradually rising from 100 to 250 ºC.

RESULTS AND DISCUSSION:

Chemical Composition: Charcoal is a porous solid containing 85-95% of carbon and produced from carbon-containing materials at the high-temperature heating. The charcoal chemical composition of *C. pleurophthalmus* waste obtained through a Scanning Electron Microscope (SEM) analysis is presented in **Table 1**.

It is dominated by carbon, with the highest in the caudal fin and the lowest in the fish scale. Oxygen occupies the second largest component, followed by calcium, phosporus, potassium, sodium, magnesium, chlorine, and sulfur.

The lowest content of chemical composition in the head skin, scale, and fins of *C. pleurophthalmus* is sulfur, with the lowest in the scale charcoal and the highest in the head skin charcoal, while the charcoal of the anal fin, ventral fin, and caudal fin does not contain sulfur.

TABLE 1: CHEMICAL COMPOSITION OF *C. PLEUROPHTHALMUS* WASTE CHARCOAL

Waste	Component (%)								
	Carbon	Oxygen	Sodium	Magnesium	Phosporous	Sulfur	Chlorine	Potassium	Calcium
Anal fin	62.984	22.033	1.173	0.281	4.289	-	0.703	1.099	7.438
Ventral fin	61.488	26.040	-	-	2.448	-	-	3.744	6.280
Dorsal fin	65.765	20.370	0.855	0.197	3.746	0.159	0.445	0.832	7.631
Scale	55.547	23.274	0.213	0.355	6.782	0.132	-	-	13.698.
Pectoral fin	62.784	22.239	1.063	0.282	4.208	0.168	0.681	0.817	7.753
Head skin	47.400	31.760	0.511	0.289	6.526	0.358	-	1.111	12.046
Caudal fin	67.744	20.287	0.697	0.259	3.756	-	0.388	0.431	6.440

Carbon in the charcoal of *C. pleurophthalmus* head skin, scale, and fins is not categorized as pure active carbon in Indonesia National Standard [19], minimum 80% in powder form. Carbon level is dependent upon the amount of carbon fraction bound in the active carbon and the amount of burned materials. Water content determines carbon value as well, in which lower water content will give higher carbon value. This condition could cause carbon surface area be bigger, and number of charcoal pores be more to absorb liquid or gas [20].

Water Content: Good charcoal contains low water content in order to yield high calories. The quality standard of the charcoal water content, according to Indonesia National Standard [19] concerning the charcoal physical and chemical properties, is 5% at maximum, so that the charcoal product of *C. pleurophthalmus* waste meets the quality standard. The charcoal water content analysis showed that the highest water content of *C. pleurophthalmus* was recorded in the scale charcoal (3.676%) and the lowest in the caudal fin (1.614%). The difference in the water content of *C. pleurophthalmus* waste charcoal could result from the different surface areas of the material.

Water content determination aims to know the hygroscopic feature of the charcoal [20]. The charcoal becomes active because of its hygroscopic feature, in which the water content reaches equilibrium in certain conditions and humidity. Water content can be influenced by humidity and storing conditions in which the water content of the charcoal is highly affected by the amount of water vapor in the atmosphere, the cooling period, and the hygroscopic feature [21]. The water content in the charcoal of *C. pleurophthalmus* is presented in **Table 2**.

TABLE 2: WATER CONTENT OF *C. PLEUROPHTHALMUS* WASTE CHARCOAL

Charcoal type	Mean	Pairwise Comparisons Probability							Notion
		Caudal fin	Anal fin	Head skin	Pectoral fin	Ventral fin	Dorsal fin	Scale	
Caudal fin	1.49		0.286	0.081	0.016	0.000	0.000	0.000	a
Anal fin	1.89	0.286		0.500	0.183	0.008	0.000	0.000	ab
Head skin	1.98	0.081	0.500		0.512	0.048	0.003	0.000	ab
Pectoral fin	2.23	0.016	0.183	0.512		0.185	0.023	0.002	bc
Ventral fin	2.65	0.000	0.008	0.048	0.185		0.341	0.079	cd
Dorsal fin	2.90	0.000	0.000	0.003	0.023	0.341		0.422	d
Scale	3.22	0.000	0.000	0.000	0.002	0.079	0.422		d

Notes: Mean values followed with the same alphabet are not significant (a and ab, ab and b, b and bc, bc and cd, cd and d); values followed with the different alphabet is significantly different (a and b, a and bc, a and cd, a and d)

TABLE 3: RENDEMENT OF *C. PLEUROPHTHALMUS* WASTE CHARCOAL

Charcoal type	Mean	Probability of Pairwise Comparisons							Notion
		Scale	Anal fin	Dorsal fin	Ventral fin	Pectoral fin	Head skin	Caudal fin	
Scale	0.74		0.396	0.272	0.017	0.006	0.000	0.000	a
Anal fin	1.37	0.396		0.802	0.126	0.058	0.000	0.000	ab
Dorsal fin	1.55	0.272	0.802		0.201	0.100	0.001	0.000	ab
VentraL fin	2.26	0.017	0.126	0.201		0.714	0.044	0.018	B
Pectoral fin	2.56	0.006	0.058	0.100	0.714		0.100	0.046	bc
Head skin	3.47	0.000	0.000	0.001	0.044	0.100		0.728	cd
Caudal fin	3.61	0.000	0.000	0.000	0.018	0.046	0.728		d

Notes: Mean values followed with the same alphabet are not significant (a and ab, ab and b, b and bc, bc and cd, cd and d);values followed with the different alphabet is significantly different (a and b, a and bc, a and cd, a and d)

The charcoal density is determined by water content, where higher density will reduce the hygroscopic feature, and the absorbability to the water will decline and vice versa [20]. Higher density makes the inter-particle spaces be closed due to the particle cohesion so that there will be no empty space.

Rendement: Rendement is an important value in product manufacturing. It is the ratio between dry weight of product and weight of raw material [22]. The rendement value is also related to the number of bioactive compounds in the animal's or plant's body.

The highest rendement was recorded in the charcoal of *C. pleurophthalmus* caudal fin, but as a whole all samples showed low rendement **Table 3**. ANOVA indicates that the mean rendement of caudal fin charcoal is significantly different from that the scale, the anal fin, ventral fin, dorsal fin, and pectoral fin, but not significantly different from that of the head skin. Also, the mean rendement of the scale charcoal is significantly different from that of the caudal fin, pectoral fin, ventral fin, pelvic fin, head skin, but not different from that of anal fin and dorsal fin.

This low rendement could result from an increased reaction between carbon and water vapor at the carbonization so that the carbon reacting to be CO_2 and H_2 becomes more. The rendement of charcoal processing depends upon the raw materials and the activation treatment, such as temperature, time, and activating material [23].

Charcoal Absorbability: The absorbability of the charcoal of *C. pleurophthalmus* waste to iodine ranged from 446.70-757.14 mg/g, with the lowest in the head skin, 446.70 mg/g, and the highest in the caudal fin, 757.14 mg/g **Table 4**.

TABLE 4: THE ABSORBABILITY OF *C. PLEUROPHTHALMUS* WASTE CHARCOAL

Charcoal type	Mean
Scale	543.57 ± 66.57
Anal fin	521.11 ± 100.23
Dorsal fin	551.27 ± 104.4
Ventral fin	545.87 ± 99.27
Pectoral fin	550.52 ± 108.52
Head skin	521.29 ± 103.03
Caudal fin	644.10 ± 97.09

A statistical test (χ^2) indicates no significantly different effect of the charcoal source of *C. pleurophthalmus* body parts on the charcoal absorbability ($P>0.05$). The charcoal absorbability in this finding has met the Indonesian quality standard of SNI 06-3730- 95 for charcoal, at least 750 mg/g, in the caudal fin of *C. pleurophthalmus*. The charcoal absorbability of *C. pleurophthalmus* waste of other body parts does not meet the Indonesian quality standard because the product is not activated charcoal. This condition could also result from imperfect charcoal manufacturing [18], and there are pores covered by hydrocarbon, tar, and other components, such as ash, water, nitrogen, and sulfur, so that all charcoal pores are not optimally opened so that the absorbability is low [23].

The charcoal of animal bone has high absorbability since it has numerous pores [16]. Its high absorbability to absorb color, which yields light yellow color as titrated with 0.1 $NNa_2S_2O_3$, makes bone charcoal be very effective to be used in a small amount. Bone charcoal can also absorb certain undesired odor.

***In-vivo*:** Specific Immunoglobulin E (lgE) level of male rat was 97.83 ± 6.04 before sensitization and rose to 678.07 ± 238.15 after sensitized with ovalbumin. It reflects allergic reaction occurs in male rats **Table 5**. Previous studies [24, 25] found that the IgE level was below 48 ng/ml for the individual with no allergy, between 48-240 ng/ml for the individual with questionable allergy, and above 240 ng/ml for the individual suffering from allergy. Application of ovalbumin can raise the level blood serum after sensitization. This finding is in agreement with previous findings [26, 27] suggesting that ovalbumin administration could increase the IgE production.

Based on specific IgE measurements using Elisa reader, the male rat group treated with the dose of 15% charcoal of *C. pleurophthalmus* caudal fin had the lowest mean blood specific IgE level **Table 5**. Other dose treatments did not have an effect on specific lgE level reduction of the male rats. It reflects that the dose of 15% is capable of suppressing the specific lgE level of the male rats. Therefore, it is believed that the active compound in the charcoal of *C. pleurophthalmus* caudal fin plays an important role in impeding the histamine action so that the IgE expression can be restrained. The role of Immunoglobulin E (IgE) is central in allergic sensitization and atopic disorders, such as allergic rhinitis, asthma, and atopic dermatitis [28, 27, 29]. The lgE plays a role in the development of allergic reactions [30]. Several conditions that could cause an allergic reaction are the formation of excessive antigen-antibody complex, increased calcium influx into the mast cell and increased cAMP level in the cell [31, 32]. The application of ovalbumin is able to increase the IgE blood serum level after sensitization.

This finding is in agreement with previous report [27] that ovalbumin administration can raise the IgE production. **Table 6** shows that male rats with the highest lgE content are recorded in the control negative group (-) and statistically significantly different from that in group 2 and group 3, but not significantly different from that of the control positive group (+) and group 1. Group 2 has significantly different lgE from that in the control negative group (-), but non-significantly different lgE from that in the control positive group (+) (ac), group 1, and group 3.

TABLE 5: ELISA READER OF SPECIFIC IGE IN MALE RAT GROUP BEFORE AND AFTER SENSITIZATION, AND AFTER ADMINISTRATION OF *C. PLEUROPHTHALMUS* CAUDAL FIN CHARCOAL

Group	Elisa Reader of specific IgE(ng/ml)						
	Before sensitization	After sensitization	Treatment (Dose)				
			(-)	(+)	1	2	3
Control (-)	95.7	434.6	406.7	-	-	-	-
	91.2	412.3	399.4	-	-	-	-
	89.9	430.9	407.8	-	-	-	-
Control (+)	92.1	591.2	-	245.7	-	-	-
	101.1	475.8	-	309.7	-	-	-
	98.7	466.6	-	298.9	-	-	-
Group 1	102.3	1121.8	-	-	207.5	-	-
	99.1	908.7	-	-	235.9	-	-
	102.3	1147.7	-	-	205.1	-	-
Group 2	99.2	647.3	-	-	-	95.7	-
	112.4	789.6	-	-	-	98.7	-
	90.9	709.4	-	-	-	97.6	-
Group 3	96.7	749.1	-	-	-	-	103.9
	102.9	736.2	-	-	-	-	109.5
	92.9	549.9	-	-	-	-	108.7

TABLE 6: THE IGE CONTENT IN 5 MALE RAT GROUPS

Group	Mean	Probability					Notion
		P2	P3	P1	P (+)	P (-)	
Group 2	97.33 ± 1.52		0.411	0.100	0.014	0.001	a
Group 3	107.37 ± 3.03	0.411		0.411	0.100	0.014	ab
Group 1	216.17 ± 17.13	0.100	0.411		0.411	0.100	abc
Control (+)	284.77 ± 34.26	0.014	0.100	0.411		0.411	ac
Control (-)	404.63 ± 4.57	0.001	0.014	0.100	0.411		c

Notes: Mean values followed with the same alphabet are not significant (a and ab, ab and b, b and bc, bc and cd, cd and d); values followed with different alphabet is significant different (a and b, a and bc, a and cd, a and d).

The histamine inhibitory mechanism of antihistamine (AH) is through histamine receptor occupation in that histamine could be removed from the receptor [33]. Histamine inhibition makes the allergic process be reduced as well. Anti-histamine has been long prescribed for atopic dermatitis as additional therapy to prevent histamine action on the skin [34, 35, 36].

Pyrolysis GCMS (Py-GCMS) Identification: The best charcoal of *C. pleurophthalmus*, based on water content, rendement, and absorbability, is that from caudal fin. The qualitative analysis using pyrolysis-GCMS (Py-GCMS) is presented in **Fig. 1**.

Chemical component identification of the charcoal of *C. pleurophthalmus* caudal fin using single-shot Py-GCMS and qualitatively analyzed under Chem Station database library found 12 compounds **Table 7** with a dominant active compound of Hexadecanenitrile / Palmitonitrile with an area of

28.74% equivalent to 96% match quality. Hexadecanenitrile has the chemical name of palmitic acid, Nitrile, with chemical formula of $C_{16}H_{31}N$ and molecular weight of 237.42 g/mol [37]. Hexadecane ($C_{16}H_{32}$) is a derivative of hydrocarbon alkane (CnH_2n^{+2}) with long-chain or often known as higher alkanes due to having long carbon chain [38, 39]. Alkane is a hydrocarbon compound containing double bond or unsaturated carbon bond with the formula of CnH_2n.

The GC-MS analysis shows that there is an alkaloid (piperidinone, piperidine, hexadecanenitrile) in ethyl-acetate-extracted endophytic mold of custard apple *Annona muricata* leaf reported as anticancer [40]. Hexadecanenitrile is raw material used in various products and skin health industry [37].

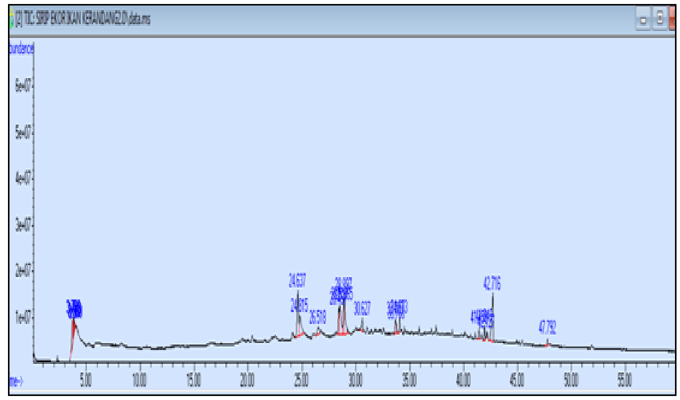

FIG. 1: PY-GCMS CHROMATOGRAM OF CHARCOAL OF C. PLEUROTHALMACAUDAL FIN

TABLE 7: TWELVE CHEMICAL COMPOUNDS IN THE CHARCOAL OF *C. PLEUROPHTHALMUS* CAUDAL FIN WASTE

Peak	Retention Time (RT)	Area (%)	Compound assessment	Quality (%)
1	3.718	3.39	L-Alanine, ethyl ester oxirane	40
2	3.752	0.85	L-Alanine, ethyl ester acetaldehyde	40
3	3.787	0.52	L-Alanine	9
4	3.820	0.26	1-Octanamine, N-methyl-acetaldehyd	17
5	24.578	10.45	Pentadecanonitrile	95
6	24.870	28.74	Hexadecanenitrile, palmitonitrile	96
7	28.380	3.88	1-Pentadecene	91
8	28.474	5.39	Cyclotetradecane	91
9	28.838	12.44	Hexadecylene-1	91
10	28.835	8.08	Heptadecanenitrile	86
11	29.008	18.86	Octadecanenitrile	90
12	42.599	7.13	Cholesta-3,5-diene	98

CONCLUSION: The charcoal quality of *Channa pleurophthalmus* wastes from Central Kalimantan through characterization and exploration contained the following dominant chemical composition, 55.547%-67.744% of carbon, 1.614-.676% of water with the lowest in caudal fin, rendement of 0.6036-3.7612% with the highest in caudal fin, absorbability of 446.70-757.14 mg/g with the highest in the caudal fin.

The characterization and exploration indicated that the best charcoal quality occurred in the caudal fin. *In-vivo* test found that the dose of 15% charcoal of *C. pleurophthalmus* caudal fin could suppress the IgE expression in the male rat.

The Py-GC/MS analysis detected 12 compounds and the dominant active compound was Hexadecanenitrile, Palmitonitrile with 28.74% match quality 96%. The charcoal of *C. pleurophthalmus* possesses great bioactivity potential to be developed in pharmacy.

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REFERENCES:

1. Lenny S and Zuhra CF: Isolation and bioactivity test on main chemical content of red puddingusing brine shrimp method. Jurnal Komunikasi Penelitian 2005; 17(5): 56-59.
2. Ministry of Health of Indonesian Republic: Formulation of Indonesian Traditional Drugs. Indonesia 2017.
3. Semiawan F, Ahmad I and Masruhim MA: Anti-inflammatory activity of beautyberry (*Callicarpa longifolia* L.) leaf extract. Jurnal Sains dan Kesehatan 2015; 1(1): 1-4.

4. Afriansyah B, Hidayati NA and Aprizan H: The use of animal as traditional medicine by Lom ethnic in Bangka. Jurnal Penelitian Sains 2016; 18 (2): 66-74.
5. Valsan A and Raphael RK: Pharmacognostic profile of *Averrhoa bilimbi* Linn. Leaves. South Indian Journal of Biological Science 2016; 2(1):75-80.
6. Al-Rubaye AF, AF Kaizal and IH Hameed: Phytochemical Screening of Methanolic Leaves Extract of *Malva sylvestrs*. International Journal of Pharmacognosy and Phytochemical Research 2017; 9(4): 537-52
7. Lee YY, Park J, Lee E, Lee S, Kim D, Kang JL and Kim H: Anti-inflammatory mechanism of ginseng saponin metabolite Rh3 in lipopolysaccharide-stimulated microglia: critical role of 5'-adenosine monophosphate-activated protein kinase signaling pathway. Journal of Agricultural and Food Chemistry 2015; 63: 3472-80.
8. Salem AMD: Effect of *Nigella sativa* supplementation on lung function and inflammatory mediators in partly controlled asthma: a randomized controlled trial. Ann Saudi Med 2017; 37(1): 64-71.
9. Gunel C, Meteoglu I, Yilmaz M, Omurlu I and Kocaturk T: The anti-inflammatory effects of thymoquinone in a rat model of allergic rhinitis. J Ear Nose Throat 2017; 27: 226-32.
10. Liu FC, Chiou HJ, Kuo CF, Chung TT and Yu HP: Epidemiology of anaphylactic shock and its related mortality in hospital patients in taiwan: a nationwide population-based study. Shock Society 2017; 48(5): 525-28.
11. Choi YJ, Kim JH, Jung JY, Kwon HS and Park JW: Underuse of epinephrine for pediatric anaphylaxis victims in the emergency department: a population-based study. Allergy, Asthma & Immunology Research 2019; 11(4): 529-34.
12. Baratawidjaja KG and Rengganis I: Basic Immunology. Ed 11. Jakarta: Badan Penerbit Fakultas Kedokteran Universitas Indonesia 2014; 217-83.
13. Mukesi M, Phillipus IN, Moyo SR and Mtambo OP: Prevalence of skin allergies in adolescents in Namibia. Int Journal of Allergy Medications 2018; 3(1): 1-5.
14. Kuby J: Immunology. Edisi ke-5. New York: WH Freeman 2007; 832.
15. Eckerle P, Pursch M, Cortes HJ, Sun K, Winniford B and Luong J: Determination of short-chain branching content in polyethylene by pyrolysis comprehensive multi-dimensional gas chromatography using low thermal mass column technology. Journal of Separation Science 2008; (1): 3416-22.
16. Liu WT, Li GY, Miao YQ and Wu XH: Preparation and characterization of pepsin-solubilized type I collagen from the scales of snakehead (*Ophiocephalus argus*). Journal of Food Biochemistry 2009; 33: 20-37
17. AOAC (Association of Official Analytical Chemist): Official method of analysis of the association of official analytical of chemist. Arlington: The Association of Official Analytical Chemist, Inc. 2005; 25.
18. Lempang M: Manufacturing and benefit of active charcoal. Info Teknis EBONI 2014; 11 (2): 65-80.
19. SNI: SNI 06-3730-1995: Technical active charcoal. Badan Standardisasi Nasional. Jakarta 1995; 5-8.
20. Sahara E, Sulihingtyas WD and Mahardika IPAS: Active charcoal production and characterization of Mexican marigold (*Tagetes erecta*) plant stem activated with H_3PO_4. Jurnal Kimia 2017; 11(1): 1-9.
21. Faizal M, Andynapratiwi I and Putri PDA: The effect of charcoal and adhesive composition on the quality of rubber tree biobriket. Teknik Kimia 2014; 2 (20): 36-44.
22. Yuniarifin H, Bintoro VP and Suwarastuti A: Effect of various doses of phosphoric acid in cattle bone maceration on the rendement, ash content and gelatin viscosity. Journal Indon Trop Anim Agric 2006; 31(1): 55-61.
23. Polii FF: The effect of temperature and activation duration on the quality of active charcoal of coconut wood. Jurnal Industri Hasil Perkebunan 2017; 12 (2): 21-28.
24. Selvianti DR and Pawarti: Anti immunoglobulin E (Omalizumab) in Rinitis allergy therapy. Jurnal THT-KL 2009; 2 (2): 95-05.
25. Perdijk O and Marsland BJ: The Microbiome: Toward Preventing Allergies and Asthma by Nutritional Intervention. Current Opinion in Immunology 2019; 60: 10-18.
26. Han S, Sun L, He F and Che H: Anti-allergic activity of glycyrrhizic acid on IgE-mediated allergic reaction by regulation of allergy- related immune cells. Scientific Reports 2017; 7: 1-9.
27. Xu Z, Wang T, Guo X, Li Y, Hu Y, Ma C and Wang J: The Relationship of Serum Antigen-Specific and Total Immunoglobulin E with Adult Cardiovascular Diseases. International Journal of Medical Sciences 2018; 15(11): 1098-04.
28. Olorunnisola OS, Adetutu A and Fadahunsi OS: Anti-allergy potential and possible modes of action of *Sphenocentrum jollyanum* pierre fruit extracts. The Journal of Phytopharmacology 2017; 6(1): 20-26.
29. Toizumi M: Asthma, Rhinoconjunctivitis, eczema and the Association with perinatal Anthropometric Factors in Vietnamese Children. Scientific Reports 2019; 9(2655) : 1-5
30. Lowe AJ, DYM Leung, MLK Tang, JC Su and KJ Allen: The skin as a target for prevention of the atopic march. Ann Allergy Asthma Immunol 2018; 120: 145-51.
31. Tannaro AP, Expósito IL, Ojalvo DL, Fandiño RL and Molina E: Antibody production, anaphylactic signs, and t-cell responses induced by oral sensitization with ovalbumin in BALB/c and C_3H/HeOuJ Mice. Allergy, Asthma & Immunology Research 2016; 8(3): 239-240
32. Randall KL and Hawkins CA: Antihistamines and allergy. Australian Prescriber 2018; 41(2): 42-45.
33. Pouessel G: Abstract From the Food Allergy and Anaphylaxis Meeting 2016. Clinical and Translational Allergy 2017; 7(10): 1
34. Xie C, Liu Q, Xia JM, Gao Y, Yang Q, Shao Z, Liu G, and Yang X: Anti-allergic compounds from the deep-sea-derived actinomycete nesterenkonia flava MCCC 1K00610. Mar. Drugs 2017; 15(71):1-8.
35. Ikhsan M, Hiedayati N, Maeyama K and Nurwidya F: *Nigella sativa* is as anti inflammatory agent in asthma. BMC Research Note 2018; 11(744): 1-5.
36. Thangam EB, Jemima EA, Singh H, Baig MS, Khan M, Mathias CB and Saluja: The role of histamine and histamine receptors in mast cell-mediated allergy and inflammation: the hunt for new therapeutic targets. Frontiers in Immunology 2018; 9: 1-9.
37. PubChem: Hexadecanenitrile. Compound Summary. US National Library of Medicine. 2005; https://pubchem.ncbi.nlm.nih.gov/compound/69424
38. Wibowo S and Hendra Dj: Wild sugarcane (Saccharum spontaneum Linn.) bio-oil using fast pyrolytic process. Jurnal Penelitian Hasil Hutan 2015; 33 (4): 347-363.
39. Mohanty SK, Khuntia A, Yellasubbaiah N, Ayyanna C, Naga Sudha B and Harika MS: Design, synthesis of novel azo derivatives of benzimidazole as potent antibacterial and anti tubercular agents. Beni-Suef University Journal of Basic and Applied Sciences 2018; 7(4): 646-51.

40. Minarni: Anticancer activity of ethyl acetate-extracted endophytic mold of custard apple (*Annona muricata* L.) leaf. Master Thesis. Sekolah Pascasarjana Institut Pertanian Bogor 2016; 79.

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