STUDY OF LIQUID FRACTION SEPARATING IN PEROLISIS OF BIOLOGICAL ORGANIC WASTE

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Abstract. *Nowadays, the need for clean drinking water is increasing year by year. There are a lot of adsorbents in water treatment, but in obtaining adsorbents, bicoals are one of the most popular methods as adsorbents with a high purification index and a cheap price. Liquid fractions, which were retained as condensates of the mixed gases released during the pyrolysis process, were studied. Our liquid fraction differs from other liquid fractions by the presence of combustible and fuel additives in a small amount. It is recommended to prevent the emission of waste gases into the atmosphere and to use the obtained secondary raw materials as secondary raw materials for paint and antifreeze production enterprises.*

Keywords: *perolysis, biochar, secondary raw materials, liquid fraction, partial pressure, mixture.*

INTRODUCTION: Today, as the number of industrial enterprises increases, the needs of people are also increasing. Year by year, due to the construction of industrial enterprises, new lands are being developed. During the operation of industrial enterprises, the mixing of gas and liquid wastes into the atmosphere, soil, underground and surface water is increasing year by year. Disposal of industrial and domestic wastes causes anthropogenic problems if they are not controlled by separation of gaseous and liquid toxic substances. Based on the world experience, one of the most popular ways to prevent this is to use adsorbents, i.e. biochars. Biochars are obtained from agriculture, forestry, waste. At the same time, it has the ability to adsorb and clean the liquid and gas wastes coming out of the industrial enterprise, and it is distinguished by its low cost.

- Analysis of literature on the topic (Literature review). Humanity has used porous carbon materials (adsorbents) for many centuries. In the 18th century, coal's ability to purify various liquids and absorb some gases was discovered [1]. Until the beginning of the 20th century, carbon sorbents (mainly obtained from wood, bone, agricultural waste) were mainly used for liquid purification in the food industry and winemaking [1].

Today, biochars are secondary raw materials with various carbon content. For example: coconut and citrus fruit waste, wood, cellulose, [2-3] lignite and hard coal, [4] liquid and gaseous hydrocarbons, synthetic [5] polymers, agricultural and o Pyrolysis-activated adsorbents are obtained from vegetable waste [6], waste containing organic substances, bitumen, asphalt, used car tires, waste agricultural and industrial rubber, synthetic polymers.

Activated carbon carbons are a product of the processing of carbon-containing materials, characterized by a highly developed porous surface and high efficiency of soda processing. It is used in industry: it is highly effective in air and gas purification, waste water purification, technical and drinking water absorption, and industrial water purification of wastewater with medium toxic concentration [7].

– RESEARCH METHODOLOGY (Research Methodology). In the autumn season, one of the main traffic streets in Olmozor district is crowded with cars, and one of the non-stop traffic

streets is the perennial plant on the side of the intersection of Sagbon small village) Pinus eldarica - pine cones (i.e. spruce 'toys') we collected the spilled pine fir cones and washed it with technical water to remove dust and waste substances from the fir cones. Spilled spruce cone waste mainly contains fiber, fatty esters, phenolic compounds and gasoline vapors, and toxic gases settle in the composition of leaves and spruce cones during the filtering of gases and dust from the atmosphere. Spruce cones are used to reduce the percentage of ash content by washing the denatured substances contained in the washing target (Fig. 1). After we dry the waste of washed spruce cones under the sun for half a day, we put them in a pyrolysis furnace and start burning them in airless conditions (Fig. 2). Starting at 50 ºS, the initial carbon was converted to bio-char in 300 minutes at a high temperature of 450-500 ºS in an oxygen-free environment (Fig. 2). After more than 40 minutes during the process, the mixed gases coming out of our perolisis furnace are condensed and held in drops using a water cooler. It should be noted that when the temperature reaches 450-500 ºS in 240 minutes, 700 ml of liquid fraction is released from 1,800 kg of mature leaves.

Figure 1. Spilled Christmas tree toys.

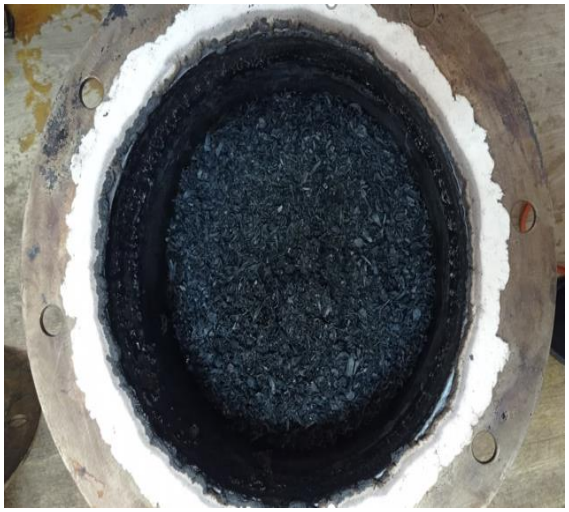

Figure 2. Our biochar inside our pyrolysis furnace.

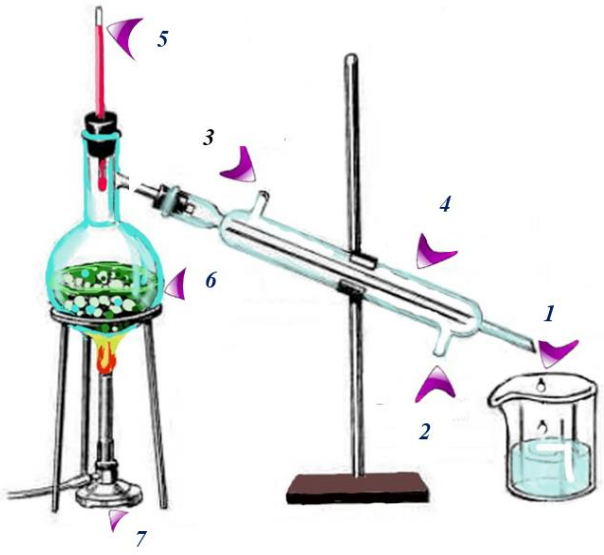

Fig. 3 Separation of volatile substances using the distillation method: collecting tank, 2- inlet of water cooler, 3- outlet of water cooler, 4- water cooler, 5- Thermometer, 6- process of driving liquid fraction, 7- tube heater

Evaporate the obtained liquid fraction at atmospheric pressure. Depending on the conditions, there are three types of driving: 1) driving at atmospheric pressure; 2) drive under low pressure, i.e. in a vacuum; 3) driving with water vapor. Using the first method, substances are boiled and brought to a vapor state. Then the vapors turn into liquid in the cooler. During driving, the amount of substances that boil at low temperatures is greater in the vapor phase than in the liquid phase. When such vapors condense, a fractional liquid with a new composition that boils at a low temperature is formed. A typical driving apparatus consists of a round flask with a side tube (Virs flask), a thermometer, a cooler, a flask, and a collecting flask. The boiling liquid vapor passes into the cooler and condenses (Fig. 3). Therefore, depending on the position of the side tube, the flask is selected according to the boiling temperature of the liquid. If the boiling point of the propellant is high, the side tube of the flask should be bent downwards.

If the boiling temperature is low, the side of the flask should be raised above the neck of the flask. The formula for determining the molecular mass of the substance and the partial pressure of water at the boiling temperature of the mixture using the following formula:

$$\frac{W_A}{W_{H2O}} = \frac{P_A - M_A}{P_{H2O} \,.\, 18{,}02}$$

In this $\frac{W_A}{W_{H2O}}$ mass of matter and water, P_A,P_{H2O} the substance at the boiling point of the mixture and partial pressures of water, MA is the molecular mass of the substance

Any round-bottom flask with a dephlegmator can be used for driving. A mixture of two substances is divided into fractions depending on the boiling temperature. Two different fractions are usually collected during the first run:

In order to capture volatile chemicals in its composition, we collect the liquid fraction with a temperature of up to 95 oC using a distillation apparatus, and we also collect the curd residue. We can collect chemicals mixed with water up to a temperature of 110 oC with the help of a mechanical device, and we can also collect curd residue.

Using a flask heater, pour 250 ml of our liquid fraction into a heat-resistant 500 ml flask, install the first hand in the flask using a three-hole glass adapter, the second hand put it in the refrigerator, and the third hand 200 ºS we install a temperature-resistant thermometer. We collect the volatile chemical substances released during the process in separate storage tanks depending on the temperature at which they are released.) we collect the liquid extracted from the process of perolysis of pine cones of Pinus eldarica at temperatures of 95 ºS and 105 ºS with the help of a thermometer. In 290 minutes of the process, we separated the liquid fractions and put them in a collecting container, and we sent the liquid fraction to infrared spectroscopy for inspection, and the solid part to a temperature of 120 ºS was given for chromatography analysis.

– **ANALYSIS AND RESULTS** (Analysis and results). Two different liquid fractions obtained, i.e. volatile chemicals obtained at a temperature of 95 ºS and liquid fraction obtained at a temperature of up to 120 ºS, were checked using the mass selective "5977 AMSD" DRUGS_SKAN.A1 M method orcal of 5% in the "Agileht technoogies 7890NNetwork GC system" chromato-mass spectrometry. with a length of 30 m covered with phenylmethylsiloxane. using a capillary column, the temperature of the injector is 280 oS, and the temperature of the thermostat rises from 150 ºS to 289 ºS in 1 min. between 10 ºS, the analysis time is 29.32 minutes. When we examine our liquid fraction using liquid chromatography, we can see in Table 1 below:

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File       :G:\2024\January\53_1.D
Operator   : NHN
Acquired   : 27 Jan 2024  00:33     using AcqMethod Drugs_SCAN_A G_4_auto.M
Instrument :    GCMS
Sample Name:
Misc Info  :
Vial Number: 7
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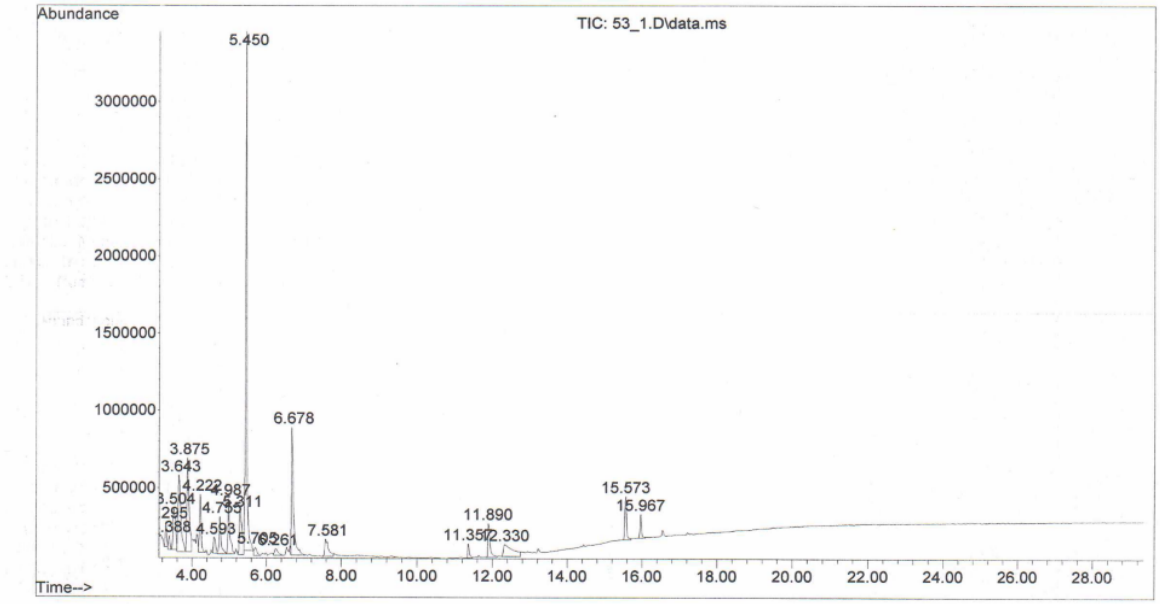


№	time taken for checking (minutes).	Increase in temperature ºS over time	Chemical substance % and name from the liquid fraction	Minimum Accuracy Quality Percentage %
1	3:30	180	1,44% 3 Metil siklogeksen	76 %
2	3:38	184	0,88% 1 Metil siklogepten	58 %
3	3:50	187	4,46% 3 pentanon metil	53 %
4	3:56	189	9,24% 2 furankarboksaldegid	95 %
5	3:59	189	8,95 fenol	95 %
6	4:22	192	3,72% 2furankarboksilik kislota, tetrahidro furil metil efir	64 %
7	4:30	195	1,44% 2siklopenten, 2gidroksi-3metil	76 %
8	4:45	196	2,90% 2 siklopenten, 3 dimetil	87 %
9	4:52	198	4,35% Fenol,2 metil	98 %
10	5:5	201	5,53% kreozol,fenol,3-metil	95 %

11	**5:30**	**206**	**27,87% Fenol, 2- metoksi**	**97 %**
12	**5:55**	**208**	**0,88% Fenol,3-dimetil**	**84 %**
13	**6:26**	**212**	**0,93% Fenol,4-dimetil**	**94 %**
14	**6:45**	**215**	**11,31% kreozol**	**97 %**
15	**7:55**	**227**	**2,74 fenol,4-etil,2-metoksi**	**93 %**
16	**11:30**	**235**	**0,93% Ftalik kislota, izobutil propil efir**	**80 %**
17	**11:55**	**238**	**303% 2- benzendikarboksilik kislota,2- metilpropil efir**	**95 %**
18	**12:30**	**245**	**4,75% fenobarbital**	**99 %**
19	**15:45**	**255**	**3,23% bis (2-etilheksil) ftalat**	**99 %**
20	**15:59**	**259**	**1,42% 1,2-siklogeksandikarboksilik kislota, siklobutil oktil efiri**	**35 %**

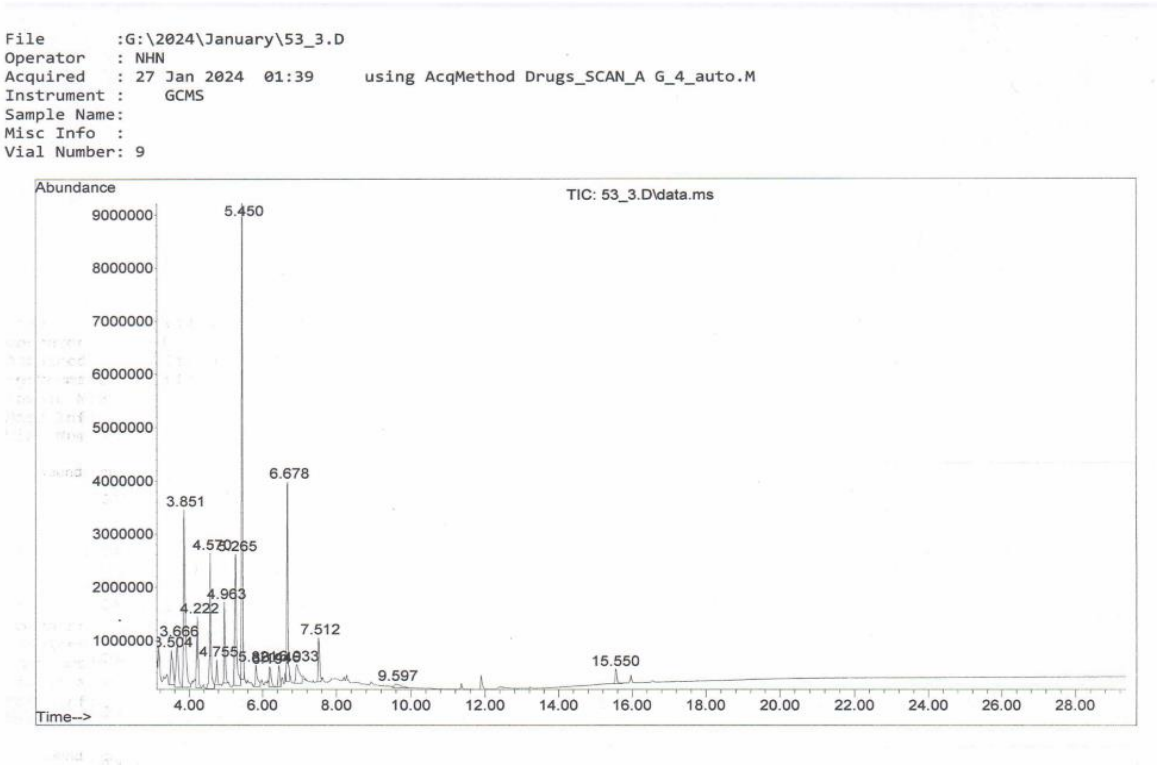
In Table 1, the composition of our liquid fraction obtained up to 95 °S in the "Agileht technoogies 7890NNetwork GC system" chromato-mass spectrometry.

As can be seen in this table, substances with high concentrations of chemicals are: **CH_3, $C_6H_{10}O$, C_2H_6O, $C_6H_5OCH_3$, $C_9H_6O_5$, $C_7H_{17}N$, C_7H_8O,$C_5H_{10}O$** organic binders are widely used in the varnish industry as an organic additive solution or solvent.

These organic substances disperse into the environment in volatile gas or liquid form, these substances are characterized by their volatility in open air. If the atmosphere, soil, underground and surface waters are poisoned very quickly.

At the same time, it is considered a chemical poison that affects human health through the respiratory tract, redness or tearing of the eyes, burns under the skin and on the skin, or as an allergen and death.

Our obtained organic chemicals are recommended for use in the food and paint industries.



№	time taken for checking (minutes).	Increase in temperature ºS over time	Chemical substance % and name from the liquid fraction	Minimum Accuracy Quality Percentage %
1	3:20	184	3,70 % 2-butanon, 3-dimetil	72 %
2	3:38	186	4,90% 2-siklopenten, 3-metil	96 %
3	3:50	189	14,57% fenol	95 %
4	4:22	192	4,87% 2-propenik kislota, 2-metil,(tetrahydro-2-furanil) metal efir	64 %
5	4:30	190	9,16% 2-siklopenten-1-bir, 2-gidroksi-3-metil	96 %
6	4:35	193	1,42% 2-siklopenten-1-bir, 3-dimetil	90 %
7	4:40	196	4,31% fenol, 2-metil	98 %
8	5:20	202	10,56% p-kresol	96 %
9	5:30	205	21,86%	

			fenol, 2-metoksi	**97 %**
10	**5:45**	**207**	**2,11% 2-siklopenten-1-bir, 3-etil-2-gidroksi**	**97 %**
11	**6:19**	**212**	**1,76% fenol, 5-dimetil**	**96 %**
12	**6:30**	**215**	**1,71% fenol, 3-etil**	**90 %**
13	**6:45**	**217**	**10,0% kreozol**	**98 %**
14	**6:55**	**219**	**3,40% katexol**	**96 %**
15	**7:30**	**225**	**3,27% fenol, 4-etil, 2-metoksi**	**95 %**
16	**9:30**	**245**	**1,20% 1-(4-metiltiofenil), 2-propanon gomovanil kislotasi**	**64 %**
17	**15:35**	**255**	**1,20% bis (2-etilheksil) ftalat**	**%**

Table 2 shows the composition of our liquid fraction obtained up to 110 °S in the "Agileht technoogies 7890NNetwork GC system" chromato-mass spectrometry.

As can be seen from this table, it was determined that there are organic chemicals with a high concentration in the liquid state. Our liquid separated from water at a temperature above 110 ^{o}S contains: C_6H_{12}, C_6H_6O, $CH_3C_6H_4OH$, $C_6H_5OCH_3$, C_7H_8O, $C_{16}H_{12}O_3$, these substances are distinguished by the category of danger, causing damage to the human nervous system, burning and flashing. It is recommended to use these organic substances as fuel or as a colorant in industry.

CONCLUSION (Conclusion). In this article, when we studied the technology of obtaining biochar by pyrolysis of organic-based waste, we studied the measures to prevent the poisoning of flora, water and soil by flying into the environment as a poisonous gas. In many cases, very little attention is paid to the retention of mixed gases during the perolysis process. The composition of the liquid fraction released during the perolysis process is not studied as a secondary chemical substance. Our next article focuses on obtaining liquid fuel from organic solid waste.

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