



ISSN: 2350-0328

**International Journal of Advanced Research in Science,
Engineering and Technology**

Vol. 6, Issue 4, April 2019

Technological Opportunities Power System Carrier Gaseous, Liquid and Solid Consistency by Agricultural Waste for Energy-Saving Installation

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ABSTRACT. In article is considered scientific and technical information, directed on problems of processing of solid waste and the remains of bio plant origin are provided. Data on results of pyrolysis on receiving pyro-condensate and pyro-carbon fabrics from cotton stalks are provided.

Apparently, use of the remains, materials and waste of organic origin will allow certain areas of the mother Earth to satisfy a considerable part of the needs for energy and energy carriers.

KEYWORDS: bio plant, wastes, residues, hydrocarbons, industrial, solid, municipal pyrolysis, thermal destruction.



ISSN: 2350-0328

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I. INTRODUCTION

Now carbon the containing materials are estimated as one of possible additional sources of energy. Apparently, use of the rests, materials and wastes of an organic origin will allow separate areas of a planet of the Earth to satisfy a significant part of the needs in energy and energy sources. In this connection the important meaning is got by geography of accumulation of the rests and waste.

At forecasting an energy potential of the rests, switching wastes, it is necessary to mean, that a source of energy can be only organic part of the rests. In this case are meant not only products of a biological origin, as, at least, 10 % of totals of the agricultural and urban rests in the world represent combustible materials. For reception of energy the part of the combustible rests because of their non-uniform distribution can be used only. The necessary exact data on rates of accumulation biological waste and their quantity, as a rule, are absent. Some combustible wastes, suitable for use as sources of energy, can find more effective application

II. SIGNIFICANCE OF THE SYSTEM

In article is considered scientific and technical information, directed on problems of processing of solid waste and the remains of bio plant origin are provided. The study of literature survey is presented in section III, methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and conclusion.

III. LITERATURE SURVEY

When the mankind feels an exhaustion of traditional natural sources hydrocarbon of raw material being in basic potential energy sources, then it is compelled will address to alternative sources. To such sources it will be possible to attribute first of all potential hydrocarbon waste of a biological origin, which represent high power value [1]. It is known, that mankind at an initial stage of the development for the first time addressed to wood as to a source energy sources. The not qualified usages from wood, as source of energy, limit scales of its application. The processing of a wood material with reception from it pyrolysis of gas, pyro-condensate and pyro-carbon opens new opportunities of its qualified use. On the preliminary settlement data it is visible, that in case of use pyro gas and pyro-carbon in quality energy sources in scale of republic it is annually possible to receive of 4 million tons liquid hydrocarbon, only at processing cotton stalk - stalks of the basic technical culture cotton plant. Potential cotton stalk annually in October - November of months (after the tax of a clap(cotton)) is estimated more than 100 million tons. Thus from this kind of a withdrawal, by the technology, developed by us, it is possible to receive 9 million ton pyro gas (fuel combustible gas) and 12 million ton pyro-carbon [2].

IV. METHODOLOGY

The similar approaches in many countries already give production. For example, in Turkey already in a home market has appeared in significant volume a biodiesel engine - product pyro lytic of processing of biological organic materials. In Ukraine the construction of the large complex on reception of biodiesel fuel from one-year plants - rape is finished. As the charged large territory is radioactive are most fruitful in agro culture the attitude, the government of republic has accepted the decision on rational use of this territory. Now are going to fruitful weight rape, which will be directed for processing with the purpose of reception from him of biodiesel fuel. This biodiesel engine in the near future will appear in a home market of Ukraine - having released huge potential of traditional diesel fuel, which will be directed on export.

On power summit, which was held in Bonn (Germany) 2004 from the highest tribune the appeal about necessity of intensive development of manufacture energy sources from materials of a biological origin has sounded. As in plants in very significant quantity the energy of the Sun is accumulated the qualified reception by processing these materials carries on a global scale energy-ecological and economic interest. Therefore within the framework of applied scientific - technological research, carried out by us, the tasks by definition of technological parameters of process pyro lytic of a method of reception of a fuel fraction from a stalk cotton plant and development of the technological circuit of a method of reception low hydrocarbon, gaseous and liquid consistence were put.

It is known, that in Republic of Uzbekistan the need for a home market to energy sources only in motor transport is made more by than 9 million ton per one year. From them of 6,5 million ton it is necessary on petrol and 2,5 million ton on diesel fuel. Besides need to diesel fuels show also agriculture and railway transportation. If to



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 6, Issue 4, April 2019

generalize all needs on diesel fuel, they are estimated not less than 3 million tons per one year. In the same time potential cotton stalk (stalks cotton plant), which could ensure (supply) a home market to these quantities of biofuel received on the basis of the technology, developed by us. But because of a disorganization of conducting jobs are irrevocably lost on agricultural fields cotton stalk. The very insignificant part by this cotton stalk is used by private sector in quality low-grade of fuel on village places. On accounts of the experts in the long term share of bio weight in electrical energy will reach about 10 %, and in manufacture of heat of 20 percent. The every prospect for engines of internal combustion in the future is opened by use of synthetic fuel received in process gasification from waste of a tree, agriculture and coal. On the literary data it is known, that at the end of 2003 in Saxon Freiberg manufacture "SunDistal", synthetic diesel fuel from bio weight began which reduces harmful emissions approximately to 50 percent.

Preceding from this, at performance of the applied scientific - technological project the jobs on reception pyro-condensate, appropriate fuel fractions and creation of skilled laboratory demonstration installation were stipulated. At the successful decision, the realization of a question of reception in frameworks innovation of the program will ensure in the accelerated rates to create is skilled pilot installation, which will be given to Government of Republic putting forward complex qualified use of all elements cotton plant in branches of economy.

However opportunity of use of these potentials is not so obvious, the questions having serious scientific, technological and applied meaning (importance) will not be decided (solved) yet. In a part pyrolytic by reception liquid hydrocarbon, replacing traditional hydrocarbon fuel (energy sources) and education of separate ecologically responsible (crucial) connections and if necessary managements of these processes for maintenance of observance of limiting allowable norms of emissions, and also thermal, thermodynamic and thermochemical of aspects pyrolytic by reception liquid hydrocarbon of components.

In parallel there is a necessity in management of processes with reference to real technologies of reception pyrocondensate, proceeding from technological, power, ecological and economic opportunities of republic, that predetermines necessity of development of original and optimum technologies of transportation, preparation and processing of raw materials.

As it marks, in the references, in the world already there are receptions of a biodiesel engine from various materials. However in reception from stalks cotton plant of petrol fractions anywhere yet are not engaged. The having incidental jobs specially are developed with reference to those plants, which are not respect to ours cultural. It is possible to result in acknowledgement stated such subject example, that the technology pyrolytic of processing Rape is a processing of vegetative fiber. Because rape, in the structure contains up to 20 % of vegetative fiber. And in our case - with reference to cotton plant, such technology and such process is not applicable at all, as in cotton plant (stalk cotton plant) up to 22 % of weights contains cellulose and practically absence of vegetative fiber. In view of the above-stated facts without own development it is impossible to realize taking into account features of raw material and technology of its processing, practically projects acted from outside of without certification, and respectful to local raw resources.

The recycling more than 30-35 million ton of stalks cotton plant (approximately fourth part of potential) per one year has the large energy-ecological meaning. Besides power capacity of this raw biological material makes more than 40 kcal and 200 million nm^3 of natural gas. Thus, the part of energy pyro gas and pyro-carbon can be spent for provision of energy itself pyrolytic of process, then from economy of traditional petrol fractions, accordingly will allow her on export, that at the world prices for diesel fuel on 1 t. 700 USD, even at export of 3 million ton, makes of 200 million US dollars per one year.

At performance of the present applied scientific - technological project the modes of realization of process with definition of optimum parameters such as influence of temperature, duration of process, influence fillers, residual contents of air, in without oxygen environment influence of a moisture, and other parameters influencing on pyrolysis are investigated. It has allowed to define (determine) optimum conditions, at which the necessary intensity pyrolysis is reached (achieved) to specify, that will represent the firm rests after pyrolysis and previously some questions concerning representations about the basic technological circuit pyrolysis of wood with reference to various technological conditions are found out.

V. EXPERIMENTAL RESULTS

The following stage carries out researches by definition of conditions of the minimal output soot aerosol at pyrolysis of stalks cotton plant - cotton stalk. This job has allowed estimating an opportunity study of process of course dry distillation of stalks cotton plant, both in bares a condition, and with bark. Such experiment has given the specified parameters influencing an output of a target product. As the investigated process is directed on receptions in the maximal contents pyro-condensate with an interval of boiling to the appropriate interval of boiling of petrol, for us the increase of the contents low-boiling low molecular weight of connections in pyro-condensate is not expedient. In

spite of the fact that always and in all cases of processing hydrocarbon of raw material low molecular weight of connection is more appreciated. In this case, as performance of the project is directed on reception of a petrol fraction to us more favorably to be guided by this parameter. The analysis of results has allowed further to develop to us the basic technological circuit pyrolysis of process, which will ensure of an output pyro-condensate in a maximum quantity and qualitatively to receive with an interval of boiling appropriate on an easy fuel fraction. Besides the received results form the basis on drawing up of complete representation about the possible technical and technological decisions at realization of process pyrolysis and choice of a necessary type of the device. Methods of management of process pyrolysis, directed on the maximal parity of reception pyrocondensate also are established also. The received results can be very important for universalization of process pyrolysis with reference to various kinds of a biomaterial. The rather important stage at performance of design scientific - technological job carries out researches on minimization of education of ecologically harmful components at pyrolysis of stalks cotton plant and other kinds of biological raw material. Here ecological party from operation can be various. The first part is ecological questions arising at burning pyro-gas and pyro-carbon for conducting pyrolysis of stalks cotton plant, i.e. autopyro lies. Thus the accent is directed on the contents component of structure pyro-gas and pyro-carbon. The second party of a question more seriously, as only conformity to an interval of boiling to easy fuel fractions of parameters pyro-condensate obviously insufficient. Here product should be certificated very strictly, with all gravity, and to correspond to all parameters on pretender of fuel according to State Standards. For example, it is possible to note, that the education in products macromolecular paraffin hydrocarbon of boiling, taking place in an interval, results in increase of temperature of hardening, that results in unfitness with use in the winter period. Other parameters can influence on octane number. Acidity and the acid number too concerns to such parameters, to which it will be necessary to concern very seriously. If the first task is the reception pyro-condensate the boiling's, appropriate to an interval, of diesel fuel. And in the second stage the product (fraction pyro-condensate) should sustain certification. Very probably in products pyrolysis as shows experience, are available propensity to tarring under influences of external natural conditions, that it is necessary to adjust and it is necessary to operate this process.

The scientifically research job was spent in laboratory conditions. Below in the tables 1-2 is resulted the characteristics of a secondary material - raw material pyrolysis

**Table-1
Chemical composition of the hydrocarbon part cotton stalk**

№	Elemental composition, % wt.	stalks cotton
1	Carbon	76,55
2	Hydrogen	14,11
3	Oxygen	6,16
4	Nitrogen	3,18

**Table-2
Characteristics of the hydrocarbon part of broad fraction of (SHFN) pyrolysis products of the secondary material of organic origin (PPG)**

№	Temperature, ° S	aromatics Wt%.		Naphthene Wt%.		Paraffins Wt%.	
		PPG	SHFN	PPG	SHFN	PPG	SHFN
1	60-95	0,14	-	0,43	-	0,93	-
2	95-122	0,14	0,16	0,30	0,44	0,76	0,10
3	122-150	1,51	0,98	0,65	0,83	2,84	1,95
4	150-175	1,90	1,62	0,80	1,11	3,60	12,27
5	175-200	1,43	1,76	0,56	1,06	3,51	3,33
6	200-250	3,40	2,95	0,72	1,62	7,88	6,37
7	250-300	4,76	5,14	2,6	1,91	7,14	17,19
8	300-350	3,54	3,28	5,57	4,13	6,39	7,49
	Total:	16,82	15,89	11,63	11,10	33,05	44,24



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

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VI. CONCLUSION AND FUTURE WORK

The experimental results show that under certain conditions of organic materials by pyrolysis can get almost broad fraction of hydrocarbons. Given the daily capacity of renewable organic part of municipal waste with a total capacity only for the city of Tashkent, who estimated more than 1500 tons. Annual renewal capacity biorastitelnogo material - cotton stalks more than 100 million tons of investigational direction is of interest to the development of research in this direction. Below are the comparative results of the thermal pyrolysis of recycled organic material.

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