List of references

1. *bush* Willow plains of Ukraine / [M. Gordienko, Ya.D. Fuchylo, AF Hoychuk; Ed. E. Gordienko]. - K .: Institute of Agrarian Economy UAAS, 2002. - 174 p.
2. *Kravchenko VV* The intensification of the process of recycling planting bush berries. 05.05.11 - machines and mechanization SG production: Author. Dis. for the degree of candidate. Sc. Science / VV Kravchenko. - K., 2011. - 20 p.
3. *Sausage VP*About yzhyb zhestko zadelannoho rod / VP Sausage, VA Hrydyakyn, LM Matiushenko // Vesnyk Chelyabynskoy Gosudarstvennoye ahroynzhenernoy Academy. - Chelyabinsk, 2014. - T. 69. - C. 45-50.

The article yzlozhenы results of research theory stems LINE pro-hyba drevesnыh kustarnykovыh and power machinery plants species and Benefits of application bezstruzhechnovoho rezanyya.

Эnerhetycheskye plants, prohyb stems, udarnoe rezanye.

This paper presents the research the theory of stems lines bending of energy trees and advantages of using chipless cutting wood.

Power plant, bending stem, shock cutting.

UDC 662.767.3

"WET" CLEANING METHODS BIODIESEL

OV Polishchuk applicant *

The necessity of cleaning biodiesel alkaline catalyst. The analysis of "dry" and "wet" cleaning methods

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biodiesel. Otseneni advantages and disadvantages bubble, aerosol and bulk washing biodiesel.

Biodiesel, washing, drop, bubble mixer, neutralization, methyl ester catalyst.

Formulation of the problem. In connection with the emergence of global energy and economic world crisis, mankind actively searches for alternatives to fossil energy sources. Particular attention is paid to finding substitutes for light petroleum products because no cars, planes, trains, humanity sees its continued existence. Most of the cars, tractors and many other mobile and stationary machines are driven by diesel engines at present, mainly working in the oil diesel fuel, one of which is to substitute biodiesel.

The production of biodiesel using traditional technology to

accelerate the reaction methanolysis must apply the acid or alkaline catalyst. Heterogeneous catalyst for biodiesel production is rarely used, mainly serves as a homogeneous catalyst. In the case of an acid catalyst reaction time is from one to 45 hours, alkaline – from a few tens of minutes to 8 hours (depending on temperature and pressure) For faster because the reaction methanolysis mainly used alkaline catalyst (potassium hydroxide or sodium) solution in methanol is added to fats for biodiesel. However, the catalyst does not react methanolysis, but it accelerates. Therefore, it is manufactured biodiesel completely, causing corrosion of the engine. Corrosion products, falling into the gap between the cylinder and the piston, causing them to abrasive wear. If it gets into the fuel system, they are scored fuel filters, or completely block the work of fuel equipment inability spraying fuel through nozzles [1, 2].

Analysis of recent research. To clean biodiesel from residual catalyst developed various methods, including the main so-called "wet" and "dry" cleaning biodiesel. [3] Recently began to appear about the development of enzymatic biodiesel purification method [4].

When dry purification adsorbent used that separates impurities from biodiesel. Some systems use ion exchange resins, in others - magnesium silicate, a mineral, a type of which is sold under the brand name Magnesol, the company Dallas Group of Amerisa Ins [3], or other inorganic adsorbents such as bleaching clays [5]. Ion exchange resins - a high-tech artificial resin capable of capturing soap molecules on the surface of the resin. Different pitches are working differently and use different methods of cleaning biodiesel. They give rise to a new type of waste - waste resins. Currently available in the following types of ion exchange resins: Amberlite bd10dry production company "Rohm BV Hass Shemisal Co" (designed for the removal of biodiesel methanol, alkaline catalyst is not removed), Dowex DR-G8 production of "Dow Shemisal" (designed to remove salts , soap, glycerin and other organic matter from the crude biodiesel, in addition, dried resin is also used for drying biodiesel as captures and retains water) PD206 production of "Purolite" (designed to remove soap and glycerine from biodiesel), Lewatit GF 202 production of "Lanxess" Tulsion T-45 BD production of "Thermax" (removes glycerin from biodiesel and soap). [6]

Use of inorganic materials usually involves addition of solid to biodiesel and its mixing. The resultant suspension and, after mixing the solution within the required time is cleaning with a filter. When using ion exchange resins, manufacturers usually establish a column filled with dry resin; biodiesel passes through the resin flow in its fullness. In some cases, one liter of ion exchange resins can process up to 2000 liters of biodiesel [5].

"Dry" cleaning methods are effective, but cost mahnezolu and ion exchange resins is quite high, which greatly increases the cost of

biodiesel produced. In addition, the ion exchange resin manufacturers recommend not to exceed the concentration of 500 g / ton of soap in the crude biodiesel, or cleaning quality decreases. Therefore, to reduce the costs of recommended pre-treatment biodiesel other methods. Also, if biodiesel is very dirty, ion exchange resins rapidly lose their properties and are not easily regenerate [6].

The purpose of research -Analysis of "dry" and "wet" cleaning methods biodiesel and evaluate the advantages and disadvantages bubble, aerosol and bulk washing biodiesel.

Results. The most common method of removing water-soluble impurities are "wet" cleaning of biodiesel, which is called water washing. This process uses water which is a solvent that washes away impurities, leaving pure biodiesel [3]. Water washing is divided into bubble (foam) aerosol and volume.

Foam washing is careful mixing 1/3 water and 2/3 biodiesel (water settles to the bottom and the biodiesel remains on the surface) and bubbling air through the water layer. Air bubbles provide indirect mixing two liquids - they capture a small amount of water and carry it through biodiesel, selecting soaps and other impurities. When the bubble breaks the surface, the water goes down and takes away more impurities and soap on the way down. Approximately 6 hours cleaning air flow is blocked and water is discharged, fresh water is added and the process repeated. These replacement water there three times until the water is completely transparent and the pH of the water is not neutral. Wash water can be used repeatedly washing these portions. The advantages of this technology is used less water compared to other technologies, as well as the use of relatively cheap hardware. The process does not require constant monitoring. The disadvantages of technology include inefficient purification of biodiesel poor quality and small amounts of biodiesel due to the fact that bubbles can stir the water vigorously and biodiesel, which will lead to the formation of an emulsion of two liquids. The formation of emulsions is a major problem washing, but it is also a form of quality assessment process.

Aerosol washing was developed as a way of solving problems with the formation of emulsions. This process uses more water and more sophisticated equipment. However, this method also masks the quality problems - you can visually get a "good washing", but do not always have an idea of what happened as a result. If aerosol spray washing system is used, placed over a layer of biodiesel, with the possibility of water flow after flow through the fuel. Aerosol washing is less mixing biodiesel than bubble and gradually removes soap. More gentle mixing means less chance of forming emulsions nice, mono- and diglycerides. Many users of the system and carry out additional bubble wash as the final step - after removing the soaps are not as active emulsified water and fuel, so using bubble after washing spray gives a good result. The

disadvantages include spray irrigation increased water consumption, more sophisticated equipment and masking potential problems. Unfortunately, the mono- and diglycerides are not removed from biodiesel regardless of the method of washing – they do not dissolve in water and not washed her and sink at aerosol should further control the quality of fuel.

If washing volume mix equal amounts of water and biodiesel, after which they are mixed, defended the water is discharged, and the process is repeated many times. This method is more time consuming, uses more water and can not be automated as bubble [7, 8].

However, the water washing has its drawbacks. It is a long process that requires a lot of time to complete purification of biodiesel. Sometimes, to achieve full transparency may take seven or eight cycles of washing. In addition, there is the problem of recycling waste water with dangerous impurities [3].

Typically, the washing biodiesel use a combination of methods of washing, pre-washing of aerosol final bubble; simultaneous aerosol volume and washing. For example, technology for biodiesel production in the US installation BP-190 provides double flushing combined biodiesel and aerosol volumetric methods [9, 10].

But in any case, carrying out washing and neutralization prior surgery involves passing through a layer of biodiesel water mixed with a small amount of acid. Acid reacts with alkaline catalyst causes the formation of salts of citric acid, which is then washed with water flushing.

Conclusions

1. Clean Biodiesel is made from a homogeneous catalyst "dry" and "wet" means.

2. Performance "dry" method is higher, however, and the cost of adsorbents is high enough. "Wet" method involves the use of large quantities of water, which should be exempt from refined biodiesel, but the cost of this method of cleaning is less.

3. Water washing biodiesel is made bubble, aerosol and volumetric methods. When the bubble washing the formation of emulsions and salts biodiesel catalyst, and aerosol volume and washing are characterized by the use of more water and more complex equipment.

4. Holding "wet" cleaning biodiesel precedes its neutralization.

List of references

1. Dubrovin VA Technical equipment for the production of biodiesel / VA Dubrovin, V. Mironenko, VM Polishchuk AI Frost // Scientific Bulletin of National University of Life and Environmental Sciences. – K., 2011. – Vol. 166. – Part 2. – 67 S.–72.

2. Dubrovin VA Diesel fuel from renewable resources / VA Dubrovin, *VG Mironenko, VM Polishchuk* // Scientific Bulletin of National University of Life and Environmental Sciences. – K., 2012. – Vol. 174. – Part 2. – 32 S.–35.

3. Voegele Erin. Report outlines global biodiesel production / Erin Voegele // Biodiesel Magazine. – 2011. – August 31. – R. 4.

4. Kram Jerry W. Cleaner and Clearer / Jerry W. Kram // Biodiesel Magazine. – 2008. – January 01. – R. 8–10.
5. Schultz Al. Biodiesel Purification Options / Al Schultz // Biodiesel Magazine. – 2010. – March 23. – R. 6.
6. Clean biodiesel yonoobmennыmy resins / Recscling - Using povtornoe Or Return turnover in waste production Or musora [Elektronnyy resurs] / 2013 Rezhym access journal .:http://recyclingforum.ru/ showthread.php / 228-Clean-biodiesel-yonoobmennыmy-resins. Access Date: 08.27.2013.
7. Puzыrkovaya promыvka biodiesel / Recscling - Using povtornoe Or Return turnover in waste production Or musora [Elektronnyy resurs] / 2013 Rezhym access journal .: http://recyclingforum.ru/showthread.php/ 250 Puzыrkovaya-promыvka-biodiesel? S = 4077b58b0ba1b77a0d26ea9b5a19bb 42. Date of access: 27.8.2013.
8. Alovert M. Collaborative biodiesel tutorial. "Appleesid" processor / Maria Alovert // Biodiesel Magazine. – 2005. – 6 p.
9. BP-190. – New York: FIA – 12 c.
10. Technology biodiesel / [V. Mironenko, *VA Dubrovin, VN Polishchuk SV Dragnev*].– K .: Holteh, 2009. – 100 p.

Need proved wastewater from biodiesel schelochnoho katalyzatora. Conducted analysis of "dry" and "mokrыh" sposobov biodiesel purification. Advantages and disadvantages Otsenenы puzыrkovoho, aerosol and obъemnoho promыvanyya biodiesel.

Biodiesel engine, promыvka, drop, bubbles, mixer, Nei-tralyzatsyya, metylovыy ether, katalyzator.

The necessity of purifying biodiesel from alkali catalyst. The analysis of "dry" and "wet" cleaning methods biodiesel. Evaluated the advantages and disadvantages of bubble and aerosol surround washing biodiesel.

Biodiesel, flushing, drop, bubble, mixer, neutralization, methyl ester, catalyst.

UDC 631.3

RELIABILITY ASSESSMENT OF AND FOR COOKING DEPENDING distribution FEED OF TERMS AND MODES OF OPERATION

AV Nowicki, Ph.D.

Presents the analysis of reliability of machines for the preparation and distribution of feed in the agricultural sector of Ukraine. The evaluation of specific failures depending on the particular conditions and modes of operation.