

BIOTECHNOLOGICAL ASPECTS USE OF WASTE IN ECOLOGICAL SAFETY

Olena Kharlamova, Volodymyr Shmandiy and Tetiana Rigas

Kremenchuk Mykhailo Ostohradskyyi National University, Kremenchuk, Ukraine

ecol4207@gmail.com

The purpose of work was application of biotechnologies for providing of ecological safety of motor transport. Experimental researches are conducted after standard methods both in laboratory and in operating, terms. The special motor stand was used.

It is set that the use of binary fuel mixture (mixtures of traditional fuel-oil and biofuel) allows to reduce total toxicity of exhaust gases of diesel cars, especially during work of engines on the modes of idling and partial loads. The most diminishing of emission toxicity is about 30–35%, which corresponds to the biofuel content in the binary mixture of 45–50%. We used mixture which includes 50% biofuel, which was named by B-50.

In quality of raw material for the receipt of biodiesel fuel different biological components are used. We investigated the food industry waste. One of such wastes there is a soapstock –by-product of process of alkaline refining of sunflower oil. Essence of the method applied by us consists in diminishing of viscosity a soapstock. Glycerin which is included in composition a soapstock gives it viscosity and closeness. Therefore, to get a biodiesel fuel, it is necessary to delete glycerin, substituting it by an alcohol. For this purpose, we used sorbent derived from wastes of agricultural production. During the reaction, the soapstock after treatment with the sorbent were first heated to 60°C (to accelerate the reaction), and then a catalyst and an alcohol (butanol) were added. Ferrum (III) sulfate was used to accelerate the reaction. As a result of defending mixture exfoliates, a biodiesel fuel formed in an overhead layer, below is a soap layer, and there is glycerin on a bottom. Glycerin and soap layer are separated, and a biodiesel fuel was washed to remove tailings of soap, catalyst and other possible admixtures. An output of ethers of fat acids was about 95%, that exceeds this value a parameter in absence of cleaning of coabstock. The receipt of biodiesel fuel from fat-containing wastes of food industry allows to decrease the expense of oil at the traditional method of its production. Besides, addition of biodiesel component can reduce the toxicity of engine exhaust.

On the basis of simple calculations, we conclude that the use of the biodiesel component in the mixture makes it possible to save 10 450 m³ of diesel fuel per year in the city of Kremenchug.

Conclusion. In order to reduce the toxicity of vehicle emissions, it is proposed to use a mixture of diesel fuel with biofuel (in a ratio of 1:1). For a receipt last the grounded biotechnology is with the use of departure of food industry (to the soapstock) which gives the possibility to reduce ecological risks in the places of waste deposits, and also to reduce the volumes of consumption of traditional hydrocarbon raw material.

We see the prospects of subsequent researches in the scientific and practical study of other factors forming of ecological risk.

Key words: Biotechnology, Wastes, Soabstok, Sorbent, Ecological Safety