

## **STUDY IN THE FIELD OF REDUCING THE HARMFULNESS OF A BIODIESEL POWERED ENGINE**

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Given that energy requirements are growing, that fossil fuel reserves are being depleted, and the polluting effects of their use on the ecosystem are catastrophic, it has become imperative to find new ways to produce energy from alternative sources to replace these classic fuels. One of the main directions for reducing toxic emissions is the use of alternative fuels for internal combustion engines. Particular emphasis is currently being placed on reducing the emissions of exhaust gases from diesel engines, due to the extension of their scope and the increase in the total number of vehicles equipped with diesel engines. Therefore, together with the improvement of the economic performance of diesel engines, reducing the toxicity of their exhaust gases becomes a major problem.

The studies are aimed at studying the influence of biofuel on the ecological performance of the engine, as well as identifying the practical possibility of using the optimal composition as fuel for MAC. For this, the values of the concentration of pollutant emissions from the exhaust gases generated by the combustion of biofuels were measured. The purpose of this research was to:

- establishing the values of experimental tests on pollutant emissions for various loads and speeds of diesel engine operation;
- analysis of exhaust emissions (carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), hydrocarbons (C<sub>n</sub>H<sub>m</sub>) and particulate emissions (fumigation)) in the operation of the engine with fuels tested.

When carrying out the experimental tests in laboratory conditions (on stand), the gas analyser of the Cartec type CET 2000 series was used, in order to determine the concentration of the polluting emissions in the exhaust gases. As fuels, diesel was used, the mixtures B20 (diesel 80% + biodiesel 20%), B50 (diesel 50% + biodiesel 50%) and B100 (biodiesel 100%) transesterified from rapeseed oil at the biofuel production plant M8- KPB-01 developed by S.A. „Alimentarmaş”, t. Chisinau.

Research results have shown that:

- The use of biodiesel as fuel for the DC4 11,0/12,5 engine allowed reducing the CO emission concentration by 25% at the engine operating mode at an average load of 70-75%.
- With the increase of the biodiesel concentration in diesel, the emission of C<sub>n</sub>H<sub>m</sub> in the exhaust gases decreases, which shows us that in the cylinder the fuel practically burns completely. Hence, it is mentioned that the use of B100 biodiesel reduces the concentration of C<sub>n</sub>H<sub>m</sub> emissions in the exhaust gases compared to diesel by 37,5%.
- With the increase of the biodiesel concentration in diesel, it leads to a decrease of the smoke emission concentration in the exhaust gas of the engine DC4 11,0/12,5, which significantly improves the ecological parameters.

Experimental on-site research into the concentrations of pollutant emissions from the exhaust gases of the DC4 11,0/12,5 engine powered by B100 biodiesel and a mixture of biodiesel and diesel (B20, B50) reveals that the results obtained are dependent on complex, contradictory. The establishment of the best performances of the concentrations of harmful emissions in the exhaust gases is achieved by optimizing the composition of such biofuels.

**Keywords:** alternative sources, harmful emissions, biofuels, engine powered, biodiesel, diesel.