Instituto Nacional de Ecología

National Institute of Ecology

Mission

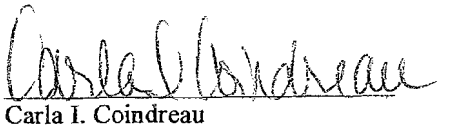
The generation of scientific and technical information on environmental issues and the training of human resources, in order to inform society, support decision making, encourage the protection of the environment, promote the sustainable use of natural resources, and support the Secretary of the Environment and Natural Resources in reading its goals.

Vision

To be a leader agency in applied environmental research, that develops and promotes scientific cooperation projects that contribute effectively to resolve the major environmental problems of Mexico, and support the conservation and restoration of the environment in the whole country.

Arriba

I certify that these documents were translated from Spanish into English truly and correctly to the best of my ability.



Carla I. Coindreau
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Department of Environment and
Natural Resources

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Mexico City, February 8, 2006

"2006, Bicentennial Anniversary of the birth of the meritorious Don Benito Juarez Garcia"

Mr. Bernardo Von Raesfeld Porras
Bio Plus Fuel

To: Mr. Ángel Trauwitz

In reference to your informative document regarding "Bio Plus Fuel", which was sent to the Head Office of the National Center for Environmental Research and Training, GGCENICA, I am enclosing the report of the outcome of the tests performed on the vehicle, carried out at the Vehicular Emissions Laboratory.

I thank you for your concern for the environment, and I send you my best regards.

Director for Atmospheric Monitoring Research and Analytical Culling of Pollutants

Ana Patricia Martinez Bolivar

C.c. Dr. Adrian Fernandez Bremaunitz-President of the National Ecological Institute
Mr. Victor J. Gutierrez-General Director of the National Center for Environmental Research and Training
Mr. Roberto Lopez Izquierdo- Technical Secretary of the C. Secretary
C. Occiel Perez Villamares- Technical Secretary to the President of the INE/INE Ref: 0501673/200500861

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INE
National Ecological Institute

Department of Environment and Natural Resources

National Ecological Institute

National Center for Environmental Research and Training

Assessment of Vehicular Emissions

Report of tests performed on the additive Called Bio Plus Fuel at the Vehicular Emissions Laboratory

Mr. Alejandro Garcia Fragoso

December 2005

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Executive Summary

Representatives for the Bio Fuel Plus group presented SEMARNAT with an additive for gasoline, a biodegradable enzymatic catalyst that claims to reduce the emission of hydrocarbons and improve the efficiency of the consumption of fuel.

In order to evaluate the above-mentioned product, the General Office for the National Center for Environmental Research and Training, DGCENICA, of the National Ecological Institute, met with the company's representatives and offered their facilities at the Vehicular Emissions Laboratory.

Out of the two evaluations authorized by the representatives, only one resulted in a reduction in the emissions of CO, by 5.89%, of HC by 11.86% and NOx by 5.34, as well as a 25% increase in the yield in fuel when using the above-mentioned catalyst.

Due to the above, the vehicular emissions lab at the DGCENICA feels that the tests performed are not sufficient to provide results with regards to the performance of the product called Bio Plus Fuel.

We recommend performing additional tests by first establishing a statistical experiment plan in order to confirm the products' effectiveness.

Introduction:

The representative for Bio Plus Fuel, Mr. Bernardo Von Raesfeld Porras requested a technical opinion from the Department of Environment and Natural Resources with regards to the biodegradable enzymatic catalyst called **"Bio Plus Fuel"**, whose theory states that its use reduces the contaminating emissions generated by the internal combustion engines in automotive vehicles.

The additive was submitted to the Head Office of the National Center for Environmental Research and Training (DGCENICA) at the National Ecological Institute for testing, and the company's representative was allowed the use of the Vehicular Emissions Labs' facilities in order to evaluate the above-mentioned product. Technical personnel from the lab were asked to perform any pertinent tests on the product.

Product Description

According to the information provided by the manufacturer, **Bio Plus Fuel** is the result of a research project developed by technical personnel experienced in the chemistry of the fuels used for vehicles. The purpose of this project is to incorporate an alternative additive to improve the yield in fuel and to reduce the exhaust emissions.

The product consists of a biodegradable tablet (Photo 1), which is added to the fuel in the vehicle's gas tank in order to molecularly modify its chemical components and to take advantage of the changes in the energy that occur.

Photo 1. (Picture included in original document)
Biodegradable Enzymatic Catalyst

Objective:

To take the measurements of the emissions of a vehicle using the dynamometer at the Vehicular Emissions Lab at the DGCENICA through dynamic test FTP-75, using a driving simulator, in order to assess the effectiveness in the reduction of emission pollutants of the additive called Bio Plus Fuel.

Activities:

1. **Interview with the products' representatives**. We had several discussions about the kind of tests that needed to be performed and the scope of each one of them. Lab technicians suggested performing a series of emission measuring tests using a prototypical sample of vehicles where the product could be applied in Mexico City. However, the company's representatives requested performing a comparative test only, evaluating the emissions of a vehicle that had not previously used the additive and after having used the additive during a period of three months.

2. **Description of Test**. A 1985 VW Sedan was used for the test, with a 1.6 liter engine, stick shift, with a fuel gas system and an approximate weight of 820 kgs. This vehicle was provided by the product's representative and the additive had not been used on it previously. Photo 2.

(Photo of Vehicle included in original document)
Testing Vehicle

The procedure followed during the test was as follows; 2 evaluations were performed following the driving route established in the protocol for test FTP-75 in its Starting Gear phase with its corresponding measurement of contaminating gases. The first evaluation was performed *without* having added the additive **Bio Fuel Plus** to the vehicle (Photo 3).

The additive **Bio Plus Fuel** was added subsequently, photos 4 and 5, and this vehicle was regularly used for a period of three months, the purpose being to clean the fuel tank. The additive in tablet form was added to the vehicle every time the tank was filled with gas. At the end of this time period, the vehicle was returned to the lab for a second evaluation.

Photo 3. Development of test
Photo 4. Additive used
Photo 5. Adding the catalyst

The second evaluation showed no significant decrease in the HC emissions, and the CO and NOx emissions increased when compared to the results obtained in the first evaluation.

Due to the results in the second evaluation, we agreed with the product representative to perform a third evaluation of emissions.

The third evaluation showed a decrease in the emissions of the following pollutants: 5.89% in CO, 11.86% in HC and 5.34% in NOx; furthermore, there was a 25% increase in fuel yield. The following table shows the final concentrations resulting from the three evaluations performed. We feel that there were better results in the third evaluation because the vehicle had already been stabilized.

Evaluation Number	Contaminating Emissions (g/Km)				Yield (Km/l)
	CO	CO2	HC	Nox	
1. Vehicle without additive	24.26	131.36	2.53	1.31	13.49
2.Vehicle with additive	24.98	122.89	2.48	1.38	14.08
3.Vehicle with additive	22.83	97.86	2.23	1.24	17.00

For further information on the measurements and results obtained during the evaluations performed, we have included a detailed account of the Results Forms for better analysis.

Conclusions:

In order for the DGCENICA to issue a diagnosis on the effectiveness of the application of the product in Mexico City, a formal study needs to be performed which takes into account the variety of vehicles in which the product may be utilized. The type of vehicles to be used as well as the model should be taken into consideration.

This would require choosing a representative sample of the variety of vehicles through appropriate statistical procedures. In order to apply parametric tests, we recommend using at least 50 vehicles, different makes and models, and up to 10 years old, selected at random, where each vehicle undergoes at least 10 tests to guarantee the stability of the vehicles and the repetitious measurements. The emissions would be measured before and after the use of the additive.

An experiment designed with an ample scope would allow us to determine the performance of the additive in the different types of vehicles, which could be classified according to make, year, and amount of cylinders among others. However, the scope of the design will be based on the resources the product representatives are willing to invest in the experiment.

National Ecological Institute

National Ecological Institute
Head Office for CENICA
Vehicular Emissions Evaluation

Results

Date	Dec 19-05	Type of Test	505-HOT
Institution	Bio Plus Fuel	Additive	YES
Veh/Type	Sedan	Catalytic Conv	No
Yr-Model	1985	Fuel	Gasoline
License Tag	None	Inertia Mass (lb)	2000
Motor (lts)	1.6	Road Load (hp)	7.7at 50mph
Transmission	MANUAL	Equip. Operator	Alex Garcia
Veh. Weight	820 kgs	Veh. Operator	Fco. Guardado
P.B.V. (kg)		Observations	
Odometer			

Parameters

	Cycle 505
Bar. Pressure	585
Temp (oC)	17
Vapor Pressure (mmHg)	14.53
Revolutions	10703
Mixture Vol. (ft3)	2437.88
Distance (km)	5.857
Rel. Humidity (%)	42
Dil. Factor	20.9

	Readings		Partial Results	
	Sample	Environment	(grams)	(g/km)
CO	1286	58	133.74	22.83
CO2	63	5	573.17	97.86
HC	1144	54	13.09	2.23
Nox	643	21	7.24	1.24

Final Results

CO	CO2	HC	NOX	YIELD
g/Km	g/Km	g/Km	g/Km	Km/l
22.83	97.86	2.23	1.24	17.00

Performed By:

Tech. Francisco Guardado Lopez
Vehicle Emissions Lab

Verified By:

Mr. Alejandro Garcia Fragoso
Vehicle Emissions Evaluation

Approved By:

I, the undersigned, Mr. Jose Luis Rueda Trujillo, Notary Public and head of Notary Public Office number 12 (twelve) in this city, CERTIFY that this document consists of 13-thirteen pages, and is a true and correct copy of the original, from which it was reproduced and which I reviewed, and which was signed and sealed as proof. The above procedure was recorded as register number 1467, page number 953 in the Tenth Book of Registries at this Notary Office on the 20th of April, 2006 (two thousand and six). This procedure took place in Santiago de Queretaro, Qro. On the 20th day of April 2006.

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