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"Effect of the Vehicle Discharge on Growth of Plant, *Vigna Aconitifolia* and on Human Health"

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Abstract: - *Amongst the different kinds of pollutants which are responsible for pollutions,* ***Vehicles Discharge*** *is one of the major problem to bio-communities. So, the present investigation study was done on Vehicles Discharge in terms of their effects on the growth rate of plants, Vigna aconitifolia and also on soil fertility. For scientific study of effect of this Vehicle discharge, the experiential setup was made in which site for sample collection sites were selected, red soil and clay pots of same size taken. Moth bean is an important kharif season Legume crop of Maharashtra, India. Vehicles discharges effects on the growth rate of plants, Vigna aconitifolia and soil fertility. Bioremediation study carried by using of cow dung in soil which enhanced the growth of experimental plants, Vigna aconitifolia which is one of the major crop in India with high nutritive values for human beings. Also survey has done on two-wheelers rider's to recognize of their health complications due to different-Vehicles pollutions.* Soil analysis reports **before and after** the experiments perform shows grates variations in its physical and chemical properties. *Thus, study concluded that* ***Vehicles Discharge*** *shows affect on growth ret of plant and life of human beings directly and indirectly. Control major and r*ecommendation were specified through this study.

Key Words: Vehicles Discharge and *Vigna aconitifolia*

INTRODUCTION: Pollution is caused by pollutants and the pollutants are the elements of pollution can be foreign substances or energies or naturally occurring; when naturally occurring, they are considered contaminants when they exceed natural levels. These contaminants cause instability, disorder, harm or discomfort to the physical systems or living organisms.**Major forms of pollution**:- The major forms of pollutions are listed below with the particular pollutants relevant to each of them; **Air pollution**: the release of chemicals and particulate into the atmosphere is called as air pollution, and the common air pollutants includes carbon monoxide, sulphur dioxide, chloroflurocarbons (cfcs) nitrogen oxides produced by industry and motor vehicles. Photo chemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight. **Water pollution**: the release of waste products and contaminants into surface runoff into river drainage systems, leaching into ground water, liquid spills, waste water discharges, eutropication and littering. **Soil pollution/contamination**:-when chemicals are released by spills or underground leakage among the most significant soil contaminants are hydrocarbons, heavy metals, herbicides, pesticides and chlorinated hydrocarbons, and also the polluted water which contains heavily diluted with vehicle discharges. **Noise pollution:** It encompasses noise, aircraft noise, industrial noise as well as high- intensity sonar. **Radioactive contamination/pollution**: radioactive pollution results from 20th centaury activities in atomic physics, such as nuclear power generation and nuclear weapons research, manufacture and deployment. Light pollution: this type of pollution includes trespass over illumination and astronomical interference. **Thermal pollution:** This pollution is a temperature change in natural water bodies caused by humans influence, such as use of water as coolant in a power plant.

The current research study is done on **Vehicles Discharge** in terms of their effects on the growth rate of plants and degree of % of soil fertility.

Composition of motor oil/vehicle discharges: Motor oil is a complex mixture of hydrocarbons and other organic compounds derived from petroleum-based and non-petroleum-synthesized chemical compounds. It is lubricant used in internal combustion engines of cars motorcycles, buses commercial vehicles, large agricultural and construction equipment, locomotives aircraft and static engines such as electrical generators. Its main function is to provide

a separating film between surfaces of adjacent moving parts thereby minimizing direct contact between them, decreasing heat caused by friction and reducing wear and tear, thus protecting the engine and improving its efficiency. However, fresh motor oil (petrol + diesel + vehicle discharge) is more of environmental concern as it contains high percentage of volatile and water soluble hydrocarbons that could be acutely toxic to organisms. The discharge of motor oil from refineries, oil pipes.

The soil come into contact with vehicles discharge Diesel oil, which is one of the major products of crude oil, constitutes a major source of pollution in our environment. With the combined dependence on diesel oil by some vehicles and generators, greater quantities are being transported over long distances. Therefore diesel oil can enter into the environment through wrecks of oil tankers carrying diesel oil, cleaning of diesel tanks b merchants, war ships carrying diesel oil and motor mechanics (Hill and Moxey, 1960).

Diesel oil spills on agricultural land generally reduce plants. Effects of waste oil / vehicle discharge on soil lead to the reduction in plant growth. The diesel oil which contaminates the soils cause direct toxic effect on plants (Baker, 1982) and reduced germination (Udo and Fayemi, 1975). The unsatisfactory soil condition may due to insufficient aeration of the soil because of the displacement of air from the space between the soil particles by diesel oil. Contamination of existing and potential agricultural lands is a major problem associated with the processing and distribution of crude and refined petroleum products in many oil producing countries (Ayotamuno *et. al*., 2006).

The problems of pollution have led to the exploration of many remedial approaches to affect the cleanup of the polluted soils. Pollution control strategies involving physic-chemical methods have often aggravated the problem rather than eliminate it. Biodegradation is recently being favored as a good option for the control of polluted sites mainly because it does not involves expensive equipment, environment friendly. Evidence exists for a possible connection between exposure to oil or oil dispersants and adverse effects on success of fertilization in marine vertebrates. Effects crude oils on the sperm and eggs of marine bivalves revealed that fertilization was depressed and spermatozoa in particular were very sensitive. Renzoni, 1973, 1975 and Nicol *et al.,* (1977) found that fuel oil depressed respiration, mobility of sperm and interfered with fertilization in sand dollars. Oil dispersants such as esso corexit 9527reduced the fertilizing capacity of sea-urchin spree in concentrations down to 0.0003 ppm (Hagstrom and Lonning, 1977).

Many of the most significant adverse health effects that are exposure premised on studies that relied on estimated exposures to diesel engine products from previous decades, specifically the 1960s and 1970s. The relevance of those studies and conclusions is becoming increasingly questionable, especially in light of the advanced diesel engines, after treatment systems, and ultra-low sulfur diesel fuels that will be entering the on highway diesel vehicle market by 2007. Thus, there is a critical need for new emissions characterization and health studies of the exhaust from prototype 2007-2010 diesel engines equipped with advances.

Some remedial measure to problem of vehicle discharge problem relegated of contamination of existing and potential agricultural lands is a major problem associated with the country. The problems of pollution have led to the exploration of many remedial approaches to affect the cleanup of the polluted soils. Pollution control strategies involving physico-chemical methods have often aggravated the problem rather than eliminate it. Biodegradation is recently being favored as a good option for the remediation of polluted sites mainly because not expensive equipment needed, environmentally friendly and simple.

Phyto-remediation is one of the forms of biodegradation which involves the in situ use of plants and associated microbes for the remediation of polluted sites. Also the introduction of the cow dung helps in increasing the moisture holding capacity of soil and also helps in degradation of pollutant content of the soil. Cow dung is widely studied for its use as organic agricultural fertilizers and extensively explored for its potential as alternative fuel or biogas due to its high methane content (Abdulkareem, 2005). However, there is lack of research on the microbial diversity and other potential applications of cow dung (Yokoyamaet al., 2007).The search for novel antimicrobial agent is one of the Current major concerns in medical research due to increasing cases of antibiotics resistance (Chitnis *et al.,*2000). Cow dung may serve as a source for this research as antifungal agents had been successfully extracted from cow dung (Muhammadand amusa, 2003). Research Revealed that *aspergillus niger*, *trichoderma harzianum*, *Bacillus cereus* and *bacillus subtilis* isolated from cow Dung can reduce the growth of *sclerotium rolfsii*, *fusariumoxysporum*, *pythium aphanidermatum*, *helminthosporiummaydis* and *rhizoctonia solani* with inhibitory zones of upto 58%. Furthermore, *b. Subtilis* isolated from cow dung can enhance plant growth, sulphur oxidation, phosphorus solubilisation and was found to produce industrial.

The present investigation study was done on Vehicles Discharge in terms of their effects on the growth rate of plants, *Vigna aconitifolia* and also on soil fertility. Moth bean is an important kharif season Legume crop of Maharashtra, India. Vehicles discharges effects on the growth rate of

plants, *Vigna aconitifolia* and soil fertility. Bioremediation study carried by using of cow dung in soil which enhanced the growth of experimental plants, *Vigna aconitifolia* which is one of the major crop in India with high nutritive values for human beings. In this study survey has done on two wheelers rider for to recognize of their health complications. Vehicles Discharge trough motors will not only polluted the air but also water and soils. Through the rain pollutants passed to fresh water bodies and to the soil also. So it is very necessary to study its effects on growth of plant and life of human beings directly and indirectly.

MATERIALS AND METHODS:

Materials:- Water mixed vehicle discharge, Small beakers, big sized beakers,5ml pipettes, Thin cotton cloth (to close the beaker mouth region),Rubber bands to tighten the cloth properly, Biological: *Vigna aconitifolia* (moth bean seeds), Red soil, Clay pots of same size, Measuring cylinder, Borosilicate beaker etc. **Area of sample collection: -** Bund garden Road and Lohegaon -Dhanori Road in Pune City, Maharashtra, India. **Date of sample collection: -** 14/09/2013 to 18/09/2013. Total amount of sample collected referred as stock solution. This was 5000ml and it is considered as 100%. **Soil used for the experiment: -** The soil used is the red soil, these soils are observed in the western portion of Pune district and also in Thane and Raigad regions. Paddy is the main Kharif crop and Rabi crops were taken in such soil in Maharashtra region. **Reasons for selection of red soil**: - a) This soil is mainly found in Pune region. b) Easily available soil. c) High nutritive values in this soil. d) Red soil has long life fertility as compare to black soil.

Method: - 1) Water mixed vehicle discharge was collected by manually in rainy season .This waste vehicle discharge contains petrol, diesel, other discharge like dissolved gases etc. **2)** Six clay pots of equal size were taken. The occupying capacity of each pot is 1.5 kg red soil. They should have hole punched below to avoid excess of water.**3)** the clay pots were labeled as pot 1, 2, 3a, 3b, 3c and3d. The **1st** pot was kept as controlled in which no vehicle discharge was poured. In 2nd pot the vehicle discharge was poured before the cultivation of *Vigna aconitifolia* that is moth bean. From pot **3rda** to **3rd d** were taken as experimental pots in which discharge sample concentration were increased gradually as shown in below table. **4)** The clay pots were kept in order from 1, 2, 3a, 3b, 3c and3d so as to make the observations regularly. These clay pots were fixed in same position so to minimize the error in it. **5)** The ten seeds same size of *Vigna aconitifolia* (moth bean) were taken and cultivated in each above selected pots. The time and date was noted. 6) Addition of water and sample should be done with care to avoid errors in results and over flooding of water should be avoided to prevent the plants from spoilage. 7) Observations were made for 10 days after the cultivation of moth bean and results were taken and tabulate in the form of tables and photographically. 8) Soil analysis has done before and after the experiment in soil testing lab at Krushi Bhavan, Shivaji Nagar, Pune. The chemical and physical properties of soil were studied. The given below table shows water and discharge concentrations taken in clay pots for control and experimental study.

Pots	pot 1	Pot 2	Pot 3a	Pot 3b	Pot 3c	Pot 3d
Water Added (ml)	250ml	250ml	240ml	230ml	220ml	210ml
Vehicle Discharge Added (ml)	00 ml	80 ml of sample was mixed in the soil before cultivation.	10ml	20ml	30ml	40ml

OBSERVATIONS, RESULTS AND DISCUSSIONS:

Day 1st (22/10/2013)	Day 2nd (23/10/2013)
	
Day 3rd (24/10/2013)	Day 4th (25/10/2013)

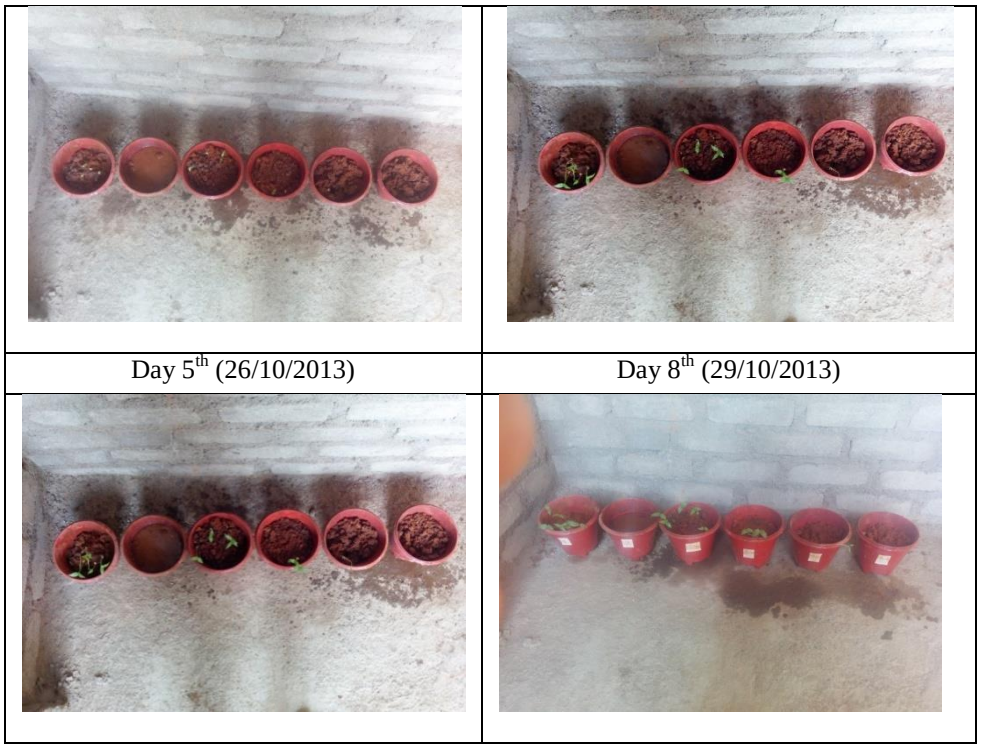

Fig:- Experimental clay pots.

Results: As per the observations tabulated in the form of tables and photographically, the results were interpreted as fallows.

Table: Ist, shows the number of plant with respect to different concentrations of vehicle discharge. The **clay pot 1st (control)** shows highest number (08) of growth of plant, *Vigna aconitifolia* as it is without vehicle discharge cultivation. The **clay pot 2nd** did not show any growth of plant, *Vigna aconitifolia* because the soil in clay pot was previously introduced or mixed with vehicle discharge before sowing. This result shows the clear indication of vehicle discharge (oil) is interfering with the soil breathing or fertility. Clay pots, from, **3rda, 3rdb, 3rdc and 3rdd** are the experimental pots with increasing the concentration of vehicle discharge, decreases the number of growth of plants respectively. Pot **3rd d** does not show any plant growth because of high concentration of oil discharge in soil.

Table: IInd, shows height of plants with respect to different concentrations of vehicle discharge. **Clay pot 1st (control)** shows increasing in height of plants, *Vigna aconitifolia* as from 1st to 10th day of cultivation seeing as without oil discharge. The heights of the plants were the maximum in 10th day of cultivation that is 11.7cm. Clay pots, from, **3rda, 3rdb, 3rdc and 3rdd** are the experimental pots with increasing the concentration of vehicle discharge, decreases the height of growth of plants respectively. But height is somewhat increases with days of cultivations within the same clay pots. Pot **3rd d** does not show any plant growth because of high concentration of oil discharge in soil.

Table: III and IV, shows number of the plants and size after prologue of cow dung with vehicle discharge in soil respectively. The clay pot 2nd was with Vehicle Discharge mixed in soil before cultivation has been mixed with 200gm of cow dung shows rising in number and size of plant with days of cultivation. **Pot 3rd d** is experimental pot with 40ml vehicle discharge and 200gm cow dung shows ever-increasing number and size of plant with days of cultivation.

Soil analysis reports **before and after** the experiments perform shows grates variations in its physical and chemical properties as shown in table numbers **Vth and VIth.** The soil examination shows depletions in macro and micro nutrients in the soil after it exposed to vehicle discharge. The soil also loses water holding capacity. It affects on porosity of soil. An electrical conductivity was increase due to which crop yield is decreases. Hydraulic conductivity decreases with oil discharge.

On human health: From survey made on bike riders or two-wheeler, it was studied that there are many harmful consequence on human health such as headache, irritating to eyes, chest unwell, problems related to respirations and so on. So, it is necessary to control over to vehicle discharge pollutants by planning and implicating strict rules and governs.

Discussions: Many fish studies indicate that fish eggs and larval stages are surprisingly resistant to crude oil and water soluble and aromatic fractions of crude oils. Some of this resistance in

fish is probably attributable to the presence of enzymes affecting metabolic detoxification (Lee *et al.*, 1972; and Korn *et. al*., 1976). Other investigators report premature spawning and reduction in survival of fish eggs induced by with crude oil exposure (Struhsaker, 1977) or a decrease in the time into between fertilization and hatching (Linden *et. al*.1979). No experimental work has become known to the reviewers regarding oil effects on reproduction, or on Survivorship and growth of eggs or juveniles of coral reef fishes.

How vehicle discharge effecting human health? There are strong associations between exposures to motor vehicle-derived particles and cardiopulmonary complications and mortality. It is necessary to examine possible differences in the effects of gasoline versus diesel-powered engine emissions. Few studies relating adverse health effects to traffic-based pollution, several epidemiological studies suggest that residence near areas of high traffic density may be associated with respiratory symptoms in children, decrements in lung function cancer, premature birth and mortality. Most studies, however, have relied on crude measures of traffic exposure; few have utilized measurements of localized pollutant concentrations, especially ultrafine particles.

Cow dung is a vast reservoir of nutrients and energy capable of supporting microbial growth, thereby enhancing microbial degradation of various pollutants (Akinde and Obire, 2008). Apart from improving soil fertility for crop production, it also contributed diverse species of microorganisms such as *a cinetobacter* spp, *bacillus* spp, *pseudomonas* spp, serratia spp, and *alcaligenes* spp which are important for natural biogeochemical processes (Akinde and obire, 2008; Adebusoye *et al*., 2007). Efficiency of biodegradation is dependent on microorganisms, capable of producing enzymes that will degrade the target pollutant. As reported by many scientists, mixed population of microorganisms with broad enzymatic capacity are needed to eliminate complex mixtures of hydrocarbons in soil, fresh water, or marine environments (Adebusoye *et. al*., 2007). Animal manure amendment has over time been used for bioremediation of petroleum hydrocarbon polluted soil.

Conclusion: - From the above observations and results it was concluded that Vehicle Discharge pollutant is not only harmful to animal but also affects on plant populations. It affects on growth of plants because of soil interfered with this kind of pollutants. But, the cow dung helps in decreasing in the effects of such pollutants directly on soil and indirectly on plant community.

Recommendation: - 1) High control over vehicle discharges by making strict rules and governors and which has to be implanted properly. 2) Plantation behind roads to control these air pollutants. 3) Bio- remediation technology should be implanted for sustainable development in agriculture field.

Table: I

Number of Plant With Respect To Different Concentrations of Vehicle Discharge

Table: III

Number of the Plants after Introduction of Cow Dung with Vehicle Discharge in Soil.

Pot sequence	Concentration of Vehicle Discharge	Amount of Cow-Dung	Days of cultivations						
			1st Day	2nd Day	3rd Day	4th Day	5th Day	6th Day	7th Day
Pot 2nd (Vehicle Discharge mixed before cultivation)	80 ml	200 gms	00	00	00	03	04	05	05
Pot 3rd (Experiential)	40ml (+210ml W.)	200 gms	00	00	03	07	08	09	09

Table: IV

Heights of plant after introduction of cow dung with Vehicle Discharge mixed soil.

Pot sequence	**Concentration of Vehicle Discharge**	**Amount of Cow-Dung**	**Days of cultivations of plants and height in cm.**						
			1st Day	2nd Day	3rd Day	4th Day	5th Day	6th Day	7th Day
Pot 2 (Vehicle Discharge mixed before cultivation)	80 ml	200 gms	00	00	00	0.2	1.5	2.4	3.6
Pot 3d (Experiential)	40ml (+210ml W.)	200 gms	00	00	0.1	1.5	03	4.1	6.1

Table: V
Soil Analysis Report (Before Experiment)

A: Chemical Properties			
Serial Number	**Properties**	**%Presence**	**Result**
1.	Ph	6.88	Sad
2.	Electrical Conductivity	0.13	
3.	Organic Carbon	0.54	Medium
4.	Available Nitrogen	00	
5.	Available Phosphorus	14.01	Medium
6.	Available Potash	125.68	Less
7.	Calcium content	58.75	
8.	Magnesium content	37.80	
9.	Sodium content	2.68	
10.	Free Calcium Carbonate	1.63	Medium
B: Physical Properties			
Serial Number	**Properties**	**%Presence**	**Result**
1.A	Sand	39.69	
B.	Silt	27.34	Clay Loam
C	Clay	32.80	
2.	Hydraulic Conductivity	20.19	
3.	Water Holding Capacity	57.29	
4.	Soil Particle Density	2.06	
5.	Bulk Density	1.14	
6.	Porosity	60.03	
7.	Swelling	32.24	
8.	Salinity	-	

Table: VI
Soil Analysis Report (After Experiment)

A: Chemical Properties			
Serial Number	**Properties**	**%Presence**	**Result**
1.	Ph	6.36	
2.	Electrical Conductivity	1.92	Harmful To Crop
3.	Organic Carbon	5.07	Very High
4.	Available Nitrogen	-	
5.	Available Phosphorus	14.01	Medium
6.	Available Potash	3364.93	Very High
7.	Calcium	48.12	
8.	Magnesium	29.61	
9.	Sodium	8.48	
10.	Calcium Carbonate	3.38	Medium

B: Physical Properties			
Serial Number	**Properties**	**%Presence**	**Result**
1.A	Sand	51.08	
B.	Silt	21.41	Sandy Clay Loam
C	Clay	27.19	
2.	Hydraulic Conductivity	7.53	
3.	Water Holding Capacity	55.86	
4.	Soil Particle Density	2.11	
5.	Bulk Density	1.34	
6.	Porosity	61.38	
7.	Swelling	35.68	
8.	Salinity	-	

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