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ESTIMATIONS OF OIL ON ROAD SIDE PLANTS IN MEERUT

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Estimations of Oil on Road Side Plants in Meerut

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Abstract – Automobile – "The need of modern world for speed and comfort", is of a great concern to us due to air/soil pollution. Thus, most Vehicle disturbs our environment. Meerut lies in the western part of Uttar-Pradesh and is important source of cereal crops. Oil and fats are reserved food in the form of fatty acids in the seed and leaf part of certain plants. The oil thus stored can be extracted by dissolving them in a suitable solvent such as Petroleum ether. This is done easily in laboratories with the help of Soxhlet's distillation apparatus. Oils are composed of three elements hydrogen, carbon and oxygen.

Key Words : Oil, Petroleum, Elements

INTRODUCTION

Soxhlet apparatus consists of 3 parts. The lower portion consists of round bottomed flasks which is filled with Petroleum ether solution. The middle part of extract consisting of a basal narrow stem and the upper part a little wide tube. The end of the narrow stem fits into the mouth of the round bottomed flask. The extractor is consisted out of two side tubes. One of them joins the basal portion of extractor to the narrow stem of the same acts as a siphon. The other side tube connects the upper portion of and the lower portion of the extractor. The upper portion of the apparatus in Liebig Condenser.

In the present paper oil extraction done in mixed grain tissue of *Triticum aestivum*, *Oryza sativa*, *Zea mays* and *Avena sativa*.

For these investigations the grains of four experimental plants were carefully collected at maturity from the field at both distances and then mixed properly. After that a thin paste of such plant grains was made in mortar and pestles. The paste so prepared was taken in a thin sel, a test tube like apparatus. The petroleum ether was taken in a round bottomed flask. The narrow stem of the extractor was fitted to the mouth of the round bottomed flask. The thimble containing the grain paste was placed inside the extractor, to the open end of which was connected to a Liebig's condenser. All the connections were supported by the stands. The round bottomed flask was then heated into water bath. A thermometer was dipped into water bath to note the temperature of liquid which was maintained at the boiling point temperature of petroleum ether used in the present study. The ether in the flask evaporated and passed into the extractor through one of the side tubes and condensed and fallen down into the thimble. Thus, the level of distilled solvent reached the top s.hon tube, it siphoned out the sufent into the Hark, so that the remaining oil also got renewed from the grain paste.

Distillation was done for 4-5 hrs at one time. The apparatus was distannected after the exprotion was over. Thus, extract collected in the flask at the end of the experiment consisted of oil and petroleum ether.

REVIEW OF LITERATURE

Agarwal and Tiwari (1998) calculated tderance in ten plant species and reported *Ficus glomerta* as tolerant and *Acacia nilotica* as sensitive species. Anbazhagan and Bhagwat (1991) reported increase in leaf area, panicle length and plant height when treated with kinetin and ascorbic acid spray. Ascorbic acid has been suggested as a reliable physiological detoxificant of pollutants by many workers (Freebarian, 1960; Keller and Schwager, 1977; Nandi et al., 1980). The plants acts as pollution sink and they replenish the atmosphere with much needed oxygen. Smith (1974) suggested the possibility of using trees as pollution sink.

Many workers (Motto et al. 1970; Mandany et al. 1990) analyzed the road side soil for different heavy metals and El-Dosuky et al. (1998) reported higher lead and cadmium contents in soil as well as in plants present along the road side.

Salgare and Iyer (1991) also studied effect of automobile exhaust pollution on some roadside plants. Kalamaker (1992) worked on the effect of automobile exhaust pollution on certain plants.

Lone (2004) studied seasonal trends in the N contents of some economically important tree species under air pollution stress. The use of plants as monitors of air pollution and vehicular pollution along roadside has long been established since plants are the initial acceptor of air pollution. This concept has been backed by the proponents of "green belt" as an aid in protecting urban environment from industrial pollution (Lone and Khan, 2007).

RESULTS & DISCUSSION

The flask was then heated to evaporate the petroleum ether. Percentage of oil was calculated.

Weight of Seed/leaf taken = 10 gm.

Weight of round bottomed flask before

Experiment (A) = X gm

Weight of RB Flask

after experiment (B) = Y gm

So weight of Oil = Y – X

= Z gm.

The results of total Oil content as estimated and are given in table 1 to 4. Results in general shows that total oil on mg/gm dry weight basis declines in the four experimental plants grown on road side (20 mt. distance) as compared to 200 mt. distance grown crop plants.

TABLE – 1

TOTAL OIL CONTENT IN GRAIN OF *TRITICUM AESTIVUM* GROWING UNDER FIELD CONDITION NEAR ROAD SIDE (20 MT. = EXPERIMENTAL) AND AWAY FROM ROAD SIDE (200 MT = CONTROL).

Site	Total oil in grain of wheat	
	mg/gm dry weight	
	Control	Experimental
(1) Meerut Ghaziabad Road	3.1	2.0
(2) Meerut Muzaffar Nagar Road	3.6	2.4
(3) Meerut Baghpat Road	3.8	2.0

TRITICUM AESTIVUM

Results of total oil content in grains tissue of wheat growing under field conditions on 3 different road sides at district Meerut are shown in table 1. Result shows that oil content decreases in grain tissue of road side plant as compared to far distance grown plant. Thus, total oil in 20 mt. distance wheat grains are 64.5% as compared to control plant seed grown 200 mt. distance away from road side on Ghaziabad Road, Meerut. However, these values on Meerut Muzaffar Nagar road side wheat grains are 66.6% of the control seed tissue on same road. Similarly on Meerut Baghpat road in experimental plant grain total oil is 73.6% of the control seed tissue present on the same road.

TABLE – 2

TOTAL OIL CONTENT IN GRAIN OF *ORYZA SATIVA* GROWING UNDER FIELD CONDITION NEAR ROAD SIDE (20 MT. = EXPERIMENTAL) AND AWAY FROM ROAD SIDE (200 MT = CONTROL)

Site	Total oil in grain of wheat	
	mg/gm dry weight	
	Control	Experimental
(1) Meerut Ghaziabad Road	4.0	3.0
(2) Meerut Muzaffar Nagar Road	4.1	3.2
(3) Meerut Baghpat Road	4.2	3.1

ORYZA SATIVA

Table 2 shows the presence of total oil content in grain tissue of *Oryza sativa* grown on three different road sides of district Meerut at 20 mt. distance and also at 200 mt. distance away from the road side.

Result shows that in general on mg/gm dry weight basis total oil content decreases in tissue of *Oryza sativa* grown near road side (20 mt. distance away from road side) as compared to tissue of Rice plant grown on 200 mt. distance away from road side. This shows that road side pollutants coming from automobile exhaust might be causing inhibition in oil synthesis. Thus, on Meerut Ghaziabad Road side collected grains from 20 mt. distance from road side shows total oil 75% of control grain collected from 200 mt. distance on the same road. Similarly total oil in the same plant at 20 mt. distance grown plant on Meerut Muzaffar Nagar is 78.0% of the control (200 mt.) plant seeds.

TABLE – 3

TOTAL OIL CONTENT IN GRAIN OF *ZEA MAYS* GROWING UNDER FIELD CONDITIONS NEAR ROAD SIDE (20 MT. = EXPERIMENTAL) AWAY FROM ROAD SIDE (200 MT. = CONTROL)

Site	Total oil in seed of Maize	
	mg/gm dry weight	
	Control	Experimental
(1) Meerut Ghaziabad Road	4.3	3.6
(2) Meerut Muzaffar Nagar Road	4.1	3.7
(3) Meerut Baghpat Road	4.5	3.6

ZEA MAYS

Table 3 shows total oil content in grain tissue of Maize plant collected from 20 mt. distance and 200 mt. distance away from three road sides of 3 places in district Meerut.

Results in general shows that vehicular traffic probably is one of the factor in reducing oil content in seed tissue of Maize plant grown at 20 mt. distance near road side as compared to control plant grown on 200 mt. distance away from road side. Thus, total oil content values in grain tissue of *Zea mays* plant collected from Meerut Ghaziabad Road, Meerut Muzaffar Nagar Road and Meerut Baghpat road are 83.7%, 90.0% and 80.0% of control tissue respectively collected from 200 mt. distances away from these road sides respectively in district Meerut.

TABLE – 4

TOTAL OIL CONTENT IN GRAIN OF AVENA SATIVA GROWING UNDER FIELD CONDITIONS NEAR ROAD SIDE (20 MT. = EXPERIMENTAL) AND AWAY FROM ROAD SIDE (200 MT. = CONTROL)

Site	Total oil in grain of oat plant	
	mg/gm dry weight	
	Control	Experimental
(1) Meerut Ghaziabad Road	5.2	4.0
(2) Meerut Muzaffar Nagar Road	5.3	4.1
(3) Meerut Baghpat Road	5.4	4.2

AVENA SATIVA

Table 4 also shows that oil content in grains of *Avena sativa* growing under field conditions near three road side (20 mt. = experimental) and also away from road side (200mt.=control) distances. Result shows that in general there is retardation in oil synthesis in those oat plants cultivated along 20 mt. distance of all three road side, as compared to 200 mt. distance grown crop plant. Thus, in grain tissue of Meerut Ghaziabad road side plant total oil values are 76.9% in 20 mt. distance grown plant as compared to 200 mt. distance grown plant on the same road. However, these values of total oil on Meerut Muzaffar Nagar road side plant are 77.3% of the control (200 mt.) distance grown plant from same road side.

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