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EFFECT OF GENERATOR CAUSED AIR POLLUTION ON TOTAL LEUCOCYTE COUNT (TLC) IN RATTUS RATTUS

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Abstract: The study was conducted to observe the influence of Generator emissions on the Total Leucocytes Count (TLC) of the common house rat, *Rattus rattus* linnaeus, 1758 collected from Bareilly, Uttar Pradesh (India). The Total Leucocytes Count values were estimated in Group I control and Group II experimental which were exposed to generator emissions from 5KV diesel generator. The latter were further subdivided into four groups, based on distance of exposure [group A (2 feet), Group B (4feet), Group C (6feet), Group D (8 feet)] The results indicated significantly lower values in exposed rats suggesting that the emissions adversely affected TLC exposed as heart disease, high fever and cancer. When from 2 feet distance mortality of 33.33% was observed.

Keywords: *Rattus rattus*, *Generator emissions*, *Total Leucocytes Count*

INTRODUCTION

It has been suggested that SO₂ could increase the expression of ECF, EGFR and Cox-2 on the transcription and translation levels in the lungs and tracheas from asthmatic rats, Which might be one of the possible mechanism by which SO₂ pollution aggravates Asthma disease.

Nanotechnology has also intervened in the field of air pollution. Meiring et al.(2005) have studied the influence of H₂O₂ histamine on lung permeability and translocation of iridium nano particles in the isolated perfused rat lung. Nano particles have been shown to translocate from lung to the circulation but most of the inhaled dose remains in the lung interstitium even upto several year. Therefore, it seems that not the epithelial but the endothelial barrier is more important in prevent of translocation to the blood. Environmental parameters in polluted areas can produce hematological changes as a consequence of simultaneous factors such as dehydration, hypoxia and toxicity. Furthermore, physiological responses to these factors depend on the species, and plasma biochemical parameters can also be good indicators of diseases.

The present study was rat hematological profile intended to investigate the toxicity of exposure to diesel exhaust from 5KV generator. This paper shows the effect of generator caused Air pollution on TLC in *Rattus rattus*.

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MATERIALS AND METHODS

In the present study male and female rats of different groups were exposed to pollution of the exhaust from the diesel generator. Five group of each male and female rats were designed investigate the effect of pollution.

Group-I : Control with no exposure.

Group-II : Experimental groups (A B C D) of rats were placed at difference to exposed then air pollution caused by diesel operated generator.

Blood was collected by puncturing ocular vein and Total Leucocyte Count (TLC) (/cu.mm.) was estimated by Neubauer counting chamber by using diluting fluid of Michael and Chester (1952). The data were then analysed significantly according to the method of student's t-test (Fisher 1963) for test of significance ($P < 0.05$) level.

RESULTS AND DISCUSSION

TLC (/cu.mm.) value of male rats exposed from different distance at different time interval (all values are mean \pm SD)

Time Intervals	Control Rats (mean \pm SD)	Experimental Rats (mean \pm SD) (distance in feet)			
		2 feet	4 feet	6 feet	8 feet
10 Days	5066.66 \pm 488.87	6433 \pm 736.35	5800 \pm 637.70	5800 \pm 432.04	5733 \pm 953.33
20 Days	5200 \pm 329.98	6266 \pm 696.45	5566 \pm 339.45	5400 \pm 408.24	5133 \pm 784.57
40 Days	5166.66 \pm 634.21	6200 \pm 637.70	6033 \pm 262.46	5333.33 \pm 679.86	5166 \pm 584.57
60 Days	4990.66 \pm 515.44	6500 \pm 854.55	6133 \pm 224.72	5833.33 \pm 590.66	5033 \pm 753.33

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TLC (/cu.mm.) value of female rats exposed from different distance at different time interval
(all values are mean \pm SD)

Time Intervals	Control Rats (mean \pm SD)	Experimental Rats (mean \pm SD) (distance in feet)			
		2 feet	4 feet	6 feet	8 feet
10 Days	4933.33 \pm 612.82	6033 \pm 776.02	5866.66 \pm 776.02	5633.33 \pm 524.93	5066 \pm 410.96
20 Days	5066.76 \pm 286.74	6266 \pm 776.55	6033 \pm 676.03	5266.66 \pm 776.02	5100 \pm 993.31
40 Days	5166.67 \pm 634.21	6466 \pm 965.62	6266 \pm 899.83	5333 \pm 974.10	5233 \pm 974.10
60 Days	5233.33 \pm 489.89	6700 \pm 979.79	6433.33 \pm 531.24	5866.66 \pm 776.02	5566 \pm 946.33

The values were CO=3.5-5.0 gm/kw.hr., Hydrocarbons=1.3 gm/kw.hr., NO_x=9.2 gm/kw.hr., SPM=0.3-0.6 gm/kw.hr., Smoke=.7 gm/mm.cu/hr. The deleterious health effect of the constituents could be because of their interaction with molecules crucial to biochemical or physiochemical processes of the human body.

The results showed that there is a significant increase in TLC (/cu.mm.) when *Rattus rattus* were exposed the pollution exhaust from the diesel generator. A negative correlation between Total leucocyte count values and pollution was recorded.

Gorriz et al. (1996) showed that there was a significant decrease in hematocrit (PVC) and significant increase in leucocytes number, mean corpuscular hemoglobin concentration, osmolality and Y- globulin in *Mus musculus*.

Lisiewicz and Rucinska (1990) demonstrated that inhalation of high levels of NO₂ cause a decline in phagocyte function of macrophages and production of antibodies. SO₂ inhalation can produce irritation in respiratory airways, and lipid peroxidation in some tissues (Haider 1995) SO₂ and NO₂ inhalation can produce morphological changes in tracheal epithelium in passerine birds and small mammals (Llacuna et al. 1993, Gorriz et al. 1994)

The leucocyte number after exposure from 2,4 feet distance at different days found to increase as compared to normal value Gorriz et al. (1996) had reported that the leucocyte number (TLC) increment observed in cage mice subjected to air pollution may indicate a response to inflammatory processes and/or infection.

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We had given exposure to rats from 2,4,6 and 8 feet distance as blood is sensitive indicator for determining the health status of an organism. after giving exposure from 10,20,40 and 60 days, it was observed that there was significant increase in TLC, decrease in Hb and PCV.

The present investigation shows a increase in TLC below normal range after generator distance from 2 feet distance at different time intervals significant changes in TLC was recorded after exposure from 2 and 4 feet distances causing kidney infection, heart disease, high fever and cancer. When from 2 feet distance mortality of 33.33% was observed.

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