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EFFECT OF AIR POLLUTANTS ON METEOROLOGICAL PARAMETERS AND AMBIENT AIR QUALITY OF CERTAIN PLANTS IN HYDERABAD CITY

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ABSTRACT
At the height of a few meters, completely extended and developed leaves were gathered from each plant in the polythene packs and transported to the research center. The leaf tests were gathered each long stretch of fifth dated from all the 2 locales and this recurrence was entirely kept up consistently. The following investigations were carried out in all the fourteeen plants *Acacia nilotica, Azadirachta indica, Calotrophis procera., Cassia auriculata, Delonix regia.Hook., Dalbergia sissoo., Ficus benghalensis, Ficus carica, Hibiscus rosasinensis, Lantana camara. L., peltophorum ferrugineum, Benth, Polyalthia longifolia, Pongamia pinnata.L and Syzgium cumini*. For photosynthetic study the chlorophyll pigments (Chlorophyll a, chlorophyll b and total chlorophyll) were studied and biochemical changes in leaves (Starch, phenols, and sugars- total, reducing and non-reducing) were studied. Air pollution tolerance index, PH, Relative Humid Content, Ascorbic Acid Content, Determination of the antioxidant enzymes like CAT, POD, PPO and air quality parameters like NOX, SO_2, PM_{10}, TSPM were studied. Meteorological data of AT, RH, BP, SR, VWS, WS, WD were studied.

KEYWORDS: PH, Relative Moisture Content, Ascorbic Acid Content, *Dalbergia sissoo., Ficus benghalensis, Ficus carica, Hibiscus rosasinensis, Lantana camara. L.*

1. INTRODUCTION

Air pollution is defined as any item introduced into the air as a result of human activity that has a detrimental effect on human health, vegetation, or impairs the utilization of natural resources. Airplanes, autos, industrial units, power plants, solid waste, and construction projects all contribute to air pollution (Javed et al. 2009). Normally, clean air contains 21% oxygen and 78% nitrogen by volume. When the oxygen concentration falls below 6%, it has an effect on man's awareness. Deepalakshmi AP *et al.* (2013) studied the nature of plants exposed to some of the pollutants discharged from vehicles and carried out the evaluation of air pollution tolerance index of ten wild plant species along the Bangalore roads that were busy. The results indicated that maximum reduction was seen in Bougainvillea spectabilis. Ageratum conyzoides was considered very much sensitive. Peltophorumpterocarpum and portulacaoleraceae are the plants species that were most tolerant to air pollution. Tanushree Bhattacharya *et al.* (2013) carried out evaluation of air pollution tolerance index of six different plant species from nine stations of Baroda city. Polyalthia longifolia, Mangifera indica and Azadiracha indica showed highest tolerance value irrespective of three seasons namely winter, summer and monsoon in the study. Uma Devi Randhi *et al.* (2012) studied the sixteen different varieties of trees in different areas of Hyderabad, A.P, India. The work carried out classified the plants into tolerant, sensitive, intermediately tolerant and moderately tolerant species. The results show that during monsoon season the air pollution tolerance index value was higher which may be due to washing of the pollutant from the leaf area of the plant. The species Delonix regia Hook, Azardiracta Indica A, Peltophorum pterocarpum DC,Alestonia scholaris L,Ficus religiosa L and Samaniasamanjacq exhibit high APTI value and act as a good sink to reduce pollution. The sensitive plants are identified as the bio indicators of stress due to air pollution. Mahecha G.S *et al.* (2013) examined the responses of the three plants and has determined the air pollution tolerance index of plants that include the Annona squamosa, Ficus racemosa and Santalum album by examining the biochemical and physiochemical parameters which are grown around in the Madri Industrial area in Udaipur. The results clearly show that plant species Santalum album L having higher value of air pollution tolerance index are preferred for the plantation in that area to minimize the effects of air pollution. Jissy Jyothi S *et al.* (2010) studied the evaluation of some of the selected tree species along NH-47 passing through Thiruvananthapuram in Kerala district to assess air pollution tolerance index. The results reveal that Polyalthia longifolia was found to be tolerant plant in the study while all the other plant varieties were sensitive to pollution stress.

Lohe.N *et al.* (2015) studied about the terrestrial plant species around Dehradun city, India. Analysis of four physiological and biological parameters of plants were considered for air pollution tolerance index value determination for seven different plant leaves. From the study it was clear that Eucalyptus globus showed more tolerance to pollution than the other seven plant leaves considered for analysis. Nwadinigwe *et al.* (2014) *et al.* studied the assessment and ability of the plants to absorb some of the gases prevailing around Industrial Corporations located in Nigeria. The analysis revealed that plants like Bougainvillea spectabilis, Delonix regia, Mangifera indica and Duranta erecta were tolerant with high air pollution tolerance index value. These plants were recommended for growth very close by near the areas of high pollution to absorb all the available harmful gases and pollutants which are very much responsible for climate variation in the earth's atmosphere. Marimuthu *et al.* (2014) studied the assessment of air pollution tolerance index value at two different places in the carriedout work. The vegetative species exposed to continuous high pollution altered the characteristics of the plant leaves and were found to be sensitive to pollution. Gopalakrishnan *et al.* (2013) investigated the leaves of Passilora edulus by its biochemical characterization. The results showed that plants could also be used for folklore medicine in various ailments. Chouhan Aarti *et al.* (2012) examined the response of few of the plants towards air pollution tolerance index in Pithampur industrial area. The study revealed that the selected plants like C.gigantea was useful in bio monitoring to minimize industrial air pollution and for green belt development towards air pollution control.

Mohammed Kuddus *et al.* (2011) studied the plant species that are economically important and grown in urban industrial area of Allahabad. The results show that Artocarpus sp as sensitive variety of plant and Mangifera indica as tolerant plant variety. Naima Huma Naveed *et al.* (2010) studied the heavy metal environmental pollution during two different seasons of winter and summer in Sargodha, Pakisthan. The results revealed the presence of higher lead concentration in the industrial area during both seasons compared to other areas of study.

Sarika karda and kiran pawar *et al.* (2015) studied the status of air quality and its effect on biochemical parameters on the species available in Jalgoan city in Maharashtra. The results revealed that the species like Alstonia scholaris and polyalthia longifolia are the varieties from the selected species that are highly tolerant trees and Ficus religeosa and plumeria rubra are the species that are very much sensitive in the studied area.

Namita Joshi and Meha bora *et al.*) (2011) studied the impact of prevailing air quality on the physiological attributes of eight different plant species in Haridwar, Uttarkhand. The evaluation of the results prove that combination of all physiological parameters selected for the study give more reliable results than the individual. It was found that maximum of dust interception was shown by Psidium gujava and species Ficus religiosa was seen to show the highest tolerance index towards air pollution. Shailendra Arora *et al.* (2014) studied the relationship between the two parameters namely, biochemical characteristics and air pollution stress of some of the selected and available plants at Sarita vihar in New Delhi, India. The road side region having vegetation with very high traffic was much affected due to vehicular pollution than those away from the road side.

Dwivedi A.K *et al.* (2007) studied to investigate the composition of vegetation nearby coal fired factory using ninetynine different varieties of plants. Ricinus Communis with highest air pollution tolerance index was found to be the most tolerant in the wild plant category at the sites emitting pollution. Lapidium sativum was identified to be most sensitive plant found in less pollution emitting sites. Pradhan A.A *et al.* (2016) studied the reason for high level of air pollution by evaluation of air pollution tolerance index value of trees along NH-6 Ainthapali to Remed of Sambalpur town area in Odisha India. The results of the study revealed the species Tectona grandis was the most tolerant plant variety with air pollution tolerance index value ranging from 7.13 to 10.33.

Shital Gharge *et al.* (2012) studied the air pollution tolerance index of four herbs from the site around Ambarnath MIDC region of the Thane Industrial Estate in the state of Maharashtra, India during monsoon and winter seasons. The results showed that plant species Amaranthus spinosus Linn was identified as most tolerant plant and can be used as indicator of pollution there by acting as sink to eliminate air pollutants.

2. MATERIALS & METHODS

2.1 Meteorological parameters: The meteorological components deciding evapotranspiration are climate parameters which give vitality to vaporization and expel water vapor from the dissipating surface. In present investigation meteorological parameters, for example, Atmospheric Temperature, Relative Humidity, Solar Radiation, Barometric Pressure, Wind Speed and Wind Direction are considered for a time of 2 years i.e., at Hyderabad, Nanakramguda-site-1, BHEL campus-site-2, Patancheru industrial area-site-3 and Lingampally Railway station-site-4. Telangana all the four sites fall under Hyderabad City and these meteorological parameters were talked about like manner for two destinations.

2.1.1 Atmospheric Temperature: Temperature is a proportion of Hotness or Coldness of an article. Temperature is specifically identified with the convergences of fine particles and dark carbon. It is estimated with Thermometer. Environmental temperature at or over the 40^0C support the dissipation and emanation of unpredictable mixes and nitrogen oxides and increment the speed of compound responses prompting zone and fine particles. Air Temperature underneath 40^0C may improve the buildup of some fine Particulate issue.

Meteorological parameters, such as temperature and precipitation are very important to the life and development of plants. This is why the changes in these parameters have a great impact on plant development. However, the plants have integral response not only to changes of climate, but also to changes of pedological, geological and other elements.

Since the end of the '80s the need for phenological data has increased significantly and with it the number of scientists who analyze this data. This is caused by rising temperatures in recent decades and a clear response of plants to these changes which is seen in phenological data. The impact of climate on plants was investigated by scientists in Slovenia (Kajfež-Bogataj in Črepinšek, 2003; Bergant in sod., 2004; Črepinšek in Zrnec, 2005) and other European countries (Ahas et al, 2000; Alexandrov and Hoogenboom, 2000; Menzel, 2000; Roetzer et al., 2000; Sparks et al., 2001; Fitter and Fitter, 2002; Menzel, 2003). On other continents these studies are also present (Robeson, 2002; Atrri and Rathore, 2003; Zhang et al., 2004; McCabe et al., 2011).

Based on the analysis of phenological phases earlier beginning of spring and later ending of autumn phenophases of plants is noticed. With this comes the extension of the growing season. The main reason for this is, above all, the high positive trends of spring air temperatures. Similar data are obtained by scientists in other countries. In Austria and Germany spring phenophases of plants occur earlier from 0.36 days/decade in Germany to 0.39 days/decade in Austria (Menzel et al., 2003). Sparks et al. (2001) suggests that in the UK spring phenophases occur from 8 to 10 days earlier with an increase in air temperature of 1°C. In the UK flowering occurs 4.5 days earlier in the last decade of the XX century compared to the period 1950-1990 (Fitter and Fitter, 2002). Based on the data from the International Phenological stations in Europe for the period 1959-1996, Menzel (2000) indicates that in Europe the spring phenophases occurred 6.3 days before and autumn phenophases 4.5 days later. In China, spring phenophases occur from 1.4 to 5.2 days/decade earlier in the north to 7.5 days/decade in the south of the country (Zhang et al, 2004). It is noticed that plants in different parts of the world have a similar response to the increase of air temperature values which is in accordance with the results obtained in this work.

2.1.2 Relative Humidity (%): Relative Humidity (%) is the proportion of the measure of Water vapor in air. It is the proportion of the genuine vapor weight to the immersion vapor weight and communicated as %. It is estimated by Hygrometer. The Moisture substance of the environment impacts the destructive activity of air toxins and shows the possibility for Fog development in connection to level of air pollution.

2.1.3 Barometric Pressure (mm/Hg): It is the vertical power of an air mass over a given reference point and is estimated by Barometer.

One consequence of low atmospheric pressure at high altitudes is the decrease of partial pressures of O_2 and CO_2, which are essential substrates for respiration and photosynthesis (Xu et al., 2015; Zabalza et al., 2009). Changes in O_2 and CO_2 partial pressures have been linked to changes in plant physiology and growth (He et al., 2007; Kammer et al., 2015; Paul et al., 2004; Zhou et al., 2017). Effects are complex, since the decrease of the partial pressure of the atmospheric gases is accompanied by an increase in diffusion rates, which may compensate for the low ambient concentration of the essential gases (Terashima et al., 1995). Further, as the diffusion coefficient for water vapour is increased, transpiration increases (Smith & Geller, 1979), which can impose water stress on plants growing under reduced atmospheric pressure (Iwabuchi & Kurata, 2003; Paul et al., 2004; Richards et al., 2006).

2.1.4 Solar Radiation: Solar radiation is the biggest vitality source and can change huge amounts of fluid water into water vapor. Because of distinction in the situation of the sun, the potential radiation varies at different scopes and in various seasons. The genuine sunlight based radiation achieving the surface relies upon the turbidity of the air and the nearness of mist which reflect and ingest significant parts of the radiation.

2.1.5 Wind Speed (m/s):

Mishra et al. (2016), through their work on the air quality of Sukinda valley concluded that, the valley is polluted with particulate matters. The level of particulate pollutants exceeded the permissible limits on most occasions. They observed that the meteorological parameters guided the dispersion of pollutants and also found the role of wind speed and direction to be an important factor on the significant variation of particulate pollutants.

Wind Speed is a basic environmental rate. Wind speed is caused via air moving from high strain to low weight. Wind speed influences climate estimating, flying machine and oceanic tasks, development ventures, development and digestion rate of many plant species. Wind speed is generally estimated with an anemometer. The higher the speed of the breeze close to the point of release of pollution, the more quickly are the toxins diverted from the source.

2.1.6 Wind Direction:

Chizoruo et al, (2017) studied the ambient air quality of Orlu, South-Eastern, Nigeria and reported that, all the studied air pollutants (PM1O, N02, S02 and CO) were above the US national permissible standards. Further, the AQI of the area ranged between 1 51 and 225, and categorized under unhealthy to very unhealthy atmospheric condition. They concluded that the pollutants were dispersed and transported significantly due to the wind speed and direction prevalent in the study area.

Wind Direction is accounted by the bearing from which it starts. Wind heading is typically revealed in cardinal ways or in azimuth degrees.

2.2 Ambient Air Quality

There are a few parameters to pass judgment on air quality three of them-Sulphur-di-oxide, oxides of nitrogen and Suspended Particulate Matter (SPM)gives a reasonable thought of Pollution stack conveyed via air. In the present investigation surrounding air quality is surveyed by dissecting four parameters sulphur-di-oxide, oxides of Nitrogen, Total Suspended Particulate Matter and Respirable Suspended Particulate Matter at 2 destinations.

2.2.1 SO_2 (Sulphur-di-oxide): SO_2 (Sulphur-di-oxide) is a horrendous and exceedingly chafing gas. The fundamental wellspring of SO2 noticeable all around is Industrial action that forms materials which contain Sulfur. It is delivered by volcanoes and in different mechanical procedures. Since Coal and oil frequently contain sulfur aggravates, their burning produces sulfur intensifies, their ignition creates sulfur dioxide. Further oxidation of SO_2, usually within the sight of an impetus, for example, NO_2, shapes H_2SO_4 and along these leads to acid rain. This is one of the foundations for worry over the ecological effect of the utilization of these powers as power sources. It is destructive, non-inflammable gas and has coordinate impact on vegetation. These impacts cause brief and lasting damage to plant vegetation. Health impacts caused by introduction to elevated amounts of SO_2 incorporate breathing issues, respiratory disease, changes in lung guards, and exacerbating respiratory and cardiovascular diseases.

Rao and Leblanc (1966) mentioned that high amount of gaseous SO2 causes destruction of chlorophyll and that might be due to the replacement of Mg++ by two hydrogen atoms and degradation of chlorophyll molecules to phaeophytin.

Davison and Barnes (1986) mentioned that pollutants like SO2, NO2 and H2 S under hardening conditions can cause more depletion of soluble sugars in the leaves of plants grown in polluted area.

The free radical production under SO2 exposure would increase the free radical scavengers, such as ascorbic acid, super oxide dismutase, peroxidase etc. (Pierre and Queirz, 1981) based on dosage and physiological status of plant. Plants having high ascorbic acid possess resistance to SO_{2} , Varshney SRK, et al. (1984).

2.2.2 Oxides of Nitrogen (NO_x **µg/m³):** Oxides of Nitrogen, for example, N_2O, NO and NO_2 is generally spoken by image NO_x. The Chief Pollutant NO_x is emitted in numerous forms, such as Smog (or) particles. NO is oxidized to NO_2 in a Polluted air through Photochemical responses. It adds to a dangerous atmospheric devastation and hampers Plant development.

NO_x acts essentially as an aggravation, influencing the mucosa of the eyes, nose, throat and respiratory tract. Extremely high-portion introduction (as in a building fire) to NO_x may result in aspiratory edema and diffuse lung injury. Continued presentation to high NO_x levels can add to the improvement of intense or interminable bronchitis. Low dimension of NO_x introduction may expanded bronchial reactivity in asthmatics, diminished lung work in patients with constant obstructive pneumonic malady and expanded danger of respiratory diseases, particularly in young kids.

Nitrogen inputs have hardly changed over the past ten years and the data sets now show shifts in the composition of forest ground vegetation towards more nitrogen tolerant species. Atmospheric deposition is a driver for these changes in biodiversity. Another effect of nitrogen deposition is increased tree growth which was found on intensive monitoring plots across Europe Spiecker H. (1996).

Zeevaart (1974) found induction of nitrate reductase activity in plants by atmospheric NO2.

Nitrogen oxides ($NO_x = NO + NO_2$) together with fine particulate matter (PM), sulfur dioxide (SO_2) and ozone(O_3) are the most important air pollutants in the troposphere (Cuevas et al., 2014; He et al., 2017), being responsible for the air quality degradation in many regions across the Earth (Georgoulias et al., 2019).

Factors such as cloud cover, aerosols, water vapor or volcanic eruptions affects R_s (Wang et al., 2018). Lelieveld et al. (2002) suggested that air pollution reduces the infiltration of solar radiation into the surface.

2.2.3 Particulate Matter

2.2.3.1 Total Suspended Particulate Matter (TSPM):

Particle Air Pollution is a byproduct of fuel burning (gas, diesel, wood, private warming oil and so on) and of mechanical procedures. Air borne Particulate Matter is a blend of toxins, strong and fluid structures Particles noticeable all around are grouped by streamlined measurement, size and substance piece, and are frequently alluded as PM or Aerosols. PM is commonly estimated as far as mass grouping of particles inside specific classes. Absolute suspended particulate PM10. Particles under 10 Micrometers in breadth (PM 10) represent a wellbeing concern since they can be breathed in and assemble in the Respiratory tract. In the present examination TSPM and RSPM were broke down by utilizing Respirable Dust Sampler (RDS) at two Sites for a time of 2 - Years.

Air pollutants comprised of both particulate matter (PM) and gaseous pollutants may cause adverse health effects in humans, affect plant life, and impact the global environment by changing the atmosphere of the earth (Raabe, 1999, Rai, 2013, Rai, 2015b; Rai and Panda, 2014a, Rai and Panda, 2014b).

Foliar surface of urban roadside plants acts as a sink for PM deposition and through their deposition they show specific morphological, physiological, and biochemical responses. Deposition of PM pollutants on a leaf surface induces structural and functional changes (Panda and Rai 2015).

2.2.3.2 Respirable Suspended Particulate Matter (RSPM): For the first year at Site-1 the RSPM was from 337-89 and averaged to 138, at Site-2 it is between 110-86 and averaged to 96.57. The control of air Pollution is an unpredictable procedure and utilization of physical or concoction techniques are restricted. The organic strategies that is, developing trees in open regions of urban condition and modern territory is an appropriate elective technique to control Pollution (Agarwal 1988; Shannigrahi et al., 2003; Sivasamy a Srinivasan,1996; Fukuoka, 1997; Ghose and Majee, 2001; Mondal et al., 2011). Green plants are likewise go about as living channels to sink air Pollution by ingestion detoxification and aggregation without causing serious foliar harm, in this manner enhancing air quality (Sharma et al., 1994; Rawat and Banerjee et al., 1996; Beckett et al., 1998). Be that as it may, the reaction of plants to air Pollution vary particularly, some being very delicate and other tolerant (Sing and Rao, 1983; Shannigrahi et al., 2003). The biochemical changes in the leaf used to assess the reaction to the air toxins by the test plants. The parameters are ascorbic acid (Keller and schwager, 1977), relative water content (Sen and Bhandari, 1978), chlorophyll content (Bell and Mudd, 1976) and leaf surface pH (Chaudhary and Rao, 1977). Classification of these

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parameters impact the plants development and with various toxins. The plants affectability and tolerant to air Pollution changes with their parameters and in the present investigation the species reacted contrastingly at various localities. It was seen that in every one of the plant types both the cell sap pH content and ascorbic acid has carried on differently with reference to air toxins at the examination destinations. The chlorophyll content decrease from control site to different localities saw in all the test species.

3. RESULTS & DISCUSSION

Table-1: Meteorological Data for site-1

Date	AT (°C)	Relative Humidity (%)	Barometric Pressure (mmHg)	Solar Radiation (W/m2)	WS (m/s)	WD Deg (°)
03/12/2017	19.4	61.2	711	44	0.5	45
03/01/2018	16.6	68.4	711	46	0.6	354
03/02/2018	16.2	61.7	712	44	0.5	351
03/03/2018	17.6	69.8	709	40	0.5	270
03/04/2018	24.2	47.4	709	46	2.4	205
03/05/2018	25.1	42.3	709	43	0.9	306
03/06/2018	22.6	64.9	708	49	3.7	270
03/07/2018	36.4	55.5	709	44	2.5	304
03/08/2018	22.2	76.8	702	41	3.2	234
03/09/2018	22.4	74.7	704	35	3.9	231
03/10/2018	22.3	79.7	706	30	3.6	275
03/11/2018	22.1	81.1	708	40	1.1	58
03/12/2018	20	88.4	710	-1	1.9	62
03/01/2019	20.5	79.2	710	37	0.4	20
03/02/2019	17.6	69.2	710	46	0.8	47
03/03/2019	17.6	57.7	710	41	0.3	346
03/04/2019	21.4	64.7	709	37	0.2	31
03/05/2019	24.1	69.8	708	33	0.3	24
03/06/2019	26.3	54.8	706	40	1	273
03/07/2019	24.2	69.2	706	54	0.7	235
03/08/2019	16.2	68.4	710	44	1.1	234
03/09/2019	17.6	61.7	710	40	1.9	231
03/10/2019	24.2	69.8	710	46	0.4	275
03/11/2019	25.1	47.4	709	43	0.8	58
03/12/2019	22.2	66.2	706	41	0.5	142

Table-2: Meteorological Data for site-2

Date	AT (°C)	Relative Humidity (%)	Barometric Pressure (mmHg)	Solar Radiation (W/m2)	WS (m/s)	WD Deg (°)

03/12/2017	16.2	68.4	710	44	1.1	234
03/01/2018	17.6	61.7	710	40	1.9	231
03/02/2018	24.2	69.8	710	46	0.4	275
03/03/2018	25.1	47.4	709	43	0.8	58
03/04/2018	22.2	66.2	706	41	0.5	142
03/05/2018	25.1	43.1	709	43	0.9	306
03/06/2018	22.6	64.9	708	49	3.7	270
03/07/2018	26.4	55.5	709	44	2.5	304
03/08/2018	22.2	76.8	703	41	3.7	234
03/09/2018	22.4	74.7	704	35	3.2	231
03/10/2018	22.3	79.7	706	30	3.6	275
03/11/2018	22.1	81.1	708	40	1.1	58
03/12/2018	19.4	61.2	711	44	0.5	45
03/01/2019	16.6	68.4	711	46	0.6	352
03/02/2019	15.9	61.7	712	44	0.5	351
03/03/2019	17.6	69.8	709	40	0.5	270
03/04/2019	24.2	47.4	709	46	2.4	205
03/05/2019	24.1	69.8	708	33	0.3	24
03/06/2019	26.4	54.8	706	40	1	273
03/07/2019	24.2	69.2	706	54	0.7	235
03/08/2019	16.2	68.4	710	44	1.1	234
03/09/2019	17.6	61.7	710	40	1.9	231
03/10/2019	24.2	69.8	710	46	0.4	275
03/11/2019	25.1	47.4	709	43	0.8	58
03/12/2019	22.2	66.2	706	41	0.5	142

Table-3: Meteorological Data for site-3

Date	AT (°C)	Relative Humidity (%)	Barometric Pressure (mmHg)	Solar Radiation (W/m2)	WS (m/s)	WD Deg (°)
03/12/2017	18.7	62.8	711	61	0.7	15
03/01/2018	16.4	68.7	712	54	0.3	347
03/02/2018	15.9	62.2	712	46	0.3	324
03/03/2018	17.4	69.1	710	102	0.6	289
03/04/2018	24.1	46.9	710	55	2.6	212
03/05/2018	25	41.2	709	76	1	321
03/06/2018	22.5	66.1	709	109	2.6	289
03/07/2018	26.4	57	710	72	1.7	327
03/08/2018	22.2	76.4	703	69	3.1	238
03/09/2018	22.2	75.9	704	81	3.7	233
03/10/2018	22.1	80.1	706	37	3.1	282
03/11/2018	22.3	80.5	709	59	0.6	48

03/12/2018	20	87.4	710	55	2	64
03/01/2019	20	80.3	710	43	0.6	22
03/02/2019	17.4	69.5	710	55	0.8	47
03/03/2019	17.4	57.4	710	42	0.4	334
03/04/2019	20.9	67.3	710	45	0.3	54
03/05/2019	24	69.1	708	73	0.2	19
03/06/2019	26.6	55.2	707	102	0.8	272
03/07/2019	24.3	69.5	706	122	0.8	223
03/08/2019	15.9	68.7	710	46	0.6	238
03/09/2019	17.4	62.2	710	102	2	233
03/10/2019	24.1	69.1	710	55	0.6	282
03/11/2019	25	46.9	710	76	0.8	48
03/12/2019	26.4	55.2	707	102	0.8	272

Table-4: Meteorological Data for site-4

Date	AT (°C)	Relative Humidity (%)	Barometric Pressure (mmHg)	Solar Radiation (W/m2)	WS (m/s)	WD Deg (°)
03/12/2017	17.4	69.5	710	55	0.8	47
03/01/2018	17.4	57.4	710	42	0.4	334
03/02/2018	20.9	67.3	710	45	0.3	54
03/03/2018	24	69.1	708	73	0.2	19
03/04/2018	26.4	55.2	707	102	0.8	272
03/05/2018	25	42.1	709	76	1	321
03/06/2018	22.5	66.1	709	109	2.6	289
03/07/2018	26.4	57	710	72	1.7	327
03/08/2018	22.2	76.4	703	69	3.1	238
03/09/2018	22.2	75.9	704	81	3.9	233
03/10/2018	22.1	80.1	706	37	3.1	282
03/11/2018	22.3	80.5	709	59	0.6	48
03/12/2018	20	89.2	710	5	2	64
03/01/2019	20	80.3	710	43	0.6	22
03/02/2019	17.4	69.5	710	55	0.8	47
03/03/2019	17.4	57.4	710	42	0.4	334
03/04/2019	20.9	67.3	710	45	0.3	54
03/05/2019	24	69.1	708	73	0.1	19
03/06/2019	26.4	55.2	707	102	0.8	272
03/07/2019	24.3	69.5	706	120	0.8	223
03/08/2019	22.1	80.1	706	37	3.1	282
03/09/2019	22.3	80.5	709	59	0.6	48
03/10/2019	20	88.4	710	5	2	64

03/11/2019	20	80.3	710	43	0.6	22
03/12/2019	17.4	69.5	710	55	0.8	47

3.1 Meteorological parameters

3.1.1 Atmospheric Temperature: The Atmp temp. was from 16.2°C-36.4^{0}C at Site-1 and Reached at the Average of 21.76^{0}C. The Atmp Temp. ranged from 15.9°C-26.4°C at Site-2 and reached average of 21.68^{0}C. The Atmp temp. was from 15.9°C-26.4^{0}C at Site-3 and Reached at the Average of 21.38^{0}C. The Atmp Temp. ranged from 17.4°C-26.4°C at Site-4 and reached average of 21.64^{0}C.

3.1.2 Relative Humidity (%): The Relative Humidity (%) shifted from 42.3% to 88.4 % and Averaged to 66% at Site-1. The Relative Humidity (%) from 43.1% to 81.1% and Averaged to 64.20% at Site-2. The Relative Humidity (%) shifted from 42.1% to 87.4% and Averaged to 65.78% at Site-3. The Relative Humidity (%) from 42.1% to 89.2% and Averaged to 70.11% at Site-4.

3.1.3 Barometric Pressure (mm/Hg): The Barometric Pressure at Site-1 (mm/Hg) was between 702-712mm/Hg and reached the average of 708.48mm/Hg. The Barometric Pressure (mm/Hg) was between 703-712mm/Hg and Reached at the Average of 708.36mm/Hg at Site-2. The Barometric Pressure at Site-3 (mm/Hg) was between 703-712mm/Hg and reached the average of 708.92mm/Hg. The Barometric Pressure (mm/Hg) was between 703-710mm/Hg and Reached at the Average of 708.44mm/Hg at Site-4.

3.1.4 Solar Radiation: The Solar Radiation was -1-49W/m3 and reached average of 40.12W/m3 in Site-1. The Solar Radiation was 30-54 W/m3 and reached average of 42.28 W/m3 in Site-2. The Solar Radiation was 42-122W/m3 and reached average of 69.56W/m3 in Site-3. The Solar Radiation was 5-120 W/m3 and reached average of 60.16W/m3 in Site-4.

3.1.5 Wind Speed (m/s): The rate of Wind speed was 0.2-3.9 m/s and Reached at the Average of 1.34m/s in Site-1. The rate of Wind speed was 0.3-3.7 m/s and found the average of 1.38 m/s in Site-2. The rate of Wind speed was 0.2-3.7m/s and Reached at the Average of 1.24m/s in Site-3. The rate of Wind speed was 0.1-3.9 m/s and found the average of 1.25m/s in Site-4.

3.1.6 Wind Direction: The Wind Direction was between 20-354° and Reached at the Average of 195.24° in Site-1. The Wind Direction was between 24-352° and Reached at the Average of 212.52° in Site-2. The Wind Direction was between 15-347° and Reached at the Average of 201.32° in Site-3. The Wind Direction was between 19-334° and Reached at the Average of 158.48° in Site-4.

3.2 Ambient Air Quality

3.2.1 SO_2 (Sulphurdioxide): At site-1 the SO_2 for the first year i.e., 2018 from 11-36.1µg/m^3 and averaged to 18.64µg/m^3. At site-2 SO_2 for the first year i.e., 2018 was from 4.9-5.4µg/m^3 and averaged to 5.13µg/m^3.

At site-1 the SO_2 for the second year i.e., 2019 from 6.7-10.5µg/m^3 and averaged to 9.31µg/m^3 at site-2 the SO_2 for the second year i.e., 2019 from 4.4-5.8µg/m^3 and averaged to 4.8µg/m^3.

At site-3 the SO_2 for the first year i.e., 2018 from 10-26.1µg/m³ and averaged to 18.64µg/m³. At site-4 SO_2 for the first year i.e., 2018 was from 4.4-5.2µg/m³ and averaged to 5.23µg/m³.

At site-3 the SO_2 for the second year i.e., 2019 from 8.7-11.5µg/m³ and averaged to 9.31µg/m³ at site-4 the SO_2 for the second year i.e., 2019 from 4.1-5.6µg/m³ and averaged to 5.1µg/m³.

3.2.2 Oxides of Nitrogen (NOX µg/m³): For the first year at Site-1 the NO_x was from 36-38.1µg/m³ and averaged to 37.19µg/m³, at Site-2 it is between 33.5-36.3µg/m³ and averaged to 36.87µg/m³, For the second year at Site-1 the NO_x was from 33.5-36µg/m³ and averaged to 33.74µg/m³, at Site-2 from 19.6-31.9µg/m³ and averaged to 379µg/m³. For the first year at Site-3 the NO_x was from 35-37.1µg/m³ and averaged to 35.21µg/m³, at Site-4 it is between 33.5-35.3µg/m³ and averaged to 34.87µg/m³, For the second year at Site-3 the NO_x was from 37.5-39µg/m³ and averaged to 38.47µg/m³, at Site-4 from 18.4-33.1µg/m³ and averaged to 32.5µg/m³.

3.2.3 Particulate Matter For the first year at Site-1 the TSPM shifted between 89-164µg/m³ and averaged to 134.73µg/m³, at Site - 2 from 86-110µg/m³ and averaged to 96.58µg/m³, For the second year at Site-1 TSPM from 58-169µg/m³ and averaged to 130.08µg/m³, at Site-2 between 66-116µg/m³ and averaged to 98.33µg/m³. For the first year at Site-3 the TSPM shifted between 87-154µg/m³ and averaged to 144.71µg/m³, at Site-4 from 84-112µg/m³ and averaged to 106.62µg/m³, For the second year at Site-3 TSPM from 52-157µg/m³ and averaged to 140.16µg/m³, at Site-4 between 67-121µg/m³ and averaged to 108.11µg/m³.

3.2.3.1 Total Suspended Particulate Matter (TSPM):

For the first year at Site-1 the TSPM shifted between 89-164µg/m³ and averaged to 134.73µg/m³, at Site - 2 from 86-110µg/m³ and averaged to 96.58µg/m³, For the second year at Site-1 TSPM from 58-169µg/m³ and averaged to 130.08µg/m³, at Site-2 between 66-116µg/m³ and averaged to 98.33µg/m³. For the first year at Site-3 the TSPM shifted between 87-154µg/m³ and averaged to 144.71µg/m³, at Site-4 from 84-112µg/m³ and averaged to 106.62µg/m³, For the second year at Site-3 TSPM from 52-157µg/m³ and averaged to 140.16µg/m³, at Site-4 between 67-121µg/m³ and averaged to 108.11µg/m³.

3.2.3.2 Respirable Suspended Particulate Matter (RSPM): For the first year at Site-1 the RSPM was from 340-438µg/m³ and averaged to 338µg/m³, at Site-2 it was from 354-313µg/m³ and averaged to 381.08µg/m³, For the second year at Site-1 RSPM from 141-370µg/m³ and averaged to 353µg/m³. at Site-2 from 156-361µg/m³ and averaged to 190.58µg/m³. For the first year at Site-3 the RSPM was from 343-441µg/m³ and averaged to 431µg/m³, at Site-4 it was from 331-345µg/m³ and averaged to 372.03µg/m³, For the second year at Site-3 RSPM from 152-378µg/m³ and averaged to 372µg/m³. at Site-4 from 134-369µg/m³ and averaged to 231.6µg/m³.

4. CONCLUSION:

Air and water Pollution are developing concerns, in light of the fact that the dangers of natural Pollution are genuine and the impacts are now felt worldwide with the beginning of 21st century. Despite the fact that water and land Pollution is exceptionally perilous, air

Pollution has turned into a worldwide issue looked by both the created countries just as the creating ones. As air Pollution has its very own idiosyncrasies, because of the inclination of its trans-limit scattering of toxins over the whole world. Air Pollution can be characterized as the human presentation into the climate of synthetic compounds, particulate issue or natural materials that reason mischief or distress to people, or other living creature or harm the earth. It has been bothered by improvements that commonly happen as nations end up industrialized: developing urban areas, expanded traffic, fast financial advancement and industrialization, and abnormal amounts of vitality utilization. Every one of these variables go about as circumstances and logical results for each other and act in a synergistic way to befoul the holiness of regular habitat. As indicated by UNEP it is evaluated that more than 1 billion individuals are presented to open air Pollution every year. Urban air Pollution is connected to up to 1 million unexpected losses and 1 million pre-local passings every year. The qualities of urban air Pollution have essentially over ongoing decades. Groupings of customarily essential poisons, for example, sulfur dioxide (SO2) and dark smoke have declined generously, while street traffic discharges have risen as the significant reason for poor air quality.

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