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Research Article

Anticipated performance index of selected plant species in University campus area, Rohtak, Haryana, India

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Air Pollution Tolerance Index, Landscaping, Green belt, Anticipated performance Index, Amelioration

Abstract

Plants are only which help in reduce air pollution. In plants leaves play a vital role in absorbing gases and some particulate matter. Therefore, vegetation acts as the natural cleanser of pollution in atmosphere. According to their degree of tolerance and sensitivity towards several air pollutants, plants have been classified in the present study. The entire results obtained from the study concluded that different plant species respond differently to air pollution. Tree species (Ziziphus mauritiana, 5.621), shrub species (Calliandra haematocephala, 4.591) and herb species (Chenopodium album, 8.409) are highly tolerant plant species with high Air Pollution Tolerance Index and which are very important in landscaping of city. According to the Air Pollution Tolerance Index values, shrubs may be sensitive but trees or herbs may be tolerant to a given pollutant. Selection of plant species for urban green belt development, evaluation of Anticipated Performance Index was studied. Tree species (Eucalypytus oblique) and shrub species (Bougainvillea glabra) are accepted to perform well for the development of “Green belt” in University Campus on the basis of API values. Plant species Hamelia patens, among the shrubs and Chenopodium album among the herbs can effectively be used for the air pollution amelioration purposes in University Campus Rohtak.
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Introduction

Air pollution is one of the severe problems faced by whole world. Introduction of chemical, particulate matters or biological materials into the atmosphere by anthropogenic activities creates adverse effects on the humans or other living organisms. Now a day’s atmosphere is quite different from natural environment before the existence of industrialization. “Clean air” is now impossible to be found anywhere on the Earth. The use of renewable and non renewable resources leads to large scale economic growth. Three fold increases in population requires resources in huge quantity, the way that increased pollution loads. Environmental stress is increasing day by day because of air pollutants (Sulphur dioxide, Nitrogen dioxide, Carbon dioxide, Carbon monoxide) and particulate matter which are emitted as the smoke from the coal fired power plant and also other industries are also responsible for the increasing level of environmental stress by dint of leaves or soil acidification (Gostin, 2007; Iqbal, 2000; Liu and Ding, 2008). These anthropogenic emissions have a very adverse consequence into the atmosphere and their alteration, reaction and conversion or modification results into an array of chronic and acute diseases at local, regional and global level (Rawat and Banerjee, 1996). Air pollution has disastrous effects on the plants. Due to various pollutants (oxides of sulphur and nitrogen, ozone, particulate matters, hydrocarbon, peroxyacl nitrate (PAN), hydrogen fluoride etc.) the urban area plants are mostly affected (Jahan and Iqbal, 1992). Morphological and physiological characteristics of the plants are adversely affected by atmospheric sulphur dioxide. Sulphur dioxide injury in plants can be promoted by high soil moisture and high relative humidity (Tankha and Gupta, 1992). There is no mechanical or chemical device, which can completely check the emission of pollutants at the source. Only plants are the hopes, which can completely reduce the pollution level in air environment by actively participating in cycling of nutrients and gases like carbon dioxide, oxygen and also provide enormous leaf area for impingement, absorption and accumulation of pollutants (Escobedo et al., 2008). Plants can also play the role of scavengers for air pollution as they are initial acceptors**.** Various pollutants can be absorbed and accumulated by the plants results in reducing the pollutant levels in the environment (Liu and Ding, 2008). Plants when exposed constantly to environmental pollutants, induces functional weakening and structural simplification and finally leads to negative effects on other biotic communities.

The resistance and susceptibility of plants to air pollutants can be determined by its physiological and bio-chemical levels. By analyzing the biochemical parameters of leaf materials such as potential of hydrogen ion concentration (pH), ascorbic acid, relative water content and total chlorophyll, the 'Air pollution Tolerance Index' (APTI) can be determined (Pandey and Sharma, 2003). Air Pollution Tolerance Index has been used to rank the plant species in their's tolerance to air pollution suggested by Raza et al. (1988). The APTI has also been used for identifying tolerance levels of plants species, then it is used by landscapers to select plant species tolerance to air pollution (Yan et al., 2008). Ascorbic acid and chlorophyll of leaf are the most significant and determining factor on which the tolerance depends (Rai, 2014). Tolerant species play a role in reducing the overall pollution and sensitive species can be regarded as primitive indicators of pollution. Tolerant species have low injury level whereas sensitive ones have high injury level (Rao, 1983). To determine load of pollution on urban/industrial sites and to use the tolerant varieties to control the menace of air pollution, these studies are very essential especially for the landscapers and green belt designers as they provide very valuable information so that they can select sensitive as well as tolerant varieties of plant species (Dineva, 2004). A large number of trees and shrubs have been identified as dust filters to check the rising urban dust pollution level (Rai et al., 2010). Ornamental shrub in the palette design element of streetscape may play a role as a beautification agent as well bio-indicators. As plants having scavenging property for many air pollutants, they are considered as the pioneer acceptors of air pollutants (Rai, 2013). Therefore they are used as the bio-monitors of air pollution.

The aim of present work is to evaluate the variation of biochemical and physiological parameters of plant species in Rohtak City, Haryana with reference to the Air Pollution Tolerance Index and Anticipated Performance Index which help to select the tolerant and indicator plant species to develop the green and ecofriendly environment.

Materials and Methods

Study area Rohtak is one of the Districts of Haryana State and known as "City of Dairies". It falls in National Capital Region. It is located (28.8909°N 76.5796°E) 70 km northwest of New Delhi and with an elevation of 214m above mean sea level. Total geographical area of the city is 1668.47 sq. kms with the total population of 1058683 as per 2011 census. Average annual rainfall of the city is 458.5 mm. The study was conducted on the thirty five different species of trees, shrubs and herbs collected from the Maharishi Dayanand University-Campus (28°52'37"N 76°37'1"E). This study was conducted during February-April 2014.

Sample collection

The leaves sample of selected plant species were collected from the study location. Due precautions were taken while taking the samples such as leaves were not plugged alone but taken out along with their twigs for the identification objectives. The plants leaves were stored in the polythene bags in order to retain their moisture level and keep away the dryness. The leaf fresh weight was taken immediately upon getting to the laboratory. Then leaf samples were preserved in refrigerator at 4˚C for biochemical analysis.

The bio-chemical analysis of plant species

Biochemical parameters such as Potential of hydrogen ion concentration (Agbarie and Esiefarenrhe, 2009), relative water content (Singh, 1997), Total chlorophyll content (Aron, 1949), Ascorbic acid content (Bajaj and Kaur, 1981), Proline content (Bates et al., 1973) were done from selected plant species.

Air pollution tolerance index (APTI)

Air pollution tolerance index was assessed by Singh and Rao (1983) to assess the tolerance/ resistance power of plants against air pollution.

The air pollution tolerance index was calculated using the formula:

$$APTI = A (T+ P) + R/10$$

Where,

A =Ascorbic acid (mg/g), T =Total chlorophyll (mg/g), P = pH of the leaf extract, R = Relative water content of leaf (%).
Air Pollution Tolerance index range:

< 1 =Very Sensitive,
1 to 16 = Sensitive,
17 to 29 = Intermediate
30 to 100 = Tolerant (Kalyani and Singaracharya, 1995).

Anticipated performance index

By combining the resultant APTI values with some relevant biological and socio-economic characters (plant habit, canopy structure, type of plant, laminar structure and economic value), the API was calculated for different plant species. Based on these characters, different grades (+ or -) are allotted to plant species. Different plant species are scored according to their grades. The criteria used for calculating API of different plant species are given in table-6.

Statistical analysis

All data were presented as mean of three replicates, ± standard deviation and data were statistically analyzed by correlation coefficient to study the statistical relationship. API, APTI calculations and other graphs have been formulated in Microsoft excel 2007 and Origin Pro 8 software.

Atmospheric data

Meteorological data was taken from automatic Continuous Ambient Air Quality Monitoring Station (CAAQMS) installed in the premises of Maharshi Dayanand University, Rohtak by HSPCB, Pnchkula, Haryana. The CAAQMS is equipped with analysers of PM_{10}, $PM_{2.5}$, CO, SO_2, O_3, NO/NO_2/NOx and Volatile Organic Compounds (BTX). Besides this meteorological sensor for Ambient Temperature, Relative Humidity, Wind Speed, Wind Direction, Vertical Wind Speed, Barometric Pressure and Solar Radiation are installed with the station and recorded in the same logger at CAAQMS.

Results and Discussion

Concentration of major air pollutants

Data for average concentration of major air pollutants such as PM $_{2.5}$, CO, NO, NO_2, NO_X, O and SO_2 was collected from month of January to March, 2014 (Table-1). Average concentration of PM 2.5 ranges from 128.17 to 75.04, CO from 1.23 to .85, NO from 21.00 to 6.6, NO_2 from 38.97 to 25.42, NO_X from 59.96 to 33.71, O_3 from 101.32 to 26.20 and SO_2 varies from 8.81 to 3.51. Maximum value of most of pollutants showed during month of March and April. Reason behind the maximum values was heavy transportation and commercial activities.

Total chlorophyll content (TChl)

Total chlorophyll content of plant species is graphically represented in graph-1 respectively for trees, shrubs and herbs. Among the tree species, highest total chlorophyll content of 1.52 mg g^{-1}fresh wt. was recorded in *Azadirachta indica* and lowest 0.072 mg g^{-1}fresh wt. in *S. cimuni*. In case of shrub species, highest total chlorophyll content showed in *Gelsemum sempervirens*, 0.306 mg g^{-1}fresh wt. and lowest in *Hibiscus rosa- sinensis*, 0.045 mg g^{-1}fresh wt. Among the herb species, C*atharanthus roseus,* 0.630 mg g^{-1} fresh wt. showed highest total chlorophyll content and *Taraxacum officinale*, 0.172 mg g^{-1} fresh wt. showed lowest total chlorophyll content. High total chlorophyll content of plant species may be due to tolerant nature of these plants toward air pollution. Chlorophyll content of plants varies from species to species; age of leaf with the pollution level as well as with other biotic and abiotic conditions (Katiyar and Dubey, 2001). Another reason for higher chlorophyll content may be washout of dust particles from the leaf surface which may increase photosynthetic activity and low water content of soil as shown by Shyam et al. (2006).

Reduction in chlorophyll content of plant species showed that these are less tolerant and can be used as indicator of air pollution. Low chlorophyll content in plant species may be the result of presence of gaseous sulphur dioxide in the air causing destruction of chlorophyll and that can be possible by the replacement of Mg^{2+} by two hydrogen atoms and degradation of chlorophyll molecule to phaeophytin. The air pollutants make their entrance into tissues through stomata and cause partial denaturation of chloroplast and decrease pigment contents in cells of polluted leaves. Further decrease in chlorophyll content in leaves can be due to alkaline condition created by dissolution of chemicals present in cell sap that is responsible for chlorophyll degradation. Reduction of photosynthetic pigment has been widely used as an indicator of air pollution (Ninave et al., 2001). Pollutants not only decrease the chlorophyll content but certain pollutants may increase the chlorophyll content. So chlorophyll is regarded as the index of productivity of plant (Agbaire and Esiefarienrhe, 2009).

In case of trees species, total chlorophyll content is negatively correlated with APTI (R^2=0.157). In case of shrub species, total chlorophyll content is positively correlated with APTI (R^2=0.135) whereas in case of herb species negatively correlated with APTI (R^2=0.041) as shown in table (2-4) for trees, shrubs and herbs respectively.

Relative water content (RWC)

The relative water content of plant species is being graphically represented in graph-2. Tree species *Ziziphus mauritiana*, shown highest relative water content of 55.84 % and *Eucalyptus oblique*, 30.36 % lowest. Among the shrub species, highest relative water content observed in *Calliandra haematocephala, 45.55%* and lowest in *Rosa indica*, 5.17 %. Among the herb species, highest relative water content observed in *Chenopodium album,* 83.73 % and lowest relative water content found in *Tagetes erecta*, 22.55 %. The large quantity of water (in terms of RWC) in plant body helps in maintaining its physiological balance under stress conditions of air pollution. High relative water content favours drought resistance in plants (Dedio et al., 1975). Therefore, in the present study plants with high relative water content may be tolerant to air pollutants.

Naturally relative water content depends upon soil moisture. Low relative water content of leaf means lower rate of availability of water in soil along with high rate of transpiration. Leaf water status is related with various physiological conditions such as transpiration, growth, respiration (Kramer and Boyer, 1995). In case of some plant species, soil moisture is vey less hence showed less relative water content in the particular area.

In case of tree and herb species, relative water content is positively correlated with APTI (R^2=0.997 for trees and R^2=0.999 for herb). In case of shrub species, strongly correlated with APTI (R^2=0.999 as shown in table (2-4) for trees, shrubs and herbs respectively.

Potential of hydrogen ion concentration in leaf extract

The pH of plant species is being graphically represented in graph-3. Among the tree species, highest potential of hydrogen ion concentration in leaf extract was shown in *F. benjamina* (7.463) and lowest showed in *Eucalyptus oblique* (4.49). Among the shrub species, highest hydrogen ion concentration showed in *lantana camara* (6.76) and lowest was found in *Hamelia patens* (3.83). In case of herb species, *Helianthus Annuus* (*9.59*) showed highest hydrogen ion concentration and lowest in *Tagetes erecta* (6.36). High potential of hydrogen ion concentration in leaf extract may be due to the presence of SOx and NOx in the ambient air.

The leaf extract potential of hydrogen ion concentration is lowered due to the presence of acidic pollutants. It was also observed that decline in potential of hydrogen ion concentration values is greater in sensitive species which reduce efficiency of conversion hexose sugar to ascorbic acid. Therefore potential of hydrogen ion concentration and reducing activity of ascorbic acid depends upon each other. (Scholz and Reck, 1977). Hence, leaf extract potential of hydrogen ion concentration on higher side gives tolerance to plants species against pollution level as shown by Agarwal (1988).

In case of tree species, pH is positively correlated with APTI (R^2=0.0012) whereas pH of all shrub species is negatively correlated with APTI (R^2=0.0011). Among the herb species, pH is positively correlated with APTI (R^2=0.089 as shown in table (2-4) for trees, shrubs and herbs respectively.

Ascorbic acid content

The ascorbic acid content of plant species is graphically represented in graph-4. Among the tree species, highest ascorbic acid content was found in *F. benjamina*, 0.16 mg g^{-1} fresh wt. and lowest in *Alstonia scolaris*, 0.042 mg g^{-1} fresh wt. In case of shrub species, highest ascorbic acid content was found in *Tecoma stans*, 0.075 mg g^{-1} fresh wt. and lowest in *Hamelia patens*, 0.045 mg g^{-1} fresh wt. Among the herb species, highest ascorbic acid content was found in *Catharanthus roseus*, 0.093 mg g^{-1} fresh wt. and lowest in *Chenopodium album*, 0.045 mg g^{-1} fresh wt. Ascorbic acid is a natural detoxicant, which may prevent the effects of air pollutants in the plant tissues (Kuddus et al., 2011). According to Chaudhary and Rao (1977) and Varshney and Varshney (1984) higher ascorbic acid content of the plant is a sign of its tolerance against sulphur dioxide pollution and pollutants which are normally affecting the roadside vegetations. Lower the ascorbic acid content in plant species supports the sensitive nature towards the pollutants particularly automobile exhausts (Conklin et al., 2001).

In case of tree and herb species, ascorbic acid is negatively correlated with the APTI (R^2=0.0404 for tree and R^2=0.0713). In case of shrub species, positively correlated with APTI (R^2=0.076) as shown in table (2-4) for trees, shrubs and herbs respectively.

Air pollution tolerance index (APTI)

Results of air pollution tolerance index (APTI) for each plant species studied is depicted in table-5. *Ziziphus mauritiana, among* the tree species exhibited the highest APTI value of 5.621 and among the shrub species, highest APTI value is 4.591 was observed in *Calliandra haematocephala*. Among the herb species studied, highest APTI value of 8.409 was observed in *Chenopodium album* in study area. The plants with high and low APTI can serve as tolerant and sensitive species respectively. Tolerant plant species with high APTI which can be used as scavengers air pollution in MDU campus as well as landscaping. These above studied tolerant plant species can also be used as "sink**"** for air pollutants in study area. Sensitivity levels of plants to air pollutants differ for herbs, shrubs and trees. Sensitive species and can be recommended as bioindicators. Tree species (*Eucalyptus oblique*, 3.068) and shrub species (*Rosa indica*, 0.548) and herb species (*Tagetes erecta*, 2.291) in residential area are having low air pollution tolerance index. Therefore these plants can be recommended as bio-indicator which is an easy and inexpensive technique to control air pollution. According to present study shrubs may be sensitive, but trees and herbs may be tolerant to pollutants which can be determined on the basis of APTI values.

Anticipated performance index (API)

Based on Air pollution tolerance index and anticipated performance index, the most suitable plant species for green belt development in urban areas were identified and recommended for long-term air pollution management. Presence of suitable plants in the urban environment can thus improve air quality through enhancing the uptake of pollutant gases and particles (McPherson et al., 1994; Beckett et al., 1998; Freer-Smith et al., 1997). Plant species were graded based on biological and socio-economic with bio chemicals parameters to determine the API of plant species (table-6).

Table-1: Monthly average of atmospheric pollutants from January-March 2014.

Month	PM_{10}	CO	NO	NO_2	NO_X	O_3	SO_2
	µg/m³	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
January	128.17	0.87	6.6	35.58	41.70	26.20	8.81
February	75.04	0.85	8.71	25.42	33.71	101.32	7.49
March	117.19	1.23	21.00	38.97	59.96	57.20	3.51

Table-2: Correlation coefficient values of different biochemical parameters of tree species in campus area

	AA	pH	TChl	RWC	APTI
AA	1				
pH	-0.314	1			
TChl	0.464	-0.459	1		
RWC	-0.247	0.044	-0.418	1	
APTI	-0.201	0.035	-0.396	0.998	1

Table-3: Correlation coefficient values of different biochemical parameters of shrub species in campus area.

	pH	RWC	TChl	AA	APTI
pH	1				
RWC	-0.036	1			
TChl	0.314	0.366	1		
AA	-0.043	0.273	0.274	1	
APTI	-0.033	0.999	0.369	0.277	1

Table-4: Correlation coefficient values of different biochemical parameters of herb species in campus area.

	pH	RWC	TChl	AA	APTI
pH	1				
RWC	0.295	1			
TChl	0.179	-0.208	1		
AA	-0.110	-0.273	0.769	1	
APTI	0.298	0.999	-0.203	-0.267	1

AA-ascorbic acid, TChl-total Chlorophyll content, RWC-relative water content, APTI-air pollution tolerance index.

Table-5: APTI values of selected plant species of campus area

S.No.	Tree Species	APTI	Shrub Species	APTI	Herb Species	APTI
1	*Eucalyptus oblique*	3.068	*Bougainvillea glabra*	2.7467	*Tagetes erecta*	2.2917
2	*Alstonia scholaris*	4.373	*Rosa*	0.5482	*Catharanthus roseus*	4.0126
3	*F. virens*	4.201	*Hibiscus rosa- sinensis*	2.5334	*Crinum latifolium*	5.5273
4	*Azadirachta indica*	3.154	*Calliandra haematocephala*	4.5910	*Helianthus Annuus*	4.4703
5	*F.religiosa*	3.397	*Hamelia patens*	3.5018	*Organum marjorana*	3.4956
6	*F. benjamina*	3.888	*Tecoma stans*	3.6160	*Chenopodium album*	8.4096
7	*F. benghalensis*	3.241	*Jatropha integerrima*	1.5052	*Amaranthus spinosus*	5.4111
8	*Mangifera indica*	4.846	*Nerium oleander*	4.0057	*Taraxacum officinale*	5.2184
9	*Syzygium cumini*	5.540	*Lantana camara*	2.1931	*Solanum nigrum*	5.2824
10	*Ziziphus mauritiana*	5.621	*Gelsemum Sempervirens*	4.5815	*Croton bonplandianus*	3.6214

Table-6: Gradation of plant species based on Air Pollution Tolerance Index (APTI) and other biological and socio-economic characters

Grading	Character	Pattern Of Assessment	Grade Allotted
Tolerance	APTI	12.0 – 16.0	+
		16.1 – 20.0	++
		20.1 – 24.0	+++
		24.1 – 28.1	++++
		28.1 – 32.0	+++++
		32.1 – 36.0	++++++
Biological and socio-economic	Plant habitat	Small	-
		Medium	+
		Large	++
	C.S	Sparse/irregular/globular	-
		Spreading crown/open semi dense	+
		Spreading dense	++
	Type of plant	Deciduous	-
		Evergreen	+
	L.S.S	Small	-
		Medium	+
		Large	++
	Texture	Smooth	-
		Coriaceous	+
	Hardiness	Delineate	-
		Hardy	+
	E.V	Less than three uses	-
		Three or four uses	+
		Five or more uses	++

E.V-Economic value, C.S.-Canopy structure, L.S.S.-Laminar structure size, *Maximum grades that can be scored by a plant = 16

Table-7: Anticipated performance index of tree species

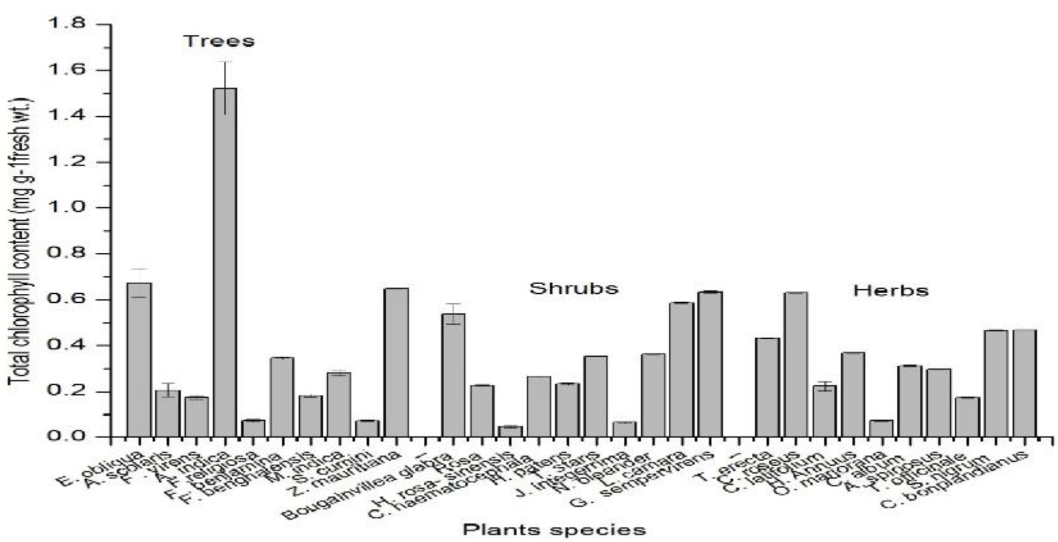
S. No.	Name	APTI	Socio economic	Total plus	% scoring	API grade	Assessment category
1	*Eucalyptus oblique*	-	10	10	63	4	Good
2	*Alstonia scholaris*	-	8	8	50	2	Poor
3	*F. virens*	-	5	5	31	1	Very poor
4	*Azadirachta indica*	-	7	7	44	2	Poor
5	*F.religiosa*	-	9	9	56	3	Moderate
6	*F. benjamina*	-	8	8	50	2	Poor
7	*F. benghalensis*	-	8	8	50	2	Poor
8	*Mangifera indica*	-	8	8	50	2	Poor
9	*Syzygium cumini*	-	6	6	38	1	Very poor
10	*Ziziphus mauritiana*	-	6	6	38	1	Very poor

Table-8: Anticipated performance index of shrub species.

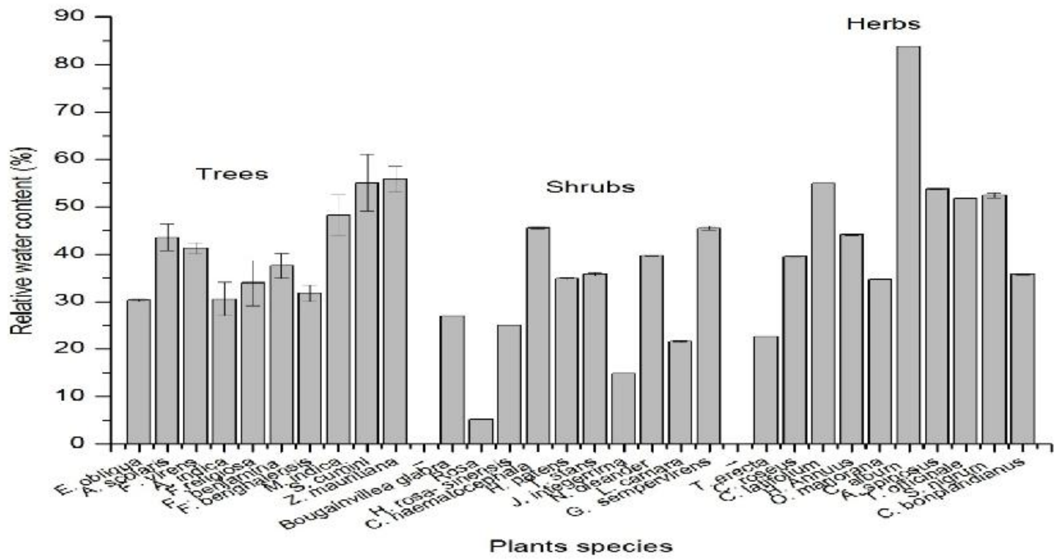
S. No.	Shrub species	APTI	Socio economic	Total plus	% scoring	API grade	Assessment category
1	*Bougainvillea glabra*	-	10	10	63	4	Good
2	*Rosa indica*	-	4	4	25	0	Not recommended
3	*Hibiscus rosa-sinensis*	-	7	7	44	2	Poor
4	*Calliandra haematocephala*	-	6	6	38	1	Very poor
5	*Hamelia patens*	-	6	6	38	1	Very poor
6	*Tecoma stans*	-	6	6	38	1	Very poor
7	*Jatropha integerrima*	-	9	9	56	3	Moderate
8	*Nerium oleander*	-	9	9	56	3	Moderate
9	*Lantana camara*	-	6	6	56	2	Poor
10	*Gelsemium sempervirens*	-	5	5	31	1	Very poor

Table-9: Anticipated performance index of herb species.

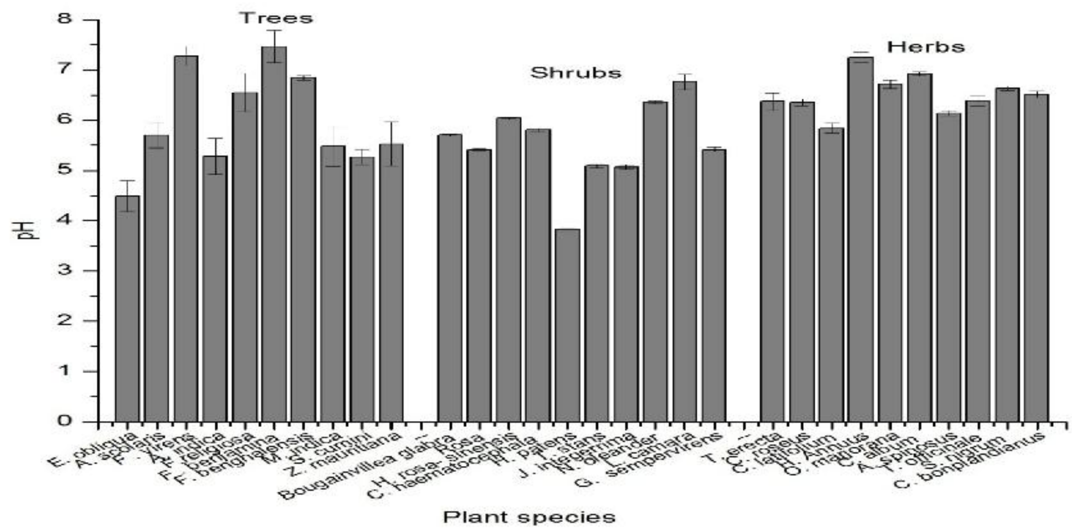
S. No	Herb species	APTI	Socio economic	Total plus	% scoring	API grade	Assessment category
1	*Tagetes erecta*	-	5	5	31	1	Very poor
2	*Catharanthus roseus*	-	8	8	50	2	Poor
3	*Crinum latifolium*	-	9	9	56	3	Moderate
4	*Helianthus Annuus*	-	6	6	38	1	Very poor
5	*Organum marjorana*	-	6	6	38	1	Very poor
6	*Chenopodium album*	-	4	4	25	0	Not recommended
7	*Amaranthus spinosus*	-	3	3	18	0	Not recommended
8	*Taraxacum officinale*	-	5	5	31	1	Very poor
9	*Solanum nigrum*	-	5	5	31	1	Very poor
10	*Croton bonplandianus*	-	4	4	25	0	Not recommended



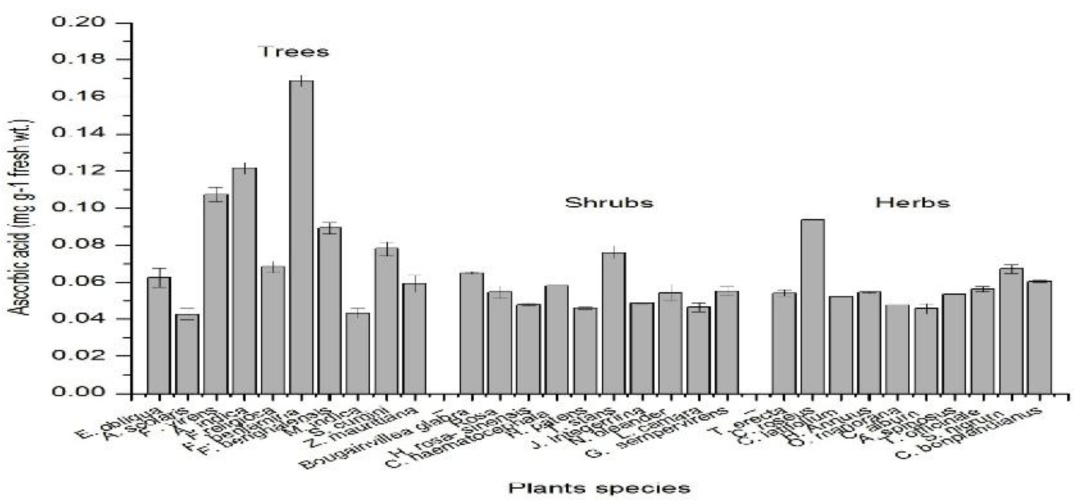
Graph-1: Total chlorophyll content of different plant species in campus area.



Graph-2: Relative water content of different plant species in campus area.



Graph-3: Potential of hydrogen ion concentration of different plant species in campus area.



Graph-4: Ascorbic acid content of different plant species in campus.

The present study also reveals that evaluation of anticipated performance index (API) of plant species is useful in the selection of suitable plant species for urban green belt development.

In the present study according to table 7, 8 and 9, tree species (*Eucalyptus oblique*) and shrub species (*Bougainvillea glabra*) is considered as good whereas tree species (*F.religiosa*), shrub species (*Jatropha integerrima and Nerium oleander*) *and* herb species (*Crinum latifolium*) is considered as moderate species respectively. Therefore present study indicates tree species (*Eucalypytus oblique*) and shrub species (*Bougainvillea glabra*) are accepted to perform well for the development of "Green belt" in campus area.

Conclusion

With the increase in air pollution, evaluation of APTI is very important in landscaping. Landscaping is based on the values of air pollution tolerance index, so it should be done on the basis of tolerance or sensitivity to air pollution of plant species. Therefore**,** tree species (*Ziziphus mauritiana*, *Syzygium cumini*, *Mangifera indica*) and shrub species (*Calliandra haematocephala*, *Gelsemum sempervirens*, *Nerium oleander*) as well as herb species (*Chenopodium album*, *Crinum latifolium*, *Amaranthus spinosus*) are very important in landscaping of campus area. The present study also reveals that evaluation of anticipated performance index (API) of plant species is useful in the selection of suitable plant species for urban green belt development. Present study indicates tree species (*Eucalypytus oblique*) and shrub species (*Bougainvillea glabra*) are accepted to perform well for the development of "Green belt" in campus area of university, Rohtak, Haryana. Among the different plant species selected for study of tolerant plant species, tree species (*Ziziphus mauritiana*), shrub species (*Calliandra haematocephala*) *and* herb species (*Chenopodium album*) can effectively be used for the air pollution amelioration purposes.

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