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Assessment of Photosynthetic Pigments and Nutrient Content in Malva parviflora Exposed to Heavy Metal

Hind A Elzletni [1] *, Aida Mohamed Mahmod [2], Galal,T.M [3], Ahmed Khlafallah [4]
[1,2] Biology Department, Faculty of Education, University of Benghazi, Benghazi, Libya.
[3] Botany and Microbiology Department, Faculty of Science, Helwan University, Egypt
[4] Botany Department, Faculty of Women for Arts, Science and Education, Ain Shams University, Egypt.
**Corresponding author: Ahmedmohamed@ctsbw.edu.ly*

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Abstract:
The present work aimed to study the Photosynthetic Pigments and Nutrient Content in Malva parviflora Exposed to Heavy Metals to Malva parviflora population, One hundred and fifty one stands (10m X 10m) were surveyed in late autumn to early spring (2014-2015 and 2015-2016). The present results reviled that Malva parviflora It is clear from the study that Malva parviflora plants have high elasticity to grow in diverse habitat and rich in plant diversity and is a resource for many plant species of environmental, economic and medical importance, The results showed that the morphological and physiological features of M. parviflora were reduced in the polluted areas. were Statistical analysis indicated high significant variations in Chlorophyll a, b and carotenoids of M. parviflora in different habitats .It can be seen that highest Chlorophyll a was recorded in Agriculture road sites , whil The concentrations of chlorophyll a, chlorophyll b, carotenoids sugar in M. parviflora reduced in polluted regions.
also The Results showed of Nutrients content of Malvaparviflora Root that (N) and (P) , (K) significantly differed from habitat . Nitrogen recorded their highest contents in Desert road sites , but the highest content of P were recorded in Two habite Salt marshes and Agricultural road sites , followed K in Railway .

Keywords: Malva parviflora Population - Photosynthetic Pigments - Nutrients content- Heavy Metals.

تقييم الأصباغ الضوئية ومحتوى العناصر الغذائية في نبات الخُبّيزة (Malva parviflora) المعرض للمعادن الثقيلة

هند عبدالعاطي الزليتني [1]*، عايده محمد محمود [2]، طارق جلال[3]، احمد خلف الله [4]
[2،1] قسم الأحياء، كلية التربية، جامعة بنغازي، بنغازي، ليبيا.
[3] قسم النبات والميكروبيولوجي، كلية العلوم، جامعة حلوان، مصر.
[4] قسم النبات، كلية البنات للآداب والعلوم والتربية، جامعة عين شمس، مصر.

الملخص
يهدف هذا البحث إلى دراسة الأصباغ الضوئية ومحتوى العناصر الغذائية في نبات الخُبّيزة (Malva parviflora) عند تعرضه للمعادن الثقيلة. تم إجراء المسح الميداني في 151 موقعًا (10م × 10م) خلال أواخر فصل الخريف وبداية الربيع في موسمي 2014–2015 و2015–2016.

أظهرت النتائج أن نبات Malva parviflora يتمتع بمرونة عالية للنمو في بيئات متنوعة وغنية بالتنوع النباتي، كما يُعد مصدرًا لأنواع نباتية عديدة ذات أهمية بيئية واقتصادية وطبية. ومع ذلك، لوحظ أن الصفات المورفولوجية والفسيولوجية للنبات انخفضت في المناطق الملوثة.

أشارت التحليلات الإحصائية إلى وجود فروق معنوية عالية في محتوى الكلوروفيل(a ، (bوالكاروتينات بين البيئات المختلفة. وقد سُجل أعلى تركيز من الكلوروفيل (a) في مواقع الطرق الزراعية، بينما انخفضت تراكيز الكلوروفيل a) و (b والكاروتينات والسكريات في المناطق الملوثة.
كما بينت النتائج أن محتوى العناصر الغذائية في جذور Malva parviflora من النيتروجين (N) والفوسفور (P) والبوتاسيوم (K) يختلف اختلافًا معنويًا حسب نوع الموطن. فقد سُجل أعلى محتوى للنيتروجين في مواقع الطرق الصحراوية، بينما كانت أعلى تراكيز الفوسفور في الموطنين (السبخات الملحية والطرق الزراعية)، تلاها البوتاسيوم الذي سجل أعلى نسبة في مواقع السكك الحديدية.

الكلمات المفتاحية: مولّد الدوال، المتحكم الدقيق PIC18F4520، المحاكاة باستخدام Proteus، توليد الموجات، التنفيذ المادي.

Introduction

Malva parviflora L. (little mallow), belonging to the family malvaceae, is an annual herb, abundant in Egypt (Shaltout, et al. 2010). It occupies high-light habitats and is a weedy invader in many orchards and vineyards (Dennis & Michael 2009). Its wide geographical distribution is likely due to its ability to compete with and displace many other annuals, in addition to its effects on a number of plant species by reducing the germination rates and seedling growth (Galal & Shehata 2014).
Heavy metals are given great attention worldwide because of their toxic and mutagenic effects even at very low concentrations. Several cases of human diseases, disorders, dysfunction and organ malformation have been reported due to metal toxicity. Lead, cadmium and chromium may be reported to cause a wide range of changes in biological systems, even at very low concentrations. Rahim et al., (2014). that accumulation of lead, cadmium, copper, zinc, manganese, and iron in M. parviflora were found to vary with the different parts (leaves, stems, and roots). there risk associated with consumption of M. parviflora from the fields located near the busy road and this risk increases with decreasing distance from the road. (Abdul-Wahab et al,(2009)
Rahim et al, (2014) illustrated, in their study samples of different parts of M. parviflora (leaves, stems, roots) and associated soils,lead,cadmium and chromium concentrations were compared in soil and plant with maximum permissible limits in different Countries were outside the maximum allowed in plant samples but in soil samples were below the maximum allowed in the case of cadmium and below but very close to the maximum allowable lead and chromium..
Revealed study Rajoub and Omari.,(2009). Heavy accumulation of heavy metals, cadmium, copper, zinc, manganese and iron in M. Pariflora ,in nearby fields The road, Also that concentrations in the soil decreased, Ibrahim et al,(2013) Stated that assess the accumulation content of toxic heavy metals in the soil, Results obtained showed accumulation Zn> Cu> Pb> Ni> Cd in shoots and roots of malva parviflora ,
The study, conducted by Abu Ziada et al. (2013), describes the impact of air pollution from brick factories and roadside pollution on some morphological and physiological characteristics of Malva parviflora, which grows naturally around these pollution sources. The results showed a decrease in the morphological and physiological characteristics of Malva parviflora in polluted areas compared to areas farther from them. Also, The study included by Ahmed et al. (2016) describing the impact of water pollution on Malva parviflora and water samples from areas using wastewater. The results showed that wastewater used for irrigation, which is loaded with heavy metals (copper and cadmium), leads to the accumulation of these elements in the stem and root parts of Malva parviflora.
According to Rahman et al. (2014), soil and plant samples, such as M. parviflora, Polygonum aviculare, Anagalis arvensis, Solanum nigrum, and Coronopus didymu, showed decreased morphological and physiological characteristics of M. parviflora in areas contaminated with heavy metals compared to areas far from these areas. Overall, leaf area, leaf length, leaf width, number of branches, and stem and root length were significantly reduced in areas contaminated with heavy metals compared to areas far from pollution. Air pollutants can cause leaf damage. Abu Ziada et al. (2015); therefore M. pariflora has the ability to absorb and accumulate toxins. Metal accumulation may pose a direct threat to human health. Abbas et al. (2011).
Abiotic stresses like heavy metal stress, air pollutants stress etc. negatively affect processes associated with biomass production and grain yield in almost all major field grown crops Agarwal et al,(2012).
Zengin et al,(2007); Kupper et at,(2017) Agree to Decrease of chlorophyll content in plants after exposure to copper is frequently reported in the literature attributed Cu-induced chlorophyll content decrease to Cu modification of chlorophyll degradation. Copper can also substitute for Mg in the chlorophyll present in both antenna complexes and reaction centres, thus damaging the structure and function of the chlorophyll.

Material and Methodes:

Study Area

A number of stands (each 10 × 10 m) were selected randomly along twelve habitats (141stands) were surveyed for studying , phyciology , Ecology and of Malva parviflora located at several governorates of Egypt, Cairo(alghaba almtahagera,The fossilized forest- orcards- suis road(,Algeza(nahia), Qalyubiya(banha - meet aseem),Alminofiya(sadat city - Alexandria deasert road sites(,Algharbiya(Alexandria Agricultural road sites),Marsa Matroh (Alexandria- matroh road), Alexandria (North Coast),Albohera(wady natron almalahat -Berket Al Sabaa - Etai El barood - Junbwai - Qwesna)

Photosynthetic pigments content

Use scalpel to cut fresh leaves , Weight approximately 5 g of leaf and Grind them , use 10 ml of acetone dilution Factor. be stored well away from oxidising agents,Calibrate at zero absorptance using a blank of pure acetone ,Measure absorbance of blank and samples at 440,644 and 662 nm , There are a bunch of different equations for calculating amounts of chlorophyll a, b, total chlorophyll and Carotenoids. calculation using the formula of Holm and Wetsttein was performed:

Chlorophyll a = 9.78*(E) 662-0.99*(E) 644 mg/g fresh weight

Chlorophyllb=21.426*(E) 644-4.65*(E) 662 mg/g fresh weight

Chlorophyll a + b = 5.134*(E) A662 + 20.436*(E)A 644

Carotenoids = 4.695*(E) 440-0.286*(chl b) mg/g fresh weight

where A = absorbency at corresponding wave length,values 9.784, .990, 21.426, 4.650 and 0.288 is the molar absorptivity coefficient according to **Holm (1954)**and **Wetsttein (1957)** for acetone (absorption).

Plant Analysis:

Seventy-two samples of Shoot and Root were collected from the study sites. Fresh weight for each sample was recorded and the samples were oven-dried at 70oC till constant weight, then the dry weight was recorded and the water content (%) was calculated. The dry samples were homogenized by grinding in stainless steel blender a. Grinded sample of 1 g was digested in 20 ml acid mixture of H_2SO_4:$HClO_4$ (1:1 v:v) till a transparent color appeared, then plant digests were filtered and diluted to 25 ml with double de-ionized water (Allen, 1989).Total N was measured by Microkjeldahl method and total P by applying molybdenum blue method using a spectrophotometer (CECILCE 1021). Potassium was determined using flame photometer (CORNING M410), while iron, copper, manganese, cadmium, zinc, lead, nickel, cobalt and chromium using atomic absorption (Shimadzu AA-6200). All these methods are outline by Allen **(1989).**

Resultes:

Photosynthetic Pigments Content

Statistical analysis indicated high significant variations in Chlorophyll a, b and carotenoids of *M. parviflora* in different habitats at $p<0.001$ (**Table.1**).It can be seen that highest Chlorophyll a was recorded in AR (16.84±3.16) followed by SM(11.95±4.72), but the lowest was recorded in RW(2.08±0.93). Highest average of Chlorophyll b was recorded in SM(9.31±1.76), followed by AR(8.81±2.32).but the lowest was recorded in CU(1.21±0.6). Highest carotenoids was recorded in DL (9.15±0.6), followed by AR(8.80±1.2). but the lowest was recorded in CU (2.88±1.6).**Fig(1)**

Table.1. Chlorophyll a, Chlorophyll b, Total Chlorophyll and Carotenoids of *M. parviflora* in different habitats.

Habitats	Chla	Chlb	Carotenoids	Total chlorophyll
FL	3.45±0.89de	2.22±0.6cde	3.04±0.5c	5.67±1.50cd
RL	3.43±0.61de	1.49±0.96e	5.04±bc	4.93±0.77cd
DR	6.98±6.60cd	4.58±5.05bcd	7.25±3.2ab	11.58±11.44bc
SM	11.96±4.72b	**9.31±1.76a**	8.70±0.8a	21.27±6.10a
RW	**2.08±0.93e**	1.55±0.046e	4.69±0.9c	3.64±0.92dd
DB	7.00±2.4cd	5.39±1.8b	5.25±1.5bc	12.39±4.24b
AR	**16.84±3.16a**	8.81±2.32a	8.80±1.2a	25.66±5.02a
OR	3.07±1.46de	1.36±0.6e	3.75±1.3c	4.43±2.08d
CB	3.38±0.76de	1.89±0.63de	2.95±0.76c	5.28±1.21cd
CU	2.3±1.08e	**1.21±0.6e**	**2.88±1.6c**	**3.53±1.70d**
CC	5.36±2.2cde	3.18±1.6bcde	4.59±1.7c	8.55±3.86bcd
DL	8.94±55.87bc	4.84±1.63bc	**9.15±0.6a**	**13.79±7.34b**
F.value	13.3***	10.4***	10.6***	12.95***

***** p< 0.001**

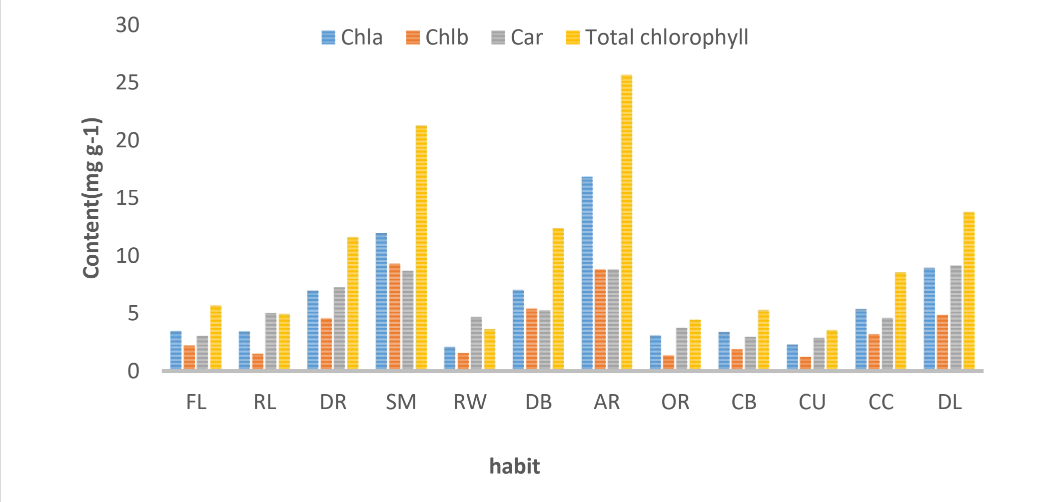

Fig.1. Chlorophyll a, Chlorophyll b, Total Chlorophyll and Carotenoids of *M. parviflora* in different habitats.

Nutrients content of Malva parviflora (Root)

Statistically **Table (2)** showed that N and P, K significantly differed from habitat . Nitrogen recorded their highest contents in DR (2.30±0.7), but the highest content of P were recorded in Two habite SM and AR (0.27±0.02 %), followed K (1.23±0.3 %) in RW . While the lowest percentage of N,P and K was recorded in SM,RL and CB(1.49±0.2%, 0.25±0.01%,0.73±0.2%) respectively.

Heavy metals content of Malva parviflora (Root)

Statistical analysis (ANOVA 1) detected no significant variation in all nutrients content of *Malva parviflora* among the study habitats (**Table 2**).The highest average of iron was recorded in *M. parviflora* in DL habitat (552.3±84.2mg g^{-1}) but the lowest value was recorded in CB (40.66±5.6mg g^{-1}). Cr recorded its highest content in *M. parviflora* CC(178.96±233mg g^{-1}) and its lowest average recorded in DR (41.85±6.5mg g^{-1}). The highest average of Mn was recorded in RL (31.33±5.7mg g^{-1}), while the lowest average was recorded in *M. parviflora* in SM habitat (12±5.5 mg g^{-1}). The lowest and highest value of Cu was recorded in SM (4±5.1.1mg g^{-1}) and deasert land (13.6±5.5mg g^{-1}), respectively. CO recorded its highest concentration in *M. parviflora* at CB (20.00±1.9mg g^{-1}) and its lowest average was recorded in FL (16.99±0.2mg g^{-1}). The highest average of Pb was recorded in OR (10.49±5.8 mg g^{-1}), while the lowest average was recorded in DB (4.34±1.5mg g^{-1}). Averages of Cd values were ranged between 2.87±0.2 mg g^{-1}. in DR and 3.88±0.9 mg g^{-1}. in the CC. But Ni averages were located between 11.13±0.8 mg kg-1. in DR and 16.03±5.8 mg g^{-1}. in CB

Nutrients content of *Malva parviflora* (shoot)

Statistically **Table (3)** showed that N, P, K no significantly differed from habitat . Nitrogen recorded their highest contents in SM (2.69±0.7 %), but the highest content of P were recorded in DL (0.28±0.02 %), followed K (1.21±0.15 %) in CC . While the lowest percentage of N,P and K was recorded in RL,DB and SM(1.89±0.5%, 0.26±0%,0.71±0.22% respectively).

Heavy metals content of *M. parviflora* (Shoot)

Statistical analysis (ANOVA 1) detected no significant variation in all nutrients content of *M. parviflora* among the study habitats except Zinc **(Table 3).** The highest average of iron was recorded in *M. parviflora* in OR habitat (481.0±39.6 mg g^{-1}) but the lowest value was recorded in DL (205.0±144.9mg g^{-1}). Cr recorded its highest content in *M. parviflora* DB(211.55±206.8mg g^{-1}) and its lowest average recorded in AR (37.53±3.7mg g^{-1}). The highest average of Mn was recorded in RW (45.00±24.3mg g^{-1}), while the lowest average was recorded in *M. parviflora* in CC habitat (12.0±4.5mg g^{-1}). The lowest and highest value of Cu was recorded in Orcards (37.33±29.1mg g^{-1}) and Deasert land (6.00±2mg g^{-1}), respectively. CO recorded its highest concentration in *M. parviflora* at CB (17.56±0.9mg g^{-1})and its lowest average was recorded in CU (16.82±0.09mg g^{-1}). The highest average of Pb was recorded in SM (13.74±13.3mg g^{-1}), while the lowest average was recorded in Deasert land (5.19±3.5mg g^{-1}). Averages of Cd were very close in all study sites, Cd values were ranged between 2.89±0.5mg g^{-1}. in DR and 3.41±0.8mg g^{-1}. in the SM. But Ni averages were located between 10.84±1.0 mg kg-1. in SM and 14.93±3.5 mg g^{-1}. in DB.

Table.2. Heavy metals and Nutrients concentration of common *Malva parviflora* (Root) in different habitats. Bold values are the highest and italic bold values are the lowest. Fallow land (FL),Reclaimied lands(RL),Desert road sides(DR), Salt march(SM), Railway(RW), Drain banck(DB), Agricultral road sides(AR), Orchards (OR),Canal bank(CB),Cultivated(CU) and Crops(CC).

Habitats	Heavy metals concentrations mg g^{-1}									Nutrients content %		
	CO	Pb	Ni	Cd	Cr	Zn	Mn	Fe	Cu	N	P	K
FL	*16.99±0.2a*	5.94±1.8a	12.89±1.6a	2.97±0.2a	46.39±1.1a	86.00±44.6a	17.66±16.0a	507±169.4ab	7.66±2.8a	2.19±0.7a	0.46±0.3a	0.81±0.3a
RL	17.43±0.3a	5.59±1.4a	14.25±1.0a	2.98±0.1a	64.95±14.8a	30.66±6.6a	**31.33±5.7a**	45±5.2c	13.3±12.7a	1.66±0.1a	*0.25±0.01b*	1.08±0.2a
DR	17.84±1.8a	5.68±2.1a	*11.13±0.8a*	*2.87±0.2a*	*41.85±6.5a*	88±64.6a	30.33±16.8a	280.6±188.5abc	9.66±6.3a	**2.30±0.7a**	0.26±0.005b	0.95±0.04a
SM	17.34±0.4a	6.17±5.4a	15.30±3.0a	3.72±0.8a	58.44±18.2a	81.33±41.5a	23.66±29.1a	452.6±374.0abc	*4±5.1a*	*1.49±0.2a*	**0.27±0.02b**	0.82±0.3a
RW	17.12±0.3a	6.24±1.4a	13.23±2.1a	3.19±0.2a	72.81±45.4a	**99.66±68.5a**	21.66±10.9a	479±153.7abc	6.33±6.8a	2.07±0.6a	0.26±0.005b	**1.23±0.3a**
DB	17.87±1.6a	*4.34±1.5a*	15.00±1.2a	3.12±0.1a	56.13±7.3a	63±49.4a	21.66±12.4a	262.6±390.0abc	6.33±6.8a	2.20±0.7a	0.27±0.005b	0.94±0.2a
AR	18.22±3.6a	7.78±4.5a	14.77±3.7a	3.40±0.6a	53.08±20.7a	58.66±47.1a	*12±5.5a*	201.6±292.8abc	6.66±6.6a	1.88±0.1a	**0.27±0.02b**	1.04±0.05a
OR	18.11±1.2a	**10.49±5.8a**	12.63±0.6a	3.06±0.3a	35.82±2.3a	87±45.9a	5.66 ±1.5a	431.3±342.6abc	4.33±3.0a	2.10±0.2a	0.27±0.005b	0.76±0.4a
CB	**20.00±1.9a**	5.04±1.8a	**16.03±5.8a**	3.69±0.7a	60.55±31.5a	32.33±4.9a	30±19.0a	*40.66±5.6c*	7±5.2a	1.78±0.3a	0.26±0.01b	*0.73±0.2a*
CU	17.18±0.5a	6.86±1.3a	14.35±3.6a	3.26±0.8a	67.44±18.9a	*30±1.4a*	26.5±33.2a	51.50±33.2bc	7.5±4.9a	1.77±0.5a	0.26±00b	1.05±0.01a
CC	17.05±0.2a	6.83±2.8a	15.45±3.3a	**3.88±0.9a**	**178.96±233a**	94±45.2a	29±16.5a	542.6±150.1a	4.33±3.5a	1.77±0.5a	0.26±00b	0.89±0.20a
DL	17.01±0.8a	7.52±1.9a	13.64±1.7a	3.16±0.2a	51.65±3.9a	92±67.2a	22±13.8a	**552.3±84.2a**	**13.6±5.5a**	1.95±0.0a	0.25±0.02b	1.06±0.10a
F.value	0.932	0.743	0.758	1.128	0.815	0.859	0.674	2.115	0.758	0.864	1.081	1.011

Table.3. Heavy metals concentration of common *Malva parviflora (*Shoot) in different habitats. Bold values are the highest and italic bold values are the lowest. Fallow land (FL),Reclaimied lands(RL),Desert road sides(DR), Salt march(SM), Railway(RW), Drain banck(DB), Agricultral road sides(AR), Orchards (OR),Canal bank(CB),Cultivated(CU) and Crops(CC). crude protein (DCP).

Habitats	Heavy metals concentrations mg g-1									Nutrients content %			
	CO	Pb	Ni	Cd	Cr	Zn	Mn	Fe	Cu	N	P	K	DCP
FL	17.03±o.43a	6.80±3.28a	14.55±1.32a	3.24±0.47ab	63.27±22.77b	34.0±3.60bc	26.33±8.08ab	328.33±15.94a	10.0±4.0a	2.04±0.50ab	0.26±0.01a	0.99±0.1a	12.77±3.17ab
RL	17.03±0.21a	7.15±1.95a	14.45±3.03a	2.94±0.23ab	81.79±26.13b	35.66±3.05bc	19.66±18.50ab	233.66±142.6a	6.66±5.03a	1.89±0.55b	0.26±0.005a	1.01±0.1a	11.85±3.48b
DR	17.14±0.50a	5.88±3.49a	12.46±2.26a	2.89±0.58b	53.72±14.34b	48.66±30.66b	20.33±15.30ab	337.00±61.5a	17.00±10.81a	2.37±0.55ab	0.27±0.00a	1.06±0.1a	14.85±3.46ab
SM	16.98±0.08a	13.74±13.39a	10.84±1.07a	3.41±0.88ab	45.49±6.57b	35.33±2.51bc	20.66±21.12ab	352.0±100a	16.66±8.50a	2.69±0.78ab	0.25±0.0057a	0.71±0.2a	16.81±4.87ab
RW	17.06±0.15a	11.43±9.54a	13.29±0.99	2.96±0.36ab	82.78±37.16b	27.33±3.21c	45.00±24.33a	456.00±111.3a	34.00±28.68a	2.66±0.29ab	0.26±0.005a	0.92±0.1a	16.64±1.83ab
DB	17.12±0.39a	6.93±5.00a	14.93±3.55a	3.94±0.85a	211.55±206.8a	26.33±2.51c	14.00±8.66b	331.0±299.5a	28.66±35.80a	2.19±0.71ab	0.26±000a	0.99±0.1a	13.71±4.45ab
AR	16.91±0.12a	6.78±1.57a	12.20±1.20a	3.09±0.29ab	37.53±3.72b	36.66±3.05bc	21.66±11.84ab	223.66±151.9a	7.66±2.51a	1.92±0.18b	0.26±0.01a	1.07±0.1a	12.00±1.12b
OR	17.26±0.51a	10.88±3.94a	13.80±1.98a	3.16±0.30ab	60.13±8.93b	31.00±1.73bc	17.66±10.69ab	481.0±39.6a	37.33±29.14a	3.00±0.43a	0.27±0.011a	1.14±0.3a	18.79±2.69a
CB	17.56±096a	5.47±1.89a	13.02±4.68a	3.05±0.43ab	53.95±36.09b	31.0±4.35bc	13.33±7.57b	213.33±136.6a	10.33±6.50a	1.96±0.20b	0.25±0.030a	1.05±0.04a	12.25±1.29b
CU	16.82±0.098	6.82±1.27a	11.34±0.32a	3.07±0.31ab	50.56±0.92b	75.50±10.60a	41.0±4.24ab	480.0±56.5a	23.00±9.89a	2.81±0.23ab	0.27±0.01a	1.17±0.3a	17.59±1.46ab
CC	16.99±0.16a	7.59±2.95a	12.03±1.04a	3.25±0.11ab	48.19±10.83b	34.66±5.50bc	12.0±4.58b	462.66±125.1a	11.0±5.56a	2.55±0.69ab	0.27±0.037a	1.21±0.2a	15.98±4.31ab
DL	17.33±0.55a	5.19±3.52a	12.89±2.31a	3.30±0.61ab	58.06±18.04b	34.33±3.21bc	20.66±18.50ab	205.0±144.97a	6.00±2.0a	2.40±0.57ab	0.28±0.02a	1.01±0.08a	17.69±3.21ab
F.value	0.584	0.665	0.837	0.892	1.55	4.01**	1.36	1.73	1.23	1.7	0.765	1.936	0.135

****P< 0.01**

Dissection:

Lokhande and Kalkar (1999); Abdul Wahab et al. (2009); Rahim et al. (2014) reported that high concentrations of toxic heavy metals, such as lead, cadmium, copper, zinc, manganese, and iron accumulation in plants, reduce soil fertility and agricultural production. Mutations are affected even at very low concentrations. There are risks associated with consuming M. parviflora from fields located near busy roads.

Chlorophyll and carotenoids are the main nuclei for energy production in green plants and are the most important organic molecules on Earth as they are essential for photosynthesis (Shweta and Agrawal, 2006; Markovic et al., 2012). Statistical analysis indicated significant variations in chlorophyll a, b, and carotenoids in Malva parviflora across different habitats. It can be observed that the highest chlorophyll a was recorded at agricultural road sites followed by salt marshes, but the lowest was recorded at railways, due to copper accumulation in Malva parviflora tissues. According to Zengin et al. (2014) showed that decreased chlorophyll content in plants after copper exposure is a common occurrence. Similar results were reported by (Abo Ziada et al., 2015), where chlorophyll a, chlorophyll b, and carotenoid concentrations in Malva parviflora decreased in contaminated areas.

The highest mean chlorophyll b was recorded in salt marshes, followed by agricultural road sites, but the lowest were recorded in cultivated areas. The highest carotenoids were recorded in desert lands, followed by agriculture, but the lowest were recorded in cultivated habitats. Ahmed et al. (2016) reported similar results, showing that wastewater used for irrigation, which is loaded with heavy metals (copper and cadmium), leads to the accumulation of these elements in the stem and root parts of Malva parviflora and a decrease in photosynthesis. and (Richardson et al, 2002)The photosynthetic pigments are most likely to be damaged by air pollution.

Many plants need for plant nutrients for normal growth and completion of their life cycle. These elements such as nitrogen (N), phosphorus (P) and potassium (K) , where used in the form of fertilizers to enhance the productivity of agricultural soils Savoy(2015).The Results showed of Nutrients content of Malvaparviflora Root that (N) and (P) , (K) significantly differed from habitat . Nitrogen recorded their highest contents in Desert road sites , but the highest content of P were recorded in Two habite Salt marshes and Agricultural road sites (0.27±0.02 %), followed K in Railway . While the lowest percentage of N,P and K was recorded in Salt marshes,Reclaimied ladns and Canal bank(1.49±0.2%, 0.25±0.01%,0.73±0.2%) respectively.
While Results showed of Nutrients content of Malva parviflora shoot that N, P, K no significantly differed from habitat . Nitrogen recorded their highest contents in Salt marshes , but the highest content of P were recorded in Desert land , followed K in Crops . While the lowest percentage of N,P and K was recorded in Reclaimied ladns, Drain bank and Salt marshes (1.89±0.5%, 0.26±0%,0.71±0.22% respectively).
Generally the content N,P,K in shoot lowest by root .this exceeds the allowable limit in the plant's. Savoy(2015) The variation in N, P and K among the study sites may be due to the variation in application of fertilizers and may be due to the number and cover of the associated plants which competes the Opuntia trees on absorption and accumulation of these nutrients. Soliman (2016) found that weeds associated to wheat and maize accumulated high contents of N, P and K in their tissues than the main crops.These results are in no agreement with present study results. Galal and Shehata (2015) reported that the relatively lower nutrients, compared with associated weeds, may be due to the high accumulation potential of these weeds.
Weeds compete very effectively with the crop for available nitrogen to the point that the reduction in yield from weed competition is generally accompanied by reduction in protein content as well (Alsaidi et al., 2017).
The present study detected no significant variation in all nutrients content of Malva parviflora Root among the study habitats . The highest average of iron was recorded in Malva parviflora in Desert lands habitat , but the lowest value was recorded in Canal banks . (Cr) recorded its highest content in M. parviflora Crops and its lowest average recorded in Desert road site . The highest average of (Mn) was recorded in Reclaimied lands, while the lowest average was recorded in M. parviflora in Salt marches habitat . The lowest and highest value of (Cu) was recorded in Salt marches and deasert lands , respectively. (CO) recorded its highest concentration in M. parviflora at Canal banks and its lowest average was recorded in Fallow lands. The highest average of (Pb) was recorded in Orcards, while the lowest average was recorded in Drain banks . Averages of (Cd) values were ranged between 2.87±0.2 mg g-1. in Desert road sits and 3.88±0.9 mg g-1. in the Crops.
These are in agreement with results of Ahmed et al,(2016) that water for irrigation sewage loaded with heavy metals(copper and cadmium) lead to the accumulation of elements in the parts of the shoot and root to Malva parviflora plant. But (Ni) averages were located between 11.13±0.8 mg kg-1. in Desert road sits and 16.03±5.8 mg g-1. in Canal banks, (CO) recorded its highest concentration in M. parviflora at Canal banks and its lowest average was recorded in Fallow lands . The highest average of (Pb) was recorded in Orcardes, while the lowest average was recorded in Drain banks . Averages of (Cd)values were ranged between 2.87±0.2 mg g-1. in Drain banks and 3.88±0.9 mg g-1. in the Crops. But (Ni) averages were located between 11.13±0.8 mg kg-1. in Desert road sits and 16.03±5.8 mg g-1. in canal banks. According to the results of the study, detected no significant variation in all nutrients content of Malva parviflora shoot among the study habitats except Zinc . The highest average of iron was recorded in Malva parviflora in Orcards habitat , but the lowest value was recorded in Desert lands . (Cr) recorded its highest content in M. parviflora Drain banks and its lowest average recorded in Agricultr road site .The highest average of (Mn) was recorded in Railway , while the lowest average was recorded in M. parviflora in Crops habitat . The lowest and highest value of (Cu) was recorded in Orcards and Deasert land. (CO) recorded its highest concentration in M. parviflora at Canal banks and its lowest average was recorded in Cultivated . The highest average of (Pb) was recorded in Salt marchs , while the lowest average was recorded in Deasert lands . Averages of (Cd) were very close in all study sites, (Cd) values were ranged between 2.89±0.5mg g-1. in Desert road sits and 3.41±0.8mg g-1. in the Salte marchs. But (Ni) averages were located between 10.84±1.0 mg kg-1. in Salt marchs and 14.93±3.5 mg g-1. in Drain banks.
Generally, malva parviflora contains high rates of heavy metals, to vary between shoot and root ,These results are in agreement with results of Abdul-Wahab et al,(2009) concluded that accumulation of lead, cadmium, copper, zinc, manganese, and iron in M. Parviflora were found to vary with the different parts (leaves, stems, and roots). there risk associated with consumption , Also Rahim et al, (2014) different parts of M. parviflora (leaves, stems, roots) and associated soils heavy metal concentrations were compared in soil and plant with maximum permissible limits in different Countries were outside the maximum allowed in plant samples ,Ibrahim et al,(2013) Results obtained showed accumulation Zn> Cu> Pb> Ni> Cd in shoots and roots of malva parviflora, Abbas et al, (2011).M. Pariflora have ability to absorb and accumulate toxins. The accumulation of minerals may be a direct threat to human health, (Patzke and Brown 1990 cited by Bothe 2011) Other plant ecotypes exist in Central Europe that are particularly adaptation to a life on heavy metal soils.
it is worse to find that Co, Pb and Cd concentrations were greatly higher than those of the permissible level set by WHO (0.4, 0.3 and 0.1, respectively).in soil and Plants

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Compliance with ethical standards
Disclosure of conflict of interest
The authors declare that they have no conflict of interest.