

Phragmatis australis

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(أستلم 2014/ 5 /21 ؛ فُبل 2018/ 6 / 12)

الملخص

¹⁻ (119 384)

¹⁻ (3.594 7.304) (0.719 4.992)

(31.34 – 36.33)

Bioaccumulation of Lead and Zinc Elements in Plant Shoot of *Phragmatis australis* Grown in Wady Al-Kharrzi at Mosul City, Iraq.

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ABSTRACT

The quality of Wady Al-Kharrzi wastewater which is considered as one of sources of Tigris river pollution in Mosul city have been investigated, Concentrations of Lead and Zinc tests of wastewater and plant samples which were taken from different sites of the Wady have been conducted to know the degree of contamination and the role of *Phragmatis australis* in phytoremediation.

The results indicated high concentration of the elements Pb and Zn either in the Wady wastewater (384, 119) ug. L⁻¹ or leaves and stems tissues of *Phragmatis australis*, which reached to (4.992, 0.719) and (7.304, 3.594) ug. Gm⁻¹ dry weight respectively. Also, significant self-purification were noted along the Wady wastewater flow, through the role of phytoremediation of the aquatic plants, with Biological accumulation coefficient of Pb and Zn in stem tissues get to (31.34- 36.33) respectively.

Keywords: *Heavy metals, Phytoremediation of polluted water, Bioaccumulation.*

ROS

(Scheid *et al.*, 2017)

(2012)
300

(Ng *et al.*, 2016) Biomagnification

)
1- (14.3) (2008

(Abdul-Kareem *et al.*, 2011 2010)

المواد وطرائق العمل

() :

(1600-1057) ()

(2018) 2200
(APHA, 1998)

2013 2012 (1)

Phragmatis australis

(6-4-1)

- -)
(Sakizadah, 2016 ; Meena *et al.*, 2017)

(1:1:3) (

"
" (10)
50 "

A. Abs. Spectrophotometer

(APHA, 1998)

70°

فقء

(3)

72

%20 HCl

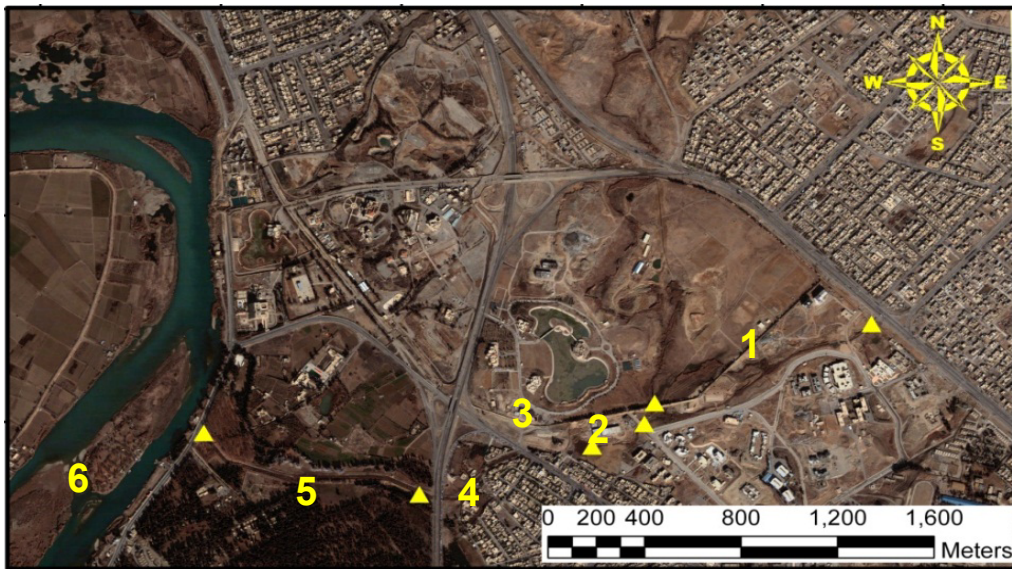
10

(5-4)

(550±50)

50

(Sakizadeh *et al.*, 2016 Kimsa *et al.*, 1998)



:1

:1

:2

:3

:4

:5

:6

(BAC) Biological Accumulation Coefficient

:(Wilberforce, 2015)

$$BAC = \frac{\text{conc. in plant tissues}}{\text{conc. in environ.}}$$

Biomagnification

(Scheid *et al.*, 2017; Ambardini *et al.*, 2016)

Stress factors

(1)

.¹⁻ . (384-34)

(¹⁻ .)

:1

2/12	1/22	12/25	12/18	12/11	11/13	11/6	10/16	10/9		
373	212	144	277	122	76	155	158	263	1	Pb
150	194		140	90	130	105	154	240	4	
384	201	46	197	316	148	108	34	170	6	
26	60	60	65			86	119	22	1	Zn
-	30	32	28			22	42	26	4	
-	95	73	70			19	67	105	6	

(2012)

^{1/2} / (12207-1724)

¹⁻ . (399-50)

(2012)

Abdul-Kareem *et al.* , (2011)

(2013)

¹⁻ . (150-11)

¹⁻ . (962)

pH

pH

(1)

(2010)

%(79-8)

(Saha and Hossain, 2011)

Na Mg Ca

Bioaccumulation

Bioavailability

.....

.(Meena *et al.*, 2017 2011)

Biomagnification

¹⁻ . (5) ¹⁻ . (0.1)

(2011 WHO, 2015)

Mg

Protochlorophyllide

(2011)

reductase

pH

(Ali and Sagid, 2013 2012)

.(2018 2017) %100

¹⁻ . (7.302-2.927) (4.295-1.402)

(2)

%79.3

(-SH)

phytochelatins

(1)

Metallothioneins

(Meena *et al.*, 2017 2007)

(¹⁻ .)

:2

BAC							
7.504	2.799	3.236	1.402	3.759	1		pb
27.190	3.670	4.992	2.707	3.312	4		
17.315	3.082	4.295	2.935	2.017	6		
13.461	5.021	7.304	2.927	4.833	1		Zn
31.341	4.231	3.646	4.563	4.484	4		
25.382	4.518	5.720	3.848	3.987	6		
3.651	0.230	0.039	0.077	0.573	1		Zn
1.75	0.042	ND	0.039	0.045	4		
8.722	0.628	0.719	0.467	0.698	6		
13.603	0.857	0.348	0.917	1.305	1		Zn
30.75	0.738	0.027	0.058	2.128	4		
36.333	2.616	2.486	1.768	3.594	6		

(2014)
ROS

Antioxidant enzymes

(2012) Saeed

(Sakizadeh *et al.*, 2016)

Raphanus

Helianthus annuus

Zea mays

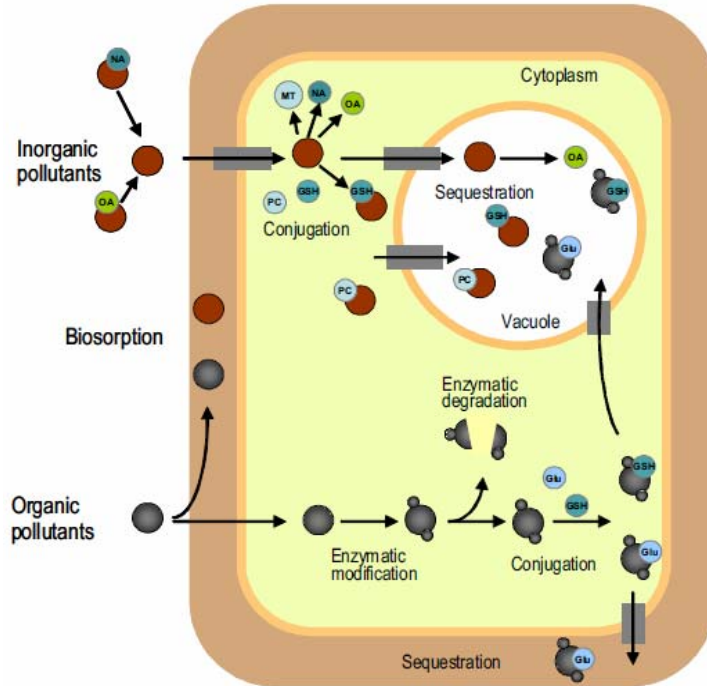
(2013)

sativus

(2010)

1- (3.64)

1- (95-983)



Phytoremediation

:1

GSH

OA

NA

MT

Gl4

(Mkandawire and Dudel, 2007) *.Pc*

(2)

(BAC)

(31.341 27.19)

.....

Bioaccumulation

.(2013)

(1) (2012)
1- . (119-19)

(2012) (2011)
1- . (393-1187)

Abdul Kareem *et* 1- . (491) (2013)

Zn (2011) *al.*

Zn (2012) Sultana 1- . (40)
1- . 132 ()

(1)
%81

1- . (3.594-0.719)

(2)
(Caldelas *et al.*, 2011) 1- . (300-100)

(2007)
1- . (4.66-0.266) (2013)

%415 (2)
(2) BAC

(36.333 8.722)
(Caldelas *et al.*, 2011)

O₂⁻

pH

(2007)

(2011)

.1

.2

.3

.1

.2

()

(2013)

(2010)

(2012)

(2010)

.167 – 144 (3)2 .

(2011)

.127-123 (2)16 .

(2013)

()

(2011)

.14-5 (2)5 .

-
- (2018)
- (2017)
- 20 – 14 (12)22 .
- (2018)
- 75 – 64 (1)27 .
- CCME WQI (2018)
- 25 – 13 5 .
- (2012)
- 606-590 .
- (2014)
- 14 .
- 70 – 61 .(
- Lemna spp. (2011)
- 471 (1)8 .
- 477
- (2011)
- 90-77 (3)24 . *Portulaca oleracea*
- 28-1 (2)14 . (2007)
- (2008)
- 49-33 (2)8 .

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