

Sinorhizobium meliloti

Glyphosate

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FA40 A39, FA38, FA37 *Sinorhizobium meliloti*

(2←1)β

FA37

45.7

FA37

Glyphosate

(/ 10)

Glyphosate

Sinorhizobium meliloti :

Isolation and Identification of Local Isolates of *Sinorhizobium meliloti* and Studying its Tolerance Towards the Herbicide Glyphosate

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ABSTRACT

Four strains (FA37 FA38, FA39, and FA40) of *Sinorhizobium meliloti* were isolated from different agricultural areas of Ninaveh, Erbil and Duhok Governorates. Identification studies were conducted for these strains for their resistance to chloramphenicol, Erythromycin and production of cell surface molecules and their ability to grow in a Minimal Medium. Results showed that the four strains had the ability to resist both antibiotics, production of $\beta(1\rightarrow2)$ cyclic glucan molecules and growth in Minimal Medium. The study of symbiosis relation between the strains and *Medicago sativa* plant showed that the strain FA37 was the most successful isolate in constructing symbiosis relation indicated by the dry shoot group, which reached 45.7 mg. The strain was then selected for further experiments. Results revealed that the strain FA37 had high resistance against different concentrations of the herbicide Glyphosate, whereas the plant showed no resistance against the least concentration 10 $\mu\text{g/ml}$ that the *Rhizobium* strains tolerated.

Keywords: *Sinorhizobium meliloti*, Glyphosate Herbicide

%25

Herbicides

5-enolpyruvyl shikimate -3-

Glyphosate

(Moorman , 1989)

(Amrhein and Steinruchen , 1980) phosphate (EPSP) synthase

Cinnamic acids

.(Becerril *et al.*, 1989)

Hydroxybenzoic

Shikimat

:

Glyphosate

..... *Sinorhizobium meliloti*

(1999) Hernandez .(Moorman *et al.* , 1992)
Glyphosate

Shikimat

Protocatechuic

Glyphosate

(2005)

dos Santos

N-(phosphonomethyl)

Zappqi

Roundup Transorp

/

43.2

Bradyrhizobium

Ethylamine

YEM

Bradyrhizobium

Glyphosate

Glyphosate

YEM

Roundup Transport

(2005) Gómez

Zabaloy

.Bradyrhizobium

Glyphosate

Glyphosate

Glyphosate

SJ140

Bradyrhizobium sp.

Sinorhizobium meliloti

Glyphosate

S. meliloti

Medicago sativa

(MSY)

S. meliloti

4-2 ° 2±28

.(Vincent , 1970) *S. meliloti*

Medicago sativa

:

: (MSY)

.(Vincent , 1970)

(Khanuja and Kumar , 1988)

.(dos Santos, 2005) Glyphosate

:(RMM)

(Singh, 1948) .

: (NF)

S.meliloti

Glyphosate.

.(Engelke *et al.*, 1987)

/ 100 70 50

:

:

400 300 200 100

(Freifelder, 1983)

.(Hussein , 2000)

/

:

S. meliloti

%0.02 Aniline blue

(3←1)β

..... *Sinorhizobium meliloti*

/ 0.1 (MSY)

Congo red

.(Swamynathan and Singh , 1995)

(2←1)β

Glyphosate

GLYPHOSATE I.P.A

Glyphosate

480

/Lizz agro-chemicals co., Ltd

.Glyphosate

Glyphosate

(MSY)

Glyphosate

(MSY)

. / 10

/

100 90 80 70 60 50 :

Control

.(dos Santos , 2005)

560

Spectrophotometer

S. meliloti

FA38 FA37 :

S. melilot

FA39

Medicago sativa

FA40

(1)

FA38 FA37

MSY

/ 400

S. meliloti

(Talaro and Talaro, 1996)

.(Tate, 2000)

.(Hussein , 2000)

MSY

Sinorhizobium meliloti

:1

				µg/ml	
FA40	FA39	FA38	FA37		
++	++	++	++	100	
+	+	++	+	200	
-	-	+	+	300	
-	-	-	-	400	
+	+	++	++	100	
-	-	-	+	200	
-	-	-	-	300	
-	-	-	-	400	

- + ++

(3←1)β

.(Swamynathan and Singh , 1995) (2←1)β

(3 ← 1) β

(2 ← 1)β

(3 ← 1) β

S. meliloti

.(D'Antuono , 2005)

..... *Sinorhizobium meliloti*

(RMM)

.(MSY)

.(Prasad , 2000)

FA37 (2)

45.7

.(1)

NF

Sinorhizobium meliloti

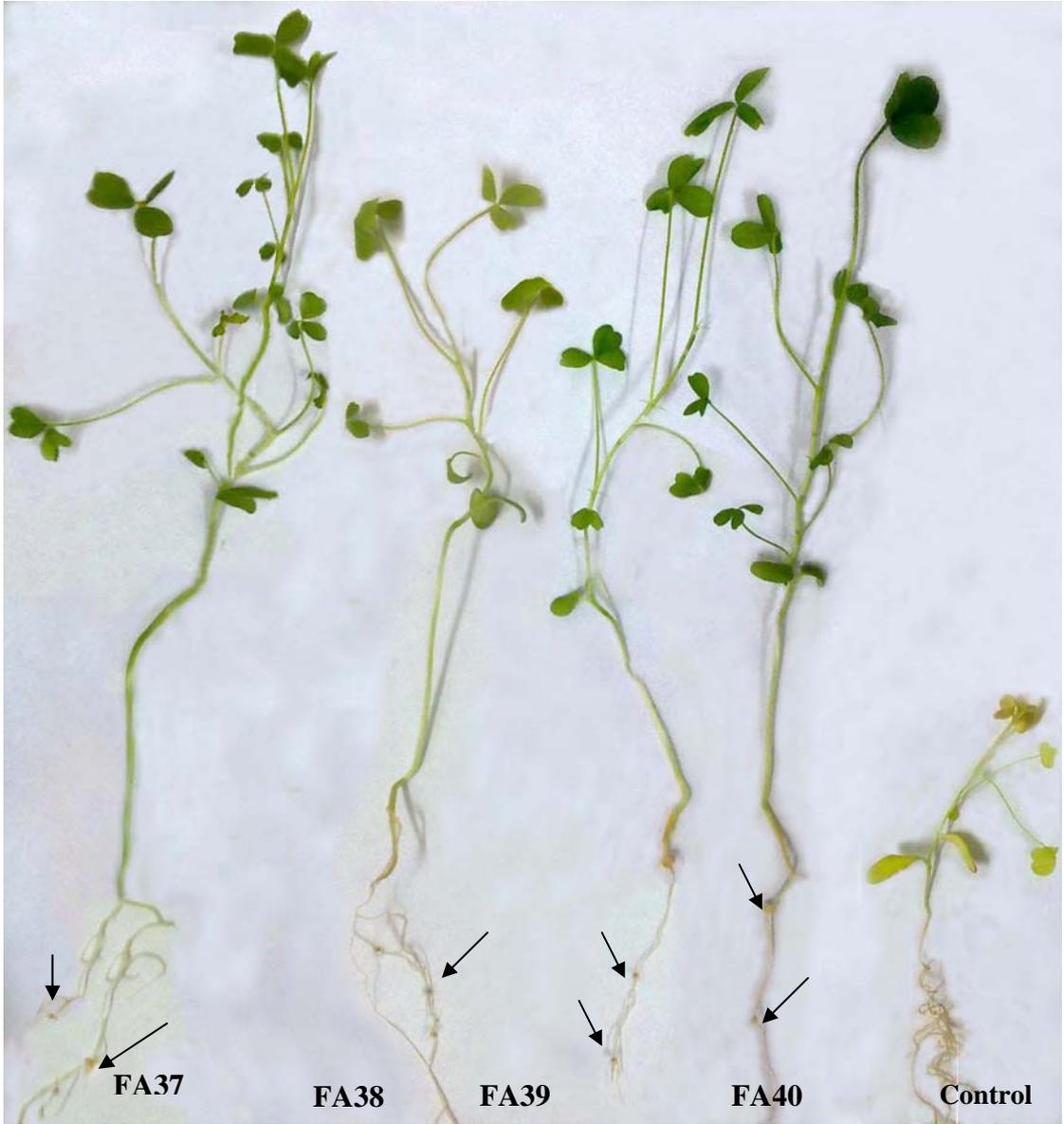
:2

()	/	()	
1.3 ± 45.7	7.9 ± 1.3	22.1 α ± *0.6	FA37
2.9 ± 40.1	1.9 ± 6.5	1.1 ± 16.8	FA38
0.8 ± 40.0	1.4 ± 7.0	0.9 ± 17.3	FA39
1.1 ± 40.4	1.7 ± 7.5	1.2 ± 17.6	FA40
0.5 ± 8.7	—	1.5 ± 5.9	Control

SD

*

α



Sinorhizobium meliloti

:1

FA37

Glyphosate

(O.D.)

/

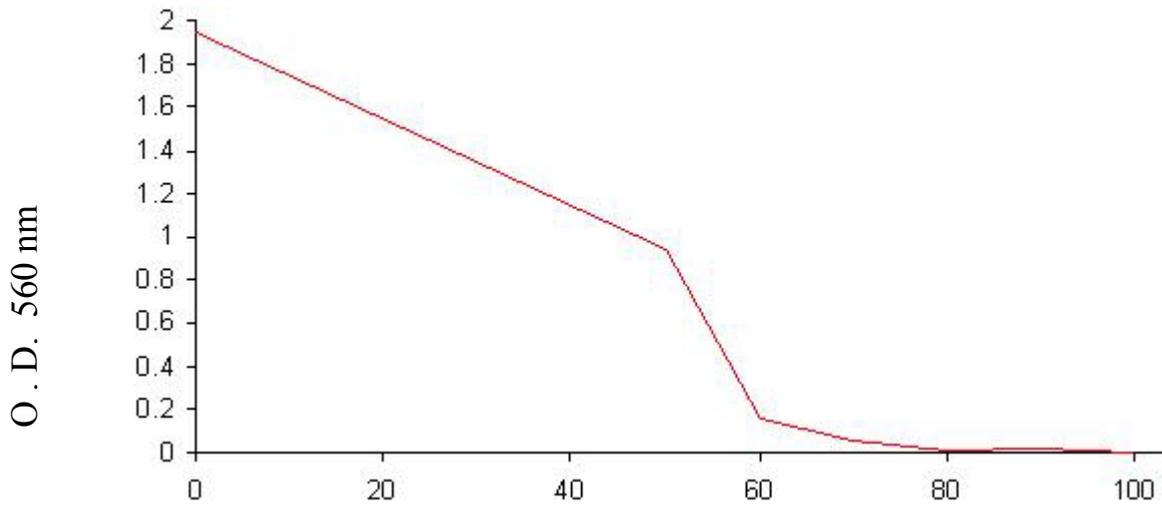
50

(%48.63)

90

..... *Sinorhizobium meliloti*

/ 100 /
(2)



تركيز الـ Glyphosate مايكروغرام /مل

Sinorhizobium meliloti FA37 : 2
.Glyphosate

/ 43.2 (2005) dos santos

5 SEMIA5087 A508A *Bradyrhizobium*

170 480

.(Pedrinoho *et al.*, 2002 ; Kishinevsk *et al.*, 1988 ; Jaworski *et al.*, 1972)

10

(NF)

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S. meliloti FA37

Glyphosate

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