

()

*

(// : // :)

(MeSA)

()

(TA)
(APX)

(TSS)

pH

TSS

APX

TA

pH

(MeSA)

(SAR)

.(Raskin, 1992)

2. Thermogenesis
3. Systemic Acquired Resistance

1. Methyl Salicylate

Ding, Wang, Gross, & Smith, MeSA (2001)	(CAT)	(APX)
(Yao & Tiana, 2005)	(H ₂ O ₂)	H ₂ O ₂
MeSA	(PR)	
^(HSP)		
	%	%
(Wang et al., 2006)	(SA)	(Raskin, 1992)
	(Srivastava & Zhang et al., 2003)	Dwivedi, 2000)
	SA	
	(Leslie & Romani, 1988)	
(Ding et al., 2002)	HSP	(Romani et al., 1989)
PR	MeSA	(Roustan et al., 1990)
(Ding et al., 2001)		SA
		ACC
		ACC Synthase
	ACC	SA (Leslie & Romani, 1988)
	MeSA	ACC Oxidase
		(Fan & He, 1998)
	(TSS)	
		(Ananieva et al., 2004)
	MeSA	
MeSA		
8. Heat shock proteins		1. Catalase
9. Total soluble solids		2. Ascorbate peroxidase
		3. Hydrogen peroxide
		4. Second messenger
		5. Low molecular weight pathogenesis related proteins
		6. Salicylic acid
		7. Natural Fungicide

(GC)

(Shimadzu 14-A)

$$EP (\mu\text{l h}^{-1}\text{g}^{-1}) = \frac{E \times V \times 60}{T \times W}$$

=EP

=E

=V

=T

= W

pH :

pH

pH

:APX

()

) x-100

pH

(

(PVP)

g

(AOAC, 1984)

: (TA)

x

(

pH

H₂O₂

)

(

1. 2,6-dichloro-indophenol
2. Titratable Acidity

MeSA

(p < /)

MeSA

MeSA

SA

SA

SA

SA

SA

(Zhang et al., 2003)

(PG) (PME)

(Prasanna et al., 2007)

APX

APX

(Jiménez et al., 1997)

TSS

MeSA

(p < /)

TSS

MeSA

% / % TSS

TSS ()

(Hubbard et al., 1991; (SPS)

SPS MacRae et al., 1992)

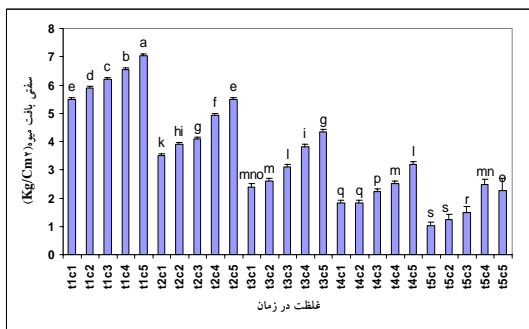
SPS

(Langenkämper et al., 1998)

(Srivastava & Dwivedi, 2000)

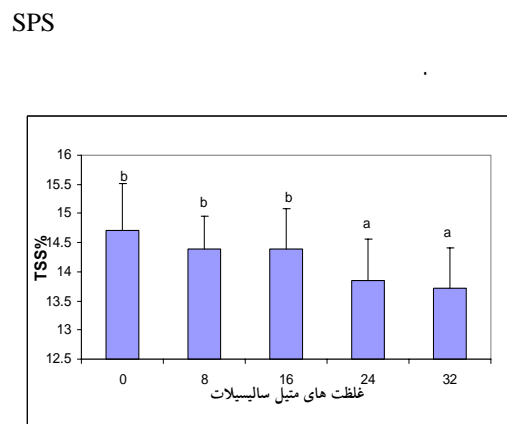
ACC

(Leslie & Romani, 1988)



MeSA

(p < /)



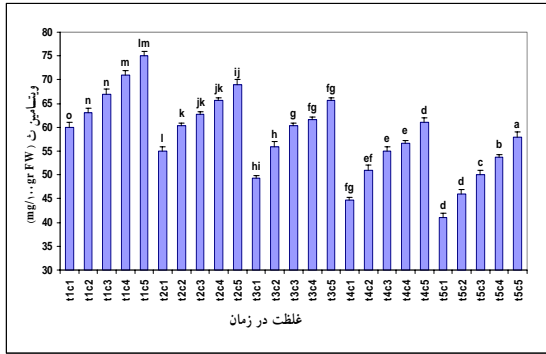
(p < /)

2. Pectin methyl esterase
3. Polygalacturonase
4. Cellulase

1. Sucrose Phosphate Synthase

AsA

AsA
AsA/DHAsA
(Hung et al., 2007)



(p < /)

MeSA
MeSA (p < /)

MeSA
MeSA ()
 γ (ASA)
(Zhang et al., 2003)

(Srivastava & Dwivedi, ACC .2000)

(Fan & He, 1998)

ACC
(Leslie & Romani, 1988)

pH
pH= / / / pH
(Romani et al., 1989)

2. Acetylsalicylic acid or Aspirin

:

MeSA
MeSA (p < /)

MeSA
MeSA ()

(ROS)

ROS
CAT APX)
(...)
(Smimoff, 1995) (E
ROS

ROS
APX
()

(Nishikawa et al., 2003)
MeSA SA

CAT APX
(AsA)

(Hung et al., 2007)

MeSA AsA
(DHAsA) AsA

1. Reactive Oxygen Species

(p > /)

(MacRae et al., 1992)

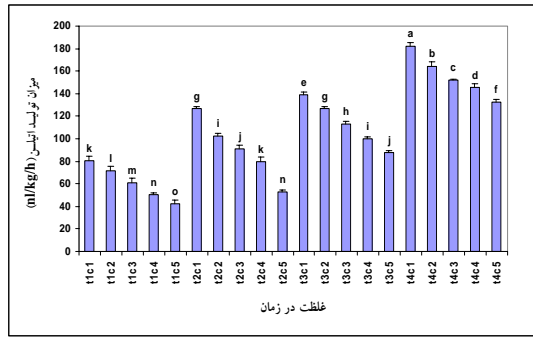
pH

pH

(p < /)

pH ()

pH



(P < /)

(APX)

pH

pH

(Marsh et al., 2000; Marsh et al., 2004)

V-ATPase

pH

pH

APX

(p < /)

()

APX

CAT APX

(Kang et al., 2003)

CAT APX

pH

V-PPase

pH

PPi

(Raskin, 1992)

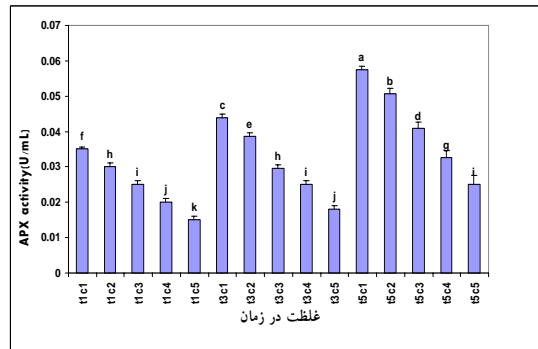
ATP

PPi

PPi

UDP

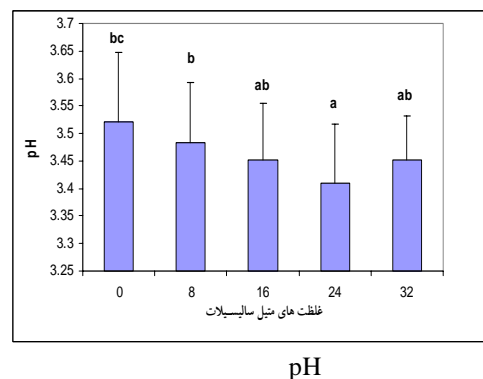
pH



(Srivastava & Dwivedi, 2000)

pH

(p < /)



($P < /$)

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