J. Agric. Sci. Mansoura Univ., 31 (10): 6713 - 6722, 2006

PREPARATION OF SOME SURFACE ACTIVE AGENTS AND EVALUATION OF IT'S PESTTCIDAL EFICIENCY AGAINST SUCKING PIERCE PESTS INFESTING COMMON BEAN

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ABSTRACT

Two type of surface active agents anionic and nonionic were prepared from locally raw materials: Fatty acids (Oleic and Stearic acid) reacted with PEG 400, 600 in case of preparation nonionic surfactants and fatty acids reacted with potassium hydroxide and calcium oxide in case of preparation anionic surfactants. Locally prepared nonionic surfactants were identified using IR and Mass spectroscopy. Physico-chemical properties were assessed such as solubility in different solvents, surface tension and pH value. Experiments were conducted to evaluate the pesticidal efficiency of those prepared surfactants to use it as alternatives instead of some conventional pesticides against sucking pierce pests infested common bean. Results obtained indicated that the prepared surfactants were effective at concentrations 1.0 and 1.5% in their initial and residual effect against: egg of whitefly and moving stages of spider mite.

INTRODUCTION

It's undesirable of using conventional pesticides for controlling the sucking pierce pests, therefore we can use some locally prepared surfactants which remain for a short period in the field, safe and cheap materials were tested as alternatives instead of those conventional pesticides. Therefore, efforts should be directed towards preparation of locally surfactants by available and locally materials.Surface active agents are playing an important role on many fields especially as pesticides in both formulation and optimization of biological efficiency (Tadros, 1995). Surface active agents are used to reduce the interfacial tension between immiscible liquids or between liquids and solid surfaces. Such surface active agents act as wetting and spreading agents by reducing the surface tension of the spray droplet, so that it spreads on the leaf surface providing more coverage for toxicants by reducing the contact angle spray drops on the solid surface (El-Sisi 1985).The effect of surfactant : Sisi-6 against egg of whitefly and moving stages of spider mite showed high initial and residual effect (Mousa *et al*,2001).The pesticidal efficiency of any surfactants is increased by its ability in decreasing the surface tension of water(El-Hariry and El-Sisi,1991) , since it might , solve the epicuticle layer of pests as a result of its emulsifying effect then cause mortality (Rizk *et al*,1999).

The aim of this research, is preparation of ionic and nonionic surfactants using locally and cheap materials and evaluation the pesticidal efficiency of this locally prepared surfactants for controlling pests infested common bean.

MATERIALS AND METHODS

1- Materials

All chemicals were used in preparation of different nonionic and ionic surfactants were selected as pure grade.

a) Fatty acids

- Oleic acid M.wt = 282.32 produced by Morgan Co. for chemicals Cairo - Egypt.
- Stearic acid M.wt = 284.42 produced by EL-Gomhoria Co. for chemicals Cairo – Egypt.

b) Poly ethylene glycol (PEG)

- Poly ethylene glycol 600 (PEG-600) M.wt = 590 produced by Morgan Co. for chemicals Cairo – Egypt.
- Poly ethylene glycol 400 (PEG-400) M.wt = 414 produced by EL Gomhoria Co. for chemicals Cairo – Egypt.

c) Other chemicals

- Potassium hydroxide KOH M.wt = 56.11 produced by EL – Naser Co. for chemicals Cairo – Egypt.
- Calcium oxide (dehydrated) CaO M.wt = 56.08 produced by produced by Morgan Co. for chemicals Cairo – Egypt.

I) Preparation of surfactant:-

a-1)Nonionic surfactant Monofatty acid esters 1(a-d).

They were prepared according to (Osipow 1964) by heating fatty acid (Oleic or Stearic acid) (0.1 mole) was heated for 30 minute then polyethylene glycol 600 or 400 (0.1 mole) was added drop wisely to heated acid. The temperature then elevated gradually to 350 C° with continuous stirring for 5-6 hrs until all water molecules were evaporated to stop the reversible reaction. The product left to cool to obtain mono fatty acid esters (surfactant) 1(a-d).

a-2) Disfatty acid esters 2(a-d).

They were prepared according to (Osipow, 1964) by heating fatty acid (0.2 mole) was heated for 30 minute then polyethylene glycol (0.1 mole) was added drop wisely to heated acid. The temperature then elevated gradually to 350 C° with continuous stirring for 5-6 hrs until all water molecules were evaporated to stopped the reversible reaction. The product left to cool to obtain difatty acid esters (surfactants) 2(a-d).

b) Preparation of ionic surfactant (salts of fatty acid).

1- Potassium salt of (oleic and stearic) acids was prepared by heating (1 mole) of oleic or stearic acid for 30 minute at 100C°, (1 mole) of KOH soluble in small amount of distillated water and dropped wisely on heated acid with continuous stirring after one hour remove the product to cool
2- Calcium salt of (oleic and stearic acid) was prepared by heating (2 mole) of oleic or stearic acid for 30 minute at 100 C°, (1 mole) of CaO added in small amount of distillated water and heated until boiling point of water reach and dropped wisely on heated acid with continuous stirring after one hour remove the product to cool.

- **Identification of the locally prepared surfactant:-**

1- Infra Red spectroscopy (IR):

IR for determination the function groups in the prepared product. IR spectra were recorded (KBr) on a pye - unicom – sp-833 perking Elmer spectrophtometer.

2- Mass spectra (Ms):

Mass spectra for determination the molecular weight of prepared products. MS spectra were run on GC mass – QP 1000 EX (SHIMADZU) Mass spectrometer, micro analytical laboratory, and faculty of science, Cairo University.

3- Elemental analysis:

The elemental analysis was done to indicate the percentage of carbon and hydrogen in the products, the analysis was done by micro analytical laboratory, in Faculty of Science, Cairo University.

- **Determination of physicochemical properties for the locally prepared surfactants:-**

1) Solubility:

It was determined by measuring the volume of distilled water, acetone and xylene for complete solubility or miscibility of 0.5 gram of salts, and then % solubility was calculated according to the following equation:

$$\% \text{ solubility} = (0.5/ v) \times 100$$

Where v is the volume of solvent required for complete soluble (El-Sisi, 1981).

2) Surface tension:

It was determined using DuNouy tensiometer at concetration 0.5%.

3) pH value :

It was determined using Schoot Gerate pH meter for the tested materials.

- **Evaluation of the pesticidal efficiency of the locally surfactants against sucking –pierce pests:**

The experiment was conducted in open field according to the Ministry of Agriculture Protocol (1999) on common bean plant seedlings infested by sucking pests (spider mite and whitefly) cultivated in (CAPL) field. All surfactants were tested at 0.5, 1, 1.5 % concentration and sprayed by plastic sprayer where first experiment carried out at 16/5/2005 with materials PEG 600 MO ,PEG 600 DO , PEG 600 MS ,PEG 400 MO ,PEG 400 DO, potassium stearate and potassium oleate and the second experiments carried out at 2/6/2005 with PEG 600 DS , PEG 400 MS and PEG 400 DS materials. Infestation was assessed before spraying and then after 1, 3, 5 and 7 days posttreatment by collecting (10) leaves from each treatment and untreatment plot. Inspection was done under binocular in laboratory to determine the number of each of considered sucking pests per leaf; the pesticidal efficiency was calculated as reduction percentage occurred in the population of each pest according to the equation adopted by Henderson and Tiltone (1995).

$$\% R = 1 - \left(\frac{Cb}{Ca} \times \frac{Ta}{Tb} \right) \quad 100$$

Where Cb = mean a live number of pest / leaf in untreated before spraying.
Ca = mean a live number of pest / leaf in untreated after spraying.
Tb = mean a live number of pest / leaf in treatment before spraying.
Ta = mean a live number of pest / leaf in treatment after spraying.

RESULT AND DISCUSSION

I) Preparation of surfactants:-

a) Nonionic surfactant

1- Monofatty acid esters 1(a-d).

$$CH_3(CH_2)_nCOOH + HO(CH_2CH_2O)_mH \xrightarrow[-H_2O]{\Delta} CH_3(CH_2)_nCOO(CH_2CH_2O)_mH$$

1- Poly ethylene glycol 600 mono oleate 1a
2-Poly ethylene glycol 600 mono stearate 1b
3- Poly ethylene glycol 400 mono oleate 1c.
4- Poly ethylene glycol 400 mono stearate 1d.

-The structure of the prepared mono ester **1a-d** was confirmed by the following facts: **poly ethylene glycol 600 mono oleate 1a.**

(i) IR spectrum for compound (**1a**) showed absorption bands at 3387 cm^{-1} (γOH) .2922 cm^{-1} (γ - CH aliphatic) , 1733 cm^{-1} (γ C= O) , 1647 cm^{-1} (γ C= C) ,1107 cm^{-1} (γ R- O-R) .

(ii) Mass spectrum showed molecular ion peak at m/z = 854

-Poly ethylene glycol 600 mono stearate 1b.

(i) IR spectrum for compound (**1b**) showed absorption bands at 3368 cm^{-1} (γ OH) , 2921,2861cm^{-1}(γ -CH aliphatic),1734 cm^{-1} (γ C=O), 1108cm^{-1} (γ R-O-R).

(ii) Mass spectrum showed molecular ion peak at m/z = 856.

- Poly ethylene glycol 400 mono oleate 1c.

(i) IR spectrum for compound (**1c**) showed absorption bands at 3390 cm^{-1} (γ OH) , 2923 , 2861 cm^{-1} (γ -CH aliphatic) , 1735 cm^{-1} (γ C=O), 1647 cm^{-1} (γ C=C) . 1108 cm^{-1} (γ R-O-R) .

(ii) Mass spectrum showed molecular ion peak at m/z = 678.

- Poly ethylene glycol 400 mono stearate 1d.

(i) IR spectrum for compound (**1d**) showed absorption bands at 3379 cm^{-1} (γ OH) , 2924.2858 cm^{-1} (γ -CH aliphatic) , 1736 cm^{-1} (γ C=O) 1111 cm^{-1} (γ R-O-R) .

(ii) Mass spectrum showed molecular ion peak at m/z = 680.

(iii) Elemental analysis

Compound	Mol for Wt	Yield %	Cal / found	
			% C	% H
1a	$C_{44}H_{88}O_{15}$ 854.98	80	61.11 60.91	10.14 9.89
1b	$C_{44}H_{88}O_{15}$ 856.79	85	60.54 60.85	10.39 10.21
1c	$C_{36}H_{70}O_{11}$ 678.78	80	63.12 63.22	10.12 10.17
1d	$C_{36}H_{72}O_{11}$ 680.88	82	63..15 63.15	10.65 10.67

- The structure of prepared diester **2a-d** was confirmed by the following facts:

- Poly ethylene glycol 600 dioleate 2a.

(i) IR spectrum for compound (**2a**) showed absorption bands at 2922, 2856 cm^{-1} (γ -CH aliphatic), 1734 cm^{-1} (γ C=C), 1110 cm^{-1} (γ R-O-R).

- Poly ethylene glycol 600 distearate 2b.

i) (i) IR spectrum for compound (**2b**) showed absorption bands at 2923 , 2855 cm^{-1} (γ - CH aliphatic) , 1736 cm^{-1} (γ C=O) , 1112 cm^{-1} (γ R-O-R).

- Poly ethylene glycol 400 dioleate 2c.

(i) IR spectrum for compound (**2c**) showed absorption bands at 2924 ,2856 cm^{-1}(γ -CH aliphatic) , 1737 cm^{-1} (γ C=O) , 1655 cm^{-1} (γ C=C),1115 (R-O-R)

(ii) Mass spectrum showed molecular ion peak at m/z = 943.

- Poly ethylene glycol 400 distearate 2d.

(i) IR spectrum for compound (**2d**) showed absorption bands at 2922, 2853Cm-1 (γ-CH aliphatic) , 1736 cm^{-1} (γ C=O) 1112 cm^{-1} (γ R-O-R) .

(ii) Mass spectrum showed molecular ion peak at m/z = 946.

(iii) Elemental analysis

Compound	Mol for Wt	Yield %	Cal / found	
			% C	% H
2a	$C_{62}H_{119}O_{16}$ 1120.28	80	65.72 66.34	10.75 10.81
2b	$C_{62}H_{123}O_{16}$ 1124.49	81	66.61 66.87	10.02 9.93
2c	$C_{54}H_{102}O_{12}$ 943.07	85	68.33 68.25	9.97 10.52
2d	$C_{54}H_{106}O_{12}$ 946.28	80	67.85 67.90	10.71 10.80

III)- Pesticidal efficiency of the locally prepared surfactants against spider mite (*T.urticae*) and whitefly (*B.tabaci*) infested common bean:-

According to the Ministry of Agriculture recommendations for using the natural products and safe materials in controlling pests, effective materials should give initial effect not less than 70% reduction and residual

effect not less than 40% reduction . According to this recommendations , results in tables 2(a and b) showed the effect of tested materials with concentrations (0.5 , 1 , 1.5 %) against moving stages of *T.urticae* which indicated that all tested materials gave high initial and residual effects agree with the Ministry of Agriculture recommendations except in case of PEG 400 . M.O and PEG 400 D.S at conc. (0.5%) which gave low initial effectless than that of recommendations (69.2 and 68.75%),respectively and high residual effect, while PEG.600. D.O gave the highest initial, followed by PEG.400 M.S, PEG.600 M.S and PEG.600 D.S, values of initial activity indesinding order were reduced (81.44, 80.94, 78.7 and 76.33%), respectively. This results agree with (El Hariry and El-Sisi 1989) and (Mousa et al 2001).

Table (1): Determination of physico-chemical properties of locally prepared surfactant.

Surfactants	Solubility			pH value	Surface Tension (Dyne/ Cm)
	Water %(Wt /V)	Xylene %(Wt /V)	Acetone %(Wt /V)		
PEG 600 MO (1a)	Give emulsion	41.6	27.7	5.61	52.6
PEG 600 DO (2a)	Give emulsion	25	22.7	5.83	42.75
PEG 400 MO (1c)	Give emulsion	100	50	5.51	50.6
PEG 400 DO(2c)	Give emulsion	50g	33.3	5.95	59.5
Potassium Oleate	2.5	Insoluble	Insoluble	9.97	29.7
Calcium Oleate	Insoluble	Insoluble	Insoluble	8.46	--
PEG 600 MS (1b)	Give emulsion	40.0	10	6.24	52.6
PEG 600 DS (2b)	Give emulsion	23.3	8.6	6.58	50.6
PEG 400 MS (1d)	Give emulsion	18.5	15.1	6.12	52.6
PEG 400 DS (2d)	Give emulsion	12.5	12.5	6.65	47.1
Potassium Stearate	2.5	Insoluble	Insoluble	9.18	38
Calcium Stearate	Insoluble	Insoluble	Insoluble	8.21	--
Water				7.24	72

Table (2a): Psticidal efficiency of the locally prepared surfactants (oleic ester and salts) against spider mite infested common bean.

Surfactant	Conc. %	Pretreatment count. (no./leaf)	Initial effect after 1 day		Residual effect after (no./leaf)					
			(no./leaf)	%R	3day	5day	7day	Total	Mean	%R
PEG.600.MO	0.5	4.8	1.35	76.17	1.2	1.83	2.28	5.3	1.77	68.2
	1.0	3.3	0.7	82.03	0.83	1.6	1.9	4.33	1.44	62.38
	1.5	4.9	0.66	88.47	1	1.66	1.4	4.06	1.35	76.2
PEG.600.DO	0.5	4.3	0.91	81.44	1.08	1.83	2.4	5.31	1.77	64.5
	1.0	5.1	0.6	90.03	0.75	1.25	2.25	4.25	1.41	76.05
	1.5	4.4	0.5	90.3	0.7	1.2	1.7	3.6	1.2	76.49
PEG.400.MO	0.5	4	1.45	69.2	1.25	1.76	2.3	5.25	1.75	65.26
	1.0	3.4	1	75.08	1.16	1.66	1.3	4.12	1.37	62.28
	1.5	4.2	0.7	85.88	0.8	1.7	1.8	4.3	1.43	70.5
PEG.400.DO	0.5	4.1	1.4	71.08	1.25	2.2	2.3	5.75	1.91	59.84
	1.0	3.9	0.9	80.5	1	2.08	2.2	5.28	1.76	61
	1.5	3.2	0.5	86.76	0.9	1.1	1.2	3.2	1.06	71.26
Pt.Oleate	0.5	3.6	1.2	69.59	1	2.2	2.4	5.6	1.86	55.3
	1.0	4.6	0.8	85.26	1.1	1.7	2.1	4.9	1.63	69.39
	1.5	4.2	0.8	89.9	0.9	1.5	1.9	4.3	1.43	70.5
control		5	5.9		5.5	5.66	6.25	17.4	5.8	

Table (2b): Pesticidal efficiency of the locally prepared surfactant (stearic ester and salts) against spider mite infested common bean.

Surfactant	Conc. %	Pretreatment count. (no./leaf)	Initial effect after 1 day		Residual effect after (no./leaf)					
			(no/leaf)	%R	3day	5day	7day	Total	Mean	%R
PEG 600 MS	0.5	4. 3	1.08	78.7	1.33	2.4	2	5.73	1.91	61.7
	1.0	5. 5	0.7	89.22	0.9	1.7	2	4.6	1.53	75.9
	1.5	4. 9	0.6	89.62	1.25	1.7	1.3	4.25	1.41	75.2
Pt.Stearate	0.5	3.6	1.2	70.76	1.7	2	2.4	6.1	2.03	51.4
	1.0	4.1	1	79.3	1.4	1.8	1.9	5.1	1.7	64.2
	1.5	4. 9	0.7	87.9	1	1.3	1.7	4	1.33	76.5
Control *		5	5.9		5.5	5.66	6.25	17.4	5.8	
PEG.600.DS	0.5	5. 2	1.7	76. 33	2.1	2.2	2.5	6.8	2.26	70.27
	1.0	6.4	1.2	86.42	1.5	1.6	1.9	5	1.66	82.18
	1.5	6.6	0.8	91. 22	1.2	1.1	1.5	3.8	1.26	86.87
PEG.400 MS	0.5	5.7	1.5	80. 94	1.6	1.8	2.1	5.5	1.83	78
	1.0	4.6	0.7	88. 9	1.3	1.5	1.8	4.6	1.53	77.2
	1.5	6.1	0.6	92. 87	0.8	1	1.4	3.2	1.06	88.03
PEG.400.DS	0.5	5.1	2.2	68.75	1.9	2.6	2.9	6.4	3.45	53.68
	1.0	4.4	0.8	86.8	1.5	2	2.1	5.6	1.86	70.98
	1.5	5.5	0.6	92.1	1	1.3	1.5	3.8	1.26	84.33
Control**		5	6.9		6	6.6	9.3	21.4	7.3	

* First experiment ** Second experiment

When another experiment was conducted at concentration 0.25% of the tested materials against *T.urticae*, because most of the tested materials gave high initial and residual effect at concentration 0.5% more than the recommendations of the Ministry of Agriculture.

Results in table (3) indicated that all tested materials gave low initial effect and high residual effect, except in case of PEG 600 D.O and PEG400 D.S while gave high initial and residual effect which agree with the Ministry of Agriculture recommendations.

Table (3):Pesticidal efficiency of the locally prepared surfactant at 0.25% against spider mite infested common bean.

Surfactant	Conc. %	Pretreatment count. (no./leaf)	Initial effect after 1 day		Residual effect after (no./leaf)					
			no./leaf	%R	3day	5day	7day	Total	Mean	%R
PEG.600.MO	0.25	5.1	2.3	67.3	2.6	2.7	2.9	8.2	2.73	67.2
PEG.600.DO	0.25	5.7	2	74.59	2.2	2.8	3.3	8.3	2.76	66.8
PEG.400.MO	0.25	6	2.5	69.8	2.7	2.8	3.4	8.9	2.96	66.18
PEG.400.DO	0.25	5	2.8	59.45	2.4	3.1	3.5	9.5	3.1	57.18
Pt . Oleate	0 25	4.5	2.1	66.18	2.4	2.8	3.8	9	3	57.59
PEG.600.MS	0.25	5.3	2.9	60.38	2.7	3.4	3.6	9.7	3.23	54.4
PEG.600.DS	0.25	5.1	2.3	67.3	2.5	2.9	3.2	8.6	2.86	58.27
PEG.400.MS	0.25	4.8	2.2	66.81	2.8	2.9	2.9	8.6	2.86	61.5
PEG.400.DS	0.25	4.6	1.9	70.09	2.3	2.6	3.2	8.1	2.7	59.8
Pt.Stearate	0.25	5.6	2.8	63.8	2.9	2.9	3.5	9.3	3.1	62.1
control		5	6.4		6	6.6	9.3	21.9	7.3	

As general conclusion of the two carried experiments, it could be recommended concentration of 1% of any surfactant for controlling spider mite.

Results presented in tables 4(a and b) showed the effect of tested materials on immature stages of whilefly , *B.tabaci* , in concentrations (0.5 , 1 , 1.5 %) .Results obtained indicating that they gave high initial effect on immature stages of *B.tabaci* and also show high residual effect agrees with the Ministry of Agriculture recommendations. PEG.600 M.O gave the highest initial effect, followed by PEG.600 D.O and PEG.400 D.O, values of initial activity indesinding order were reduced (83.8, 81.9 and 81,89), respectively.

This results agree with (El Hariry and El-Sisi 1989) and (Mousa *et al* 2001).

Table (4a) Pesticidal efficiency of the locally prepared surfactant (oleic esters and salts) against immature stages of whitefly infested common bean.

Surfactant	Conc. %	Pretreatment count. (no./leaf)	Initial effect after 1 day		Residual effect after (no./leaf)					
			(no./leaf)	%R	3day	5day	7day	Total	Mean	%R
PEG.600.MO	0.5	10.3	2	83.8	2.2	2.5	3.1	7.8	2.6	84.6
	1.0	9	1.7	84.2	1.8	2	2.5	6.3	2.1	85.8
	1.5	8	0.9	90.6	1.3	1.8	2.3	5.4	1.81	86.2
PEG.600.DO	0.5	6.9	1.5	81.9	1.6	2	3	6.6	2.2	80.6
	1.0	6	0.6	91.7	1.3	1.8	1.9	5	1.66	83.1
	1.5	5.1	0.4	93.4	1.1	1.3	1.6	4	1.33	84.1
PEG.400.MO	0.5	5.9	1.93	72.75	1.4	1.5	3.2	6.1	2.03	79.04
	1.0	7.5	0.91	89.8	1.1	2.1	2.5	5.7	1.9	84.6
	1.5	6.6	0.7	91.2	1	2.6	1.8	5.4	1.8	83.4
PEG.400.DO	0.5	5.75	1.25	81.89	1.41	2.5	3.4	7.3	2.44	74.14
	1.0	7.8	0.91	90.3	1.08	2.8	3	6.96	2.32	81.9
	1.5	7.3	0.8	91.3	0.9	1.5	1.8	4.2	1.4	88.3
Pt.Oleate	0.5	6.25	1.48	80.27	1.16	2.9	2.6	6.66	2.22	78.4
	1.0	7.7	0.833	91	1	2.3	1.9	5.2	1.73	86.33
	1.5	7.5	0.7	92.2	1.1	1.9	2.1	5.1	1.7	86.21
control		7	8.4		9.7	10.3	14.5	34.5	11.5	

Table (4b).Pesticidal efficiency of the locally prepared surfactant (stearic esters and salts) against immature stages of whitefly infested common bean .

Surfactant	Conc. %	Pretreat ment count. (no./leaf)	Initial effect after 1 day		Residual effect after (no./leaf)					
			no./leaf	%R	3day	5day	7day	Total	Mean	%R
PEG.600.MS	0.5	7.3	2.2	72.6	1.9	2.4	2.8	7.1	2.36	78.5
	1.0	8.3	1.4	85.9	1.7	2.1	2.2	6	2	85.3
	1.5	7.2	1	88.4	1.3	1.8	2	5.1	1.7	85.6
Pt.Stearate	0.5	7.2	1.6	81.4	1.3	1.7	2.3	5.33	1.77	84.9
	1.0	6.8	1	87.7	1.2	1.6	2	4.8	1.6	85.7
	1.5	6.6	0.7	91.16	0.9	1.5	1.8	4.2	1.4	87.09
Control*		7	8.4		9.7	10.3	14.5	34.5	11.5	
PEG.600.DS	0.5	6.8	1.9	76.16	2	2.8	2.9	7.7	2.54	70.25
	1.0	6.4	1	86.67	1.8	1.9	2	5.6	1.86	76.95
	1.5	5.9	0.6	91.3	1	1.2	1.6	3.8	1.26	83.03
PEG.400.MS	0.5	6	2.4	65.88	2.3	2.8	2.7	7.8	2.6	65.76
	1.0	6.2	0.9	87.61	1.2	1.9	2.3	5.4	1.8	77.06
	1.5	5.6	0.6	90.86	0.9	1.2	1.8	3.9	1.3	81.66
PEG.400.DS	0.5	5.2	1.6	73.75	1.9	2.1	2.7	6.7	2.23	66.07
	1.0	6.6	1.2	84.49	1.4	1.7	2.4	5.5	1.83	78.09
	1.5	5.3	0.8	87.12	0.9	1.2	1.7	3.8	1.26	81.19
Control**		6.4	7.5		7	7.9	9.4	24.3	8.1	

* First experiment
** Second experiment

Another experiment was conducted with concentration 0.25 % of tested materials because most of the tested materials have high initial effect with concentration 0.5 % materials. Results presented in table (5) indicated that all tested materials gave low initial effect and suitable residual effect, except in case of PEG 600 M.S which gave low initial and residual effect.

As general conclusion of the two carried experiments, it could be recommended concentration of 1% of any surfactant for controlling whitefly.

Phytotoxic effect: - No any phytotoxicity, discoloration, curling leaves or burning were observed on common bean as result of spraying the tested materials.

The mode of action of the tested materials may be due to the toxic effect of surfactants which depend on emulsify the insect epi-cuticale layer as discussed by (Abdel-Haleem et al ,1999) or due to paralysis (Imai , 1994) . Also the presence of the tested surfactants cause inhibition of normal feeding , resting and respiration of the insect (Dodwell and Harrison 1984).Finally, it could be concluded that the tested materials proved to have high pestticidal efficiency for controlling piercing and sucking pests infesting common be

Table (5): Pesticidal efficiency of the locally prepared surfactant at 0.25 % against the immature stages of whitefly infested common bean.

Surfactant	Conc. %	Pretreatment count. (no./leaf)	Initial effect after 1 day		Residual effect after (no./leaf)					
			no./leaf	%R	3day	5day	7day	Total	Mean	%R
PEG.600.MO	0.25	6.3	2.3	68.85	2.1	2.6	3	7.7	7.7	67.8
PEG.600.DO	0.25	6.1	2.6	64.2	2.6	2.4	3.1	8.1	8.1	65.03
PEG.400.MO	0.25	5.7	2.4	64.08	2.7	3	3.2	8.9	8.9	58.8
PEG.400.DO	0.25	6	2.8	60.19	2.7	2.8	3.3	8.8	8.8	61.37
Pt . Oleate	0.25	6.5	2.5	67.1	2.6	2.4	3.4	8.9	8.9	63.94
PEG.600.MS	0.25	5.5	2.9	55.02	2.4	2.8	4.0	8.0	8.0	38.41
PEG.600.DS	0.25	5.8	2.4	64.7	2.3	2.5	3.1	7.9	7.9	64.13
PEG.400.MS	0.25	6.3	2.9	60.73	2.7	2.9	3	8.6	8.6	64.05
PEG.400.DS	0.25	6.7	2.7	65.6	2.9	2.9	3.4	9.2	9.2	63.8
Pt.Stearate	0.25	6.2	2.5	65.6	2.6	2.7	3.2	8.5	8.5	63.8
control		6.4	7.5		7	7.4	9.4	24.3	8.1	

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تحضيربعض المواد ذات النشاط السطحي وتقديركفائتها الابادية ضد الافات الثاقبة الماصة التى تصيب الفاصوليا

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تم تحضير نوعان من المركبات ذات النشاط السطحي أيونية ، وغير أيونية من مـواد محلية : أحماض دهنية أليفاتية (حمض الاوليك والاستيريك) وكحول البولي ايثلين جليكول ٤٠٠ و ٦٠٠ في حالة المواد ذات النشاط السطحي الغير أيونية و من الأحماض الدهنية و هيدروكسيد البوتاسيوم وأكسيد الكالسيوم لتحضير المواد الأيونية . المواد المحلية المحضرة مواد ذات النشاط سطحي تم إثبات تركيبها الكيميائي عن طريق جهاز الأشعة تحت الحمراء وجهاز طيف الكتلة وتم تقدير الخواص الفيزيائية الكيميائية لهذه المواد المحضرة مثل الذوبان فـى المحاليـل المختلفـة والتوتر السطحى وقيمة ال pH . وقد تم إجراء بعض التجارب لتقييم الكفاءة الابادية لهذة المواد المحضرة محليا ضد الافات الثاقبة الماصة التى تصيب الفاصوليا . وقد دلت النتائج المتحصـل عليها أن لهذة المواد المحضرة محليا لها تأثير ابتدائى ومتبقى عالى ضد الطور الغير ناضج للذبابة البيضاء والطور الناضج للعنكبوت الاحمر .