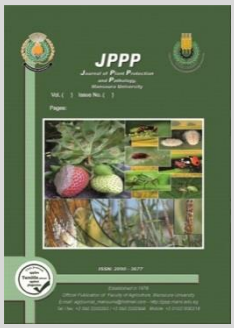
Journal of Plant Protection and Pathology

Journal homepage: www.jppp.mans.edu.eg
Available online at: www.jppp.journals.ekb.eg

Evaluation of Some Fruits Extracts and Oils to Attracted Peach Fruit Fly, *Bactrocera zonata* (Saunders) By Simple Olfactometer Design Under Laboratory Conditions

Basant S. M. El-Banna and Mahenaz A. A. Gab Alla*

Fruit Fly Res. Section, Plant Prot. Res. Inst., Agric. Res. Center, Dokki, Giza, Misr



ABSTRACT

Peach fruit fly (PFF), *Bactrocera zonata* (Saunders), is a polyphagous insect pest that damages plant species including various fruits and vegetables, which range widely from tropical to temperate zones that causes large losses to orchards. Six fruit extracts (guava, mango, banana, melon, orange and Apricot)5, 10, 25% and five oils(Anise**,** Clove**,** Cinnamon, Camphor**,** and flaxseed) 5, 10, 25% concentrations contained natural odour plant materials were evaluated against the adults of Peach fruit flies using simple olfactometer under laboratory condition. Guava and mango was highest to attracted adult of *B. zonata*at 5% and 10% concentration while, banana best at 25% concentration (21.41%). But cloves at 5 % concentration were higher attracted to the adult(17.03%)whilst the anise was higher attraction to adults at 10, 25% concentrations was (18.52%) , (6.47%) respectively .The attractibility adults in the 5th day were high. No adult attracted to camphor and flaxseed oils. Although, Mixed Fas Tac 5% EC 4ml/L water with Guava 10% and Banana 25 % increase General Mean % mortality but decrease General Mean% attracted adult of *B. zonata*.

Keywords: Fruits Extracts, Oils, Peach Fruit Fly, *Bactrocera zonata*, Olfactometer Design.

INTRODUCTION

The damage caused Peach fruit fly result first from oviposition in fruits followed by larvae feeding and to decomposition of plant tissue by invading secondary micro-organisms. Young fruits become misrepresent and usually drop. The larval tunnels provide entry points for bacteria and fungi that cause the fruit to rot Weems,(1981).

It attacks a wide host range of fruit and vegetables hosts; such as mango peach, fig, guava, citrus, apple and tomato Kapoor and Agarwall (1982).Peach fruit fly (PFF), *B. zonata*, is one of the most sever epolyphagous insect pests by Fletcher (1987).

Dacine fruit flies from the family Tephritidae are a different group of more than700 known species whose larvae infest many types of fleshy fruits found in tropical and subtropical regions (Metcalf, 1990).

The Peach fruit fly caused economic loss by damaging fruit and by interfering international horticultural trade (Shehata *et al.*, 2008).

However, in recent years, researchers have searched for new and less toxic control methods due to their plant extracts and mineral products have been considered low toxicity and low environmental impact Hanafy and El-Sayed,(2013).To control of fruit flies has been tried various ways such as mechanical, cultural, biological and chemical(Nadeem *et al.*, 2014).

The aim of this work was to determine the preference adult of *B. zonata* to different fruits extract and tested some oils used Simple olfactometer design under laboratory conditions.

MATERIALS AND METHODS

Fifty pairs of adult *B. zonata* male and female 5 days old were placed in plastic container(23cm x 18cm x 9cm) with adult media Hydrolyzed Protein and granulated sugar (1: 3).This container containing six arms connected with six transparent cylindrical plastic containers (Hanafy, 2000).The tested attractants were placed in six cylindrical plastic containers was:

1- Six fruits extracts 5**,** 10**,** 25% (guava, mango, banana, melon, orange and Apricot) compared with control (nothing).

2- Five natural odour plant materials oils 5**,** 10**,** 25% (Anise**,** Clove**,** Cinnamon, Camphor**,** and flaxseed) compared with odorless in cylindrical plastic.

Fruit extraction:

The fruit (guava, mango, banana, melon, orange and Apricot) were grinded into fine powder using a grinding mill. The extraction of the investigated fruits was carried out according to the method of (Mbatchou *et al.*, 2011). Powder of each of fruits (200g) were soaked in (700 ml) of ethanol 98% for two weeks with intermittent shaking. The extracts were separately evaporated to dryness at room temperature to obtain the crude extracts (ethanol extracts). This procedure was repeated 10 times. The resulting crude extracts were stored in glass vials pack closed at (2-4˚C) until used for bioassay assessment experiments.

Percentage of attracted flies to each transparent jar was accumulation counted and calculated Percentage of attracted flies for 5 days respectively. This design repeated three times results recorded after 24 hours until five days.

* **Corresponding author.**
E-mail address: laura.foudah64@aol.com
DOI: 10.21608/jppp.2021.188625

Mixed Fas Tac 5% EC 4ml/L water with fruit extracts (Mango 5%, Guava10% and Banana25%) and calculated percentage attracted and percentage Mortalities accumulation for 7 days respectively. The data were statistically analyzed according to split plot design recommended by Steel and Torrie (1980). To compare between Mean Percentage of attracted adult of Peach fruit fly *B. zonata*to extracts (Mango 5%, Banana 25% and Guava 10%) in presence insecticide or absent after 5 days respectively from treatment employment T- test.

RESULTS AND DISCUSSION

1-fruit extract material:

Results in Table (1) revealed that general mean percentage of attracted flies at 5% concentration to the guava extract was highest to attracted adult of *B. zonata* (34.56%)followed mango(34.01%),banana(10.43%), melon(3.07%), orange(2.64%), apricot (2.23%) and control(1.8%)respectively. The highest General Mean percentage to attracted adultat5th was (19.2%) and 4thwas (17.52%) days. The statistical analyses define significant among General Mean Percentage of Fruit extractions in 5 days.

Table 1. Attraction of Peach fruit fly *B. zonata* to different fruit extracts at 5% conc. for 5 days respectively under laboratory conditions.

Extracts	attracted adults %					General Mean% ± SD
	1day	2days	3days	4days	5days	
Guava	15.87	23.28	35.98	44.76	52.91	34.56±15.2^{a}
Mango	5.65	28.39	37.57	49.21	49.21	34.01±18.1^{b}
Banana	2.12	6.58	11.11	14.87	17.46	10.43±6.2^{c}
Melon	1.05	2.12	3.18	4.24	4.76	3.07±1.5^{d}
Orange	0.53	1.59	3.15	3.71	4.23	2.64±1.5^{e}
Apricot	0.0	2.12	2.65	3.18	3.18	2.23±1.3^{f}
Control	0.53	1.06	2.11	2.65	2.65	1.8±1.0^{g}
Mean	3.67±5.7^{E}	9.30±11.5^{D}	13.68±16.1^{C}	17.52±20.6^{B}	19.2±22.4^{A}	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

Furthermore, Table (2) showed that, the guava (47.19%) was best to attracted adult at 10% concentration of fruit extracts followed mango (28.99%), banana (14.80%), apricot (9.01%),melon (5.03%),control (1.8%)and orange (0.64%).The lowest day to attracted Peach fruit fly was1st and 2nddays.The statistical analyses define the better attracts in the 5thand4th days were 23.96 and 22.82 respectively.The statistical analyses define Significant between extract guava and extracts mango, banana, apricot, melon, orange and control in 5 days.

Meanwhile, the general mean percentage of adult of Peach fruit fly to extract Banana (21.41%) was higher than Guava (17.37%) and Mango (13.76%) followed by Apricot (9.87%) and Melon (0.64%).No adults attract to Orange (0.0%). The highest adult attracted in the5thday was (13.54%) while the lowest in the first day was (2.61%) whoever in Table (3) fruit extracts at 25% concentration.

In general, Guava is the best at 5% and 10% concentrations while banana was the highest attracted in (25%) concentration. The 5th was the best in attracted the adult peach fruit flies in the three concentrations 5%, 10% and 25%.

Table 2. Attraction of Peach fruit fly *B. zonata* to different fruit extracts at 10% conc. for 5 days under laboratory conditions

Extracts	attracted adults %					General Mean%± SD
	1day	2days	3days	4days	5days	
Guava	16.39	32.8	49.73	68.25	68.78	47.19±22.7^{a}
Mango	3.71	20.63	31.22	44.45	44.97	28.99±17.4^{b}
Banana	4.23	9.52	15.87	22.16	22.22	14.80±8.0^{c}
Melon	0.53	3.18	4.51	6.35	10.58	5.03±3.8^{e}
Orange	0.0	0.0	1.06	1.06	1.06	0.64±0.6^{f}
Apricot	2.65	7.94	2.17	14.81	17.46	9.01±7.0^{d}
Control	0.53	1.06	2.11	2.65	2.65	1.8±1.0^{f}

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

Table 3. Attraction of Peach fruit fly *B. zonata* to different fruit extracts at 25% conc. for 5 days respectively under laboratory conditions.

Extracts	attracted adults %					General Mean%± SD
	1day	2days	3days	4days	5days	
Guava	5.82	12.18	18.52	23.87	26.45	17.37±8.5^{b}
Mango	0.0	8.99	15.35	21.17	23.28	13.76±9.5^{c}
Banana	8.71	19.04	23.28	27.45	28.57	21.41±8.03^{a}
Melon	0.0	0.0	1.06	1.06	1.06	0.64±0.6^{f}
Orange	0.0	0.0	0.0	0.0	0.0	0.0^{f}
Apricot	3.18	9.52	11.64	12.25	12.77	9.87±3.9^{d}
Control	0.53	1.06	2.11	2.65	2.65	1.80±1.0^{e}
Mean	2.61±3.5^{E}	7.26±7.2^{D}	10.28±9.3^{C}	12.64±1.6^{B}	13.54±12.5^{A}	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

Adult flies, particularly females, extensively forage for proteinaceous food sources (Christenson and Foote 1960) In nature the surface wax of several fruits reflects UV light (Willson and Whelan, 1989), which may explain the attraction of tephritids to host fruits (Drew *et al.* 2003).

These results agree with Cunningham *et al.* (2016) they found acombination of only three short chain aliphatic

esters derived from guava that was attractive to the Queens land fruit fly, *Bactrocera tryoni*. Although, Shelly and Villalobos (2004) showed that *C. capitata* males given access to particular sections of branches of the common guava (*Psidium guajava* L.), whose bark contained relatively high amounts of the compound α-copaene, obtained more mattings than males denied access to these sites. In addition, this result agrees with Bharathi *et al.*, (2004) they indicated that banana and grapes are as suitable attractants especially when mixed with beer. Although, Banana was found to be as attractive, probably because its higher sugar content (Bose and Mitra, 1990).

2- Oils extract materials:

The results of the attractability of five oils(contained natural odur plant materials)to three concentrations 5%**,** 10 and 25%against *B. zonata* adults.

Data presented in Table (4) indicated that, to the results of used (5%) concentration that the cloves oil (17.03%) was the best to attracted adults followed by Anise oil (9.73%) and cinnamon oil (9.38%). The five day was the higher in attract (9.96%).The statistical analyses define no Significant between Anise and Cinnamon oil, and no significant between 5thand 4th day to attracted adult.

Table 4. Attraction of Peach fruit fly *B. zonata* to different oils at 5% conc. for 5 days respectively under laboratory conditions.

Oils	attracted adults %					General Mean%± SD
	1day	2days	3days	4days	5days	
Anise	3.17	7.41	9.52	13.23	15.34	9.73±4.8^{b}
Cloves	4.76	12.17	18.51	23.81	25.92	17.03±8.7^{a}
Cinnamon	0 ±0	6.35	10.58	14.12	15.86	9.38±6.4^{b}
Camphor	0 ±0	0 ±0	0 ±0	0 ±0	0 ±0	0.0^{c}
flaxseed	0 ±0	0 ±0	0 ±0	0 ±0	0 ±0	0.0^{c}
Control	0.53	1.06	2.11	2.65	2.65	1.80±1.0^{c}
Mean	1.41±2.1^{D}	4.49±5.0^{C}	6.79±7.4^{B}	8.97±9.7^{A}	9.96±10.7^{A}	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

However, the results in Table (5and 6) revealed that, at 10 and 25%concentrations the Anise oil was (18.52%) and (6.47%) respectively, higher attraction to adults. No adult attracted to camphor and flaxseed at 5, 10 and 25 %concentrations. Higher attraction at 4th and 5th day at10% and 25% concentrations. Generally, the fruit extracts attracted flies best than natural odour plant materials oils.

Table 5. Attraction of Peach fruit fly *B. zonata* to different oils at 10% conc. for 5 days respectively under laboratory conditions.

oils	attracted adults %					General Mean%± SD
	1day	2days	3days	4days	5days	
Anise	5.82	14.28	23.28	24.35	24.88	18.52±8.3^{a}
Cloves	2.14	5.82	8.99	13.22	15.87	9.21±5.5^{b}
Cinnamon	1.06	2.12	6.86	7.94	8.99	5.39±3.6^{c}
Camphor	0 ±0	0 ±0	0 ±0	0 ±0	0.0	0.0^{d}
flaxseed	0 ±0	0 ±0	0 ±0	0 ±0	0.0	0.0^{d}
Control	0.53	1.06	2.11	2.65	2.65	1.80±1.0^{d}
Mean	1.59±2.2^{D}	3.88±5.5^{C}	6.87±8.8^{B}	8.03±9.5^{A}	8.73±10.0^{A}	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

Table 6. Attraction of Peach fruit fly *B. zonata* to different oils at 25% conc. for 5 days respectively under laboratory conditions.

oils	attracted adults%					General Mean%± SD
	1day	2days	3days	4days	5days	
Anise	0.0	6.35	7.74	8.47	9.78	6.47±3.8^{a}
Cloves	1.06	4.23	6.94	7.46	7.46	5.43±2.8^{a}
Cinnamon	0.0	0.53	1.06	3.17	3.70	1.69±1.6^{b}
Camphor	0.0	0.0	0.0	0.0	0.0	0.0^{b}
flaxseed	0.0	0.0	0.0	0.0	0.0	0.0^{b}
Control	0.53	1.06	2.11	2.65	2.65	1.8±1.0^{b}
Mean	0.27±0.4^{D}	2.03±2.6^{C}	2.98±3.5^{B}	3.63±3.6^{AB}	3.93±4.0^{A}	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

This result approximate with Papachristos *et al.* (2009) they reported that, the positive relationship between dose-exposure and mortality effects of citrus essential peel oils on medfly neonate larvae. Whilst, Robacker and Rios (2005) they recorded that grapefruit oil attracted males and females of the Mexican fruit fly in equal proportions.

Tables (7 and 8) showed that, mixed Fas Tac 5% EC 4ml/L water with fruit extracts (Mango 5%, Guava10% and Banana25%)and recorded General Mean percentage of attracted % and Mortalities% after first day until 7thday to attract and kill adult of *B. zonata*. In Table (7) explain attracted % adults Mango 5%highest attract (18.43%) following guava10% (13.38%) and banana25% was (10.10%).No significant between Mango 5%and guava 10%. Also no significant between guava 10% and banana 25 %.No adults attracted to fruit extracts in 7th day. Table (8) illustrate Mortalities% after mixing fruit extracts (Mango 5%, Guava10% and Banana25%) with Fas Tac 5% EC 4ml/Lwater where the mix Mango 5% with insecticide was better in general mean percent (16.1%). No mortality % in first day. The 6th day was pest mortality % and no significant between 5th and 7th day.

Table 7. Percentage of Peach fruit fly *B. zonata* attracted to extracts (Mango 5%, Banana 25% and Guava 10%) + Fas Tac 5% EC 4ml/L water.

Extracts +Fas Tac	Attracted Adult%							General
5% EC	1 day	2days	3 days	4days	5 days	6 days	7 days	Mean%± SD
Mango 5%	3.33	10.67	19.33	27.67	32.33	35.67	0.0	18.43±14.2[a]
Guava 10%	1.67	7.0	11.67	17.67	25.33	30.33	0.0	13.38±11.61[ab]
Banana 25%	2.67	6.67	9.33	14.33	18.0	19.67	0.0	10.10±7.5[b]
Control	0.0	2.67	5.33	7.0	6.33	6.0	0.0	3.90±2.9[c]
General Mean%	1.92±1.4[F]	6.75±3.3[E]	11.42±5.9[D]	16.67±8.6[C]	20.50±11.1[B]	22.92±13.1[A]	0.0[F]	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability

Table 8. Percentage of Peach fruit fly *B. zonata* dead exposure to extracts (Mango 5%, Banana 25% and Guava 10%) + Fas Tac 5% EC 4ml/L water.

Extracts + Fas Tac	Mortality Adult%							General
5% EC	1 day	2days	3 days	4days	5 days	6 days	7 days	Mean%± SD
Mango 5%	0.0	3.7	8.0	15.0	24.7	29.3	32.0	16.1±12.7[a]
Guava 10%	0.0	1.3	4.0	7.3	12.7	17.7	23.33	9.48±8.76[bc]
Banana 25%	0.0	1.7	5.3	9.7	14.3	17.0	0.0	6.86±6.9[cd]
Control	0.0	0.0	1.7	3.7	5.0	6.3	0.0	2.39±2.63[d]
General Mean%	0.0[F]	1.68±1.5[E]	4.75±2.6[D]	8.93±4.7[C]	14.18±8.1[B]	17.58±9.4[A]	13.83±16.4[B]	-

Mean followed by the same letter in column and row are not significantly different according to L.S.D. test at 0.05 level of probability.

Results obtained in Table (9) clearled that, the study effect use fruit extracts (Mango 5%, Guava10% and Banana25%) with Without and Presence pesticide Fas Tac 5% EC 4ml/L water to attract adult of *B. zonata* the statistical analyses by T-test distinct different significant between Without and Presence pesticide (Fas Tac 5% EC 4ml/L water) in Guava10% and Banana25% and no significant between Without and Presence pesticide in Mango 5%.

Table 9. comparative between General Mean% attracted of adult Peach fruit fly *B. zonata* to different fruit extracts after 5 days respectively,Without and Presence pesticide(Fas Tac 5% EC 4ml/L water)under laboratory conditions.

Extracts	General Mean%± SD attracted adults after 5 days	
	Without pesticide	Presence pesticide
Mango 5%	34.01±18.1[a]	18.67±11.9[a]
Guava 10%	47.19±22.7[a]	12.67±9.2[b]
Banana 25%	21.41±8.03[a]	10.2±6.1[b]

Mean followed by the same letter in row are not significantly different according to T- test at 0.05 level of probability.

This result agrees with Maklakov *et al.*, (2001) they studied the effect of organophosphate and pyrethroid compounds on the adult *D. ciliates* by using surface contact and oral administration found pyrethroids showed rapid, massive knockdown effect, satisfactory killing ability. Moreover, Bateman and Morton (1981) mentioned that mix ammonia with insecticide attractant the adult to ammonia emitting protein source that attracts the flies to the insecticide.

In this study clearer use mix fruit extracts with pesticide (Fas Tac 5% EC 4ml/L water) increase Mortalities % however decrease% attracted adult of *B. zonata.*

REFERENCES

Bateman, M. A. and T. C. Morton (1981).The importance of ammonia in proteinaceous attractants for fruit flies (family: Tephritidae). Aust. J. Agric. Res. 32: 885-903.

Bharathi, T. E, V.K.R. Sathiyanandam and P.M.M. David (2004). Attractiveness of some food baits to themelon fruit fly, Bactrocera cucurbitae (Coquillett) (Diptera: Tephritidae). Journal of Tropical Insect Science .24(2): 125–134.

Bose, T. K and S. K.Mitra (1990) Fruits: Tropical and Subtropical NayaPrakash, Calcutta, India. 838 pp.

Christenson, L.D. and R.H. Foote (1960).Biology of fruit flies. Ann. Rev. Entomol. 5: 171–192.

Cunningham, J.P., Carlsson, M.A., Villa, T.F., Dekker, T. & Clarke, A.R. (2016). Do fruit ripening volatiles enable resource specialism in polyphagous fruit flies? Journal of Chemical Ecology, 42: 931– 940.

Drew R. A. I.; R. J. Prokopyand M. C. Romig(2003). Attraction of fruitflies of the genus *Bactrocera*to colored mimics of host fruit. Entomologia Experimentalis et Applicata 107: 39–45.

Fletcher, B.S. (1987). The biology of Dacine fruit flies. Ann. Rev. Entomol., 32: 115-144.

Hanafy, A. H. A. (2000). Laboratory evaluation of some local food attractants and natural odour Mediterranean fruit fly, *Ceratituscapitata*(Wied.). Ann. Agric. Sci., 38(4):2517-2527.

Hanafy, H. E.M. and W. El- Sayed(2013).Control of the fruit fly, *Ceratitiscapitata* (Wiedemann) and the peach fly, *Bacterocerazonata* (Saunders) (Diptera: Tephritidae) on peach and grape fruits. J. Appl. Sci. Res., 9(1): 952-959.

Kapoor, V.C. and M.L. Agarwal (1982). Fruit flies and their increasing host plants in India. Proc. CEC/IOBC Intern. Symp. Athens/Greece, 16-19: 252-257.

Maklakov, A., I.Ishaaya, A.Freidberg, A.Yawetz,A. R. Horowitz, and I.Yarom(2001)Toxicological Studies of Organophosphate and Pyrethroid Insecticides for Controlling the Fruit Fly *Dacusciliatus*(Diptera: Tephritidae).J. Econ. Entomol. 94(5): 1059-1066.

Mbatchou, V.C., A. J. Ayebila and O.B. Apea (2011). Antibacterial activity of phytochemicals from *Acacia nilotica*, *Entadaafricana* and *Mimosa pigra* L. on Salmonella typhi. Journal of Animal & Plant Sciences, 10(1): 1248-1258.

Metcalf, R. L. (1990). Chemical ecology of dacine fruit flies (Diptera: Tephritidae). Ann. Entomol. Soc. Am.83:1017-1030.

Nadeem, M. K., S. Ahmed, S. Nadeem, M. Ishfaq and M. Fiaz (2014)Assessment of insecticides resistance in field population of*Bactrocerazonata*(Saunders) (Diptera: Tephritidae).J. Anim. Plant Sci., 24(1):172-178.

Papachristos, D.P., A.C. Kimbaris, N.T. Papadopoulos and M.G.Polissiou (2009) Toxicity of citrus essential oils against *Ceratitiscapitata*(Diptera: Tephritidae) larvae. Annals of Applied Biology,155: 381–389.

Robacker, D.C. and C. Rios (2005). Grapefruit oil enhances attraction of Mexican fruit flies to a synthetic food-odor lure. J. Chem. Ecol. 31:1039–1049.

Shehata, N. F., M. W. F. Younesand Y. A. Mahmoud (2008). Biological studies on the peach fruit fly, *Bactrocerazonata*(Saunders) in Egypt. Journal of Applied Science and Research, 4: 1103–1106.

Shelly, T.E. andE.M. Villalobos (2004). Host plant influence on the mating success of male Mediterraneanfruit flies: variable effects within and between individual plants. Anim. Behav. 68: 417–426.

Steel; R.G.D. andJ.H. Torrie (1980).Principles and procedures of statistics .Auckland Hill Book Co., Inc., London .N.Y.

Weems, H.V.J. (1981). Mediterranean fruit fly, *Ceratitiscapitata*(Wiedemann) (Diptera: Tephritidae).Entomology Circular No 230. Florida Department of Agriculture & Consumer Services. Division of Plant Industry, Florida, USA.,pp: 12.

Willson, M. F. and C. J. Whelan (1989). Ultraviolet reflectance of fruitsof vertebrate-dispersed plants. Oikos 55: 341–348.

تقيم بعض مستخلصات الفاكهة و الزيوت لجذب ذبابة ثمار الخوخ بواسطة التصميم البسيط لجهاز قياس الرائحة تحت الظروف المعملية

بسنت صبرى محمد البنا و ماهيناز عبد العزيز احمد جاب الله

قسم بحوث ذبابة الغاكهة - معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - الجيزه - مصر

ذبابة ثمار الخوخ متعددة العوائل تسبب اضرار لمدى واسع من الفاكهة والخضروات فى المناطق الاستوائية وحتى المعتدلة. ستة من مستخلصات الفاكهة (جوافة – مانجو – موز – شمام – برتقال – مشمش) وخمس زيوت نباتية (ينسون – قرنفل – قرفة – كافور – زيت بذرة الكتان) بتركيز 25،10،5 % قيمت تجاه الحشرة الكاملة للذبابة بإستخدام التصميم البسيط لجهاز قياس الرائحة تحت الظروف المعملية. وقد أظهرت النتائج أن الجوافة والمانجو كانت أعلى جذب للحشرة الكاملة للذبابة عند تركيز 10،5% ، بينما الموز كان أفضل جذب 21,41% عند تركيز 25% ، لكن زيت القرنفل كان أفضل جذب 17,03% عند تركيز 5% ، بينما زيت الينسون أفضل لجذب الحشرة الكاملة عند تركيز 25،10% كان على التوالى 52, 18، 6,47%. وكان أعلى جذب للحشرة الكاملة فى اليوم الخامس من المعاملة لمستخلصات الفاكهة والزيوت. ولم يكن هناك جذب للحشرة الكاملة لزيت الكافور وزيت بذرة الكتان . وعلى الرغم من خلط المبيد Fas Tac 5% EC مع مستخلص الجوافة 10% ومستخلص الموز 25% زود المتوسط العام لنسبة الموت للحشرات المنجذبة لكن قلل المتوسط العام لنسبة الجذب للحشرة الكاملة.