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PRELIMINARY SCREENING TESTS OF ANTIFERTILITY COMPOUNDS INHIBITING THE REPRODUCTION IN HOUSEFLY, MUSCA DOMESTICA (L.)

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Sterilization of male can in certain circumstances be more efficent than killing as a method for control of insects. A number of chemicals (chemosterilants) show promise of producing sexual sterility in insects without some of the practical limitations of radiation. The present publication encompasses the result of screening of 42 compounds produced by of PCSIR Laboratories The results obtainedi ndicate that three compounds affected the reproductive potential of housefly appreciable. They are β-dimethylaminopriophenone hydrochloride, 3,4,5-trimethyl benzamide and acid from iodopalilantin.

The preliminary studies reported herein were initiated to find out a few effective compounds for inhibiting the reproduction of housefly, *Musca domestica* (L.) The results obtained indicate that out of a group of 42 compounds, three compounds are very effective while 12 are moderately effective.

In each test 20 pairs of newly emerged adult houseflies were released in wirescreen cages fitted with narrow-mouth test tubes, containing water to increase humidity in the range of 60–75% R.H. The temperature ranged between 80–85°F. The compounds were given orally at the dose of 50–100 mg/g food (glucose) for 3 days. After 3 days, the flies were examined to determine mortality caused by the chemicals. The dose was decreased in case of high mortality. The flies were fed on untreated food consisting of dry milk to provide sufficient proteins essential for egg development. Beside milk protein 6% sugar solution soaked in cotton was also supplied. The cotton pieces soaked in milk also served as oviposition medium. This medium was made available to 3-day old treated flies to lay eggs and replaced daily for 21 days. The eggs laid per cage were collected on moist filter papers for observing percentage hatch and the time required for hatching of the affected eggs. The oviposition was noted for a period of 3 weeks, which was considered to be the life span of the treated flies. Cages containing untreated food were used as check. In experiments herein reported, the treatment was replicated three times. These methods are with certain modifications over the technique described by Fye *et al.*[1] and Fye.[2] Since both the sexes were given antifertility compounds, the results did not demonstrate whether sterility, if it occurred, had been induced in males, females or both. The percent control of reproduction potential was calculated by applying the following formula:[3] control of reproduction $= 100(V_1 - V_2)/V_1$ in which V_1 is the number of viable eggs per female in a control and V_2 is the number of viable eggs per female in test treatment.

The results obtained with 42 compounds at the dose of 25–100 mg/g food are summarized in Table 1. The most effective compounds are β-dimethylaminopriophenone hydrochloride, 3, 4, 5-trimethyl benzamide, which produced 85% control of reproduction at the dose of 50 mg/g and 100 mg/g, food respectively. Acid from Iodopalilantin controlled 86% reproduction at 100 mg/g food. Twelve compounds proved moderately effective producing 70–79% inhibition of reproduction (Table 1). Compounds inhibiting reproduction below 70% are considered ineffective.

Table 2 presents the prevention of oviposition due to antifertility effect of the compounds. The compounds 3,6-dichloro-4-methylpyridazine at the

Table 1.—Effect of 42 Compounds on the Fertility of Houseflies Fed for 3 Days after Emergence.

Compounds	Concn. mg/g food (glucose)	Average No. of eggs laid ♀	No. of viable eggs ♀	% control of reproduction
Amudol [5]	100 mg/g	95	71	50
N-skatyl-2-methylbenzimidazole [6]	,,	89	76	47
N-skatylbenzimidazole [6]	,,	56	45	61
Benzimidazole [6]	,,	95	71	51
p-Nitrophenyl-β-dimethylaminopropionic acid	,,	87	43	70
β-Dimethylaminopropiophenone hydrochloride	50 mg/g	41	14	85

(*Continued*)

(*Table 1 continued*)

Compound	Concn. mg/g food (glucose)	Average No. of eggs laid ♀	No. of viable eggs ♀	% control of reproduction
Phenyl-β-dimethylaminoethyl ketone[7] and its hydrochloride	100	41	31	78
3, 6-Dichloro-4-methylpyridazine	100	35	21	75
1, 1′-Azocyanocyclohexane	50	36	19	79
1, 1′-Azobiscyclohexylnitrile		42	37	74
3-Diethylaminomethyl indole[8]	100	48	46	67
2,4,6-Tri-(3-hydroxyphenyl)-1,3,5-trithian[9]		87	69	57
2,4,6-Tri-(4-methoxyphenyl)-1,3,5-trithian[9]		37	26	73
3-Indolepropionic acid[8]		35	22	77
2,4,6-Tri-(2,3-dimethoxyphenyl)-1,3,5-trithian[9]		35	29	70
N-stearylethanolamine		61	46	33
Hexanecarboxylicacidamide		36	31	64
3,4,5-Trimethylbenzamide		18	13	85
Valeramide		24	22	74
Malonamide		51	44	49
2,4,6,8 9,10-Hexa-(4-nitrophenyl)-hexamine[10]	25	56	49	59
2,4,6,8,9,10-Hexaphenyl hexamine[10]	100	43	36	65
2,4,6,8,9,10-Hexa-(3-nitrophenyl)-hexamine[10]	50	73	61	29
Hydro-*o*-chlorobenzamide[10]	100	32	27	75
3-Indolepropylamine[8]		21	20	79
Napthyldiindole-3-methane		48	34	66
Acid from iodopalilantin		20	14	86
Palmitamide		58	48	55
Palmitanilide		53	45	60
α-Pentadecyladipic acid		68	66	30
Hydrobhilawanol		84	58	44
Curvin[12]		89	43	55
Curvulin[13]		52	42	60
Curvulol[13]		95	72	24
Guanidine sulphate		64	53	38
Guanidine thiocyanate	25	82	72	16
Chaksine dihydrophosphate[14]	50	70	50	58
Chaksine nitrate[14,15]		78	54	55
Nitrochaksine sulphate[14,15]	100	39	31	70
Nitrourea chaksine[15]		38	34	66
Isoeuphrol	50	92	76	11
Euphrol	100	51	43	59

TABLE 2.—COMPOUNDS THAT PREVENTED OVIPOSITION OF HOUSEFLIES IN TREATED FEMALES MATED WITH TREATED MALES.

Compound	Concn. mg/g food	Prevention of oviposition in days (average)
3, 6-Dichloro-4-methylpyridazine	100	15
β-Dimethylaminopropiophenone hydrochloride	50	13
1, 1′-Azocyanocyclohexane		12
3-Diethylaminomethyl indole[8]	100	11
2,4,6-Tri-(4-methoxyphenyl)-1,3,5-trithian		10
2,4,6-Tri-(3-hydroxyphenyl)-1,3,5-trithian[9]		10
3-Indolepropionic acid[8]		10
2,4,6-Tri-(2,3 dimethoxyphenyl) 1,3,5-trithian[9]		10
1, 1′-Azobisocyclohexylnitrile	50	9
3,4,5-Trimethylbenzamide	100	9
Valeramide		9
Control		5

dose of 100 mg/g food inhibited the oviposition for 15 days. Ten compounds prevented oviposition for at least 9 days. Flies treated with these compounds oviposited fertile eggs after the inhibitory period. It should be noted that oviposition began at the end of 3 days in control with an average of 5 days. Piquett and Keller[4] have reported the prevention of oviposition for 8 days when house fly pupae were treated at 100 mg/ml solution. They reported the maximum prevention for 21 days in case of colchicine at the dose of 50 mg/ml concentration.

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