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Samina Arif
Department of Zoology, Federal Urdu University of Arts, Science & Technology, Gulshan – E – Iqbal Campus, Karachi- 75300- Pakistan

Syed Naim Ul Hassan Naqvi
Baqai Medical University Karachi 51, Toll Plaza Super Highway, Gadap Road, P.O. Box: 2407, Karachi – 74600, Pakistan

Abid Raza
Department of Environmental Science, Federal Urdu University of Arts, Science& Technology, Karachi, 75300- Pakistan

Sadaf Tabassum
Department of Zoology, Federal Urdu University of Arts, Science & Technology, Gulshan – E – Iqbal Campus, Karachi- 75300- Pakistan

Nadia Fatima
Department of Zoology, Federal Urdu University of Arts, Science & Technology, Gulshan – E – Iqbal Campus, Karachi- 75300- Pakistan

Correspondence:
Abid Raza
Department of Environmental Science, Federal Urdu University of Arts, Science& Technology, Karachi, 75300- Pakistan

Fecundity effect of Biosal against *Callosobruchus analis* (Fabricius, 1781)

Samina Arif, Syed Naim Ul Hassan Naqvi, Abid Raza, Sadaf Tabassum, Nadia Fatima

Abstract
Toxicity of Biosal essential oil against *Callosobruchus analis* by three methods Direct Application Method (DAM), Glass Film Method (GFM) and Filter paper Impregnation Method (FIM) after 24 hours of treatment. The LC_{50} value calculated as 1.338504 µl/cm^2 by DAM, 12.174 µl/cm^2 by GFM and 6.945603 µl/cm^2 by FIM. Fecundity was observed after 15 days of treatment of Biosal against *Callosobruchus analis* number of emergence by three different methods was noted, In direct application method it was 72% and 67.74%, In glass film method it was 83.33% and 76.69%, In filter paper impregnation method 88.8% and 79.16% respectively in treated and control insect, while after 30 days of treatment of Biosal against *Callosobruchus analis* by direct application method average number of emergence observed in control and treated insects was 85.29% and 69.56% respectively, In glass film method emergence was observed in control and treated insects as 94.94% and 88.85% respectively, in filter paper impregnation method average number of emergence was observed in control and treated was 97.15% and 91.72% respectively.

Keywords: Fecundity, Biosal, *Callosobruchus analis.*

1. Introduction
[1]Worked on evaluation of some plant extract as protectants against the pulse beetle *Csallosobruchus maculates* (F.) infesting. Jilani G *et al.* [2] Studies on insecticidal activity of some indigenous plant materials against pulse weevil *Callosobruchus analis* F. (Coleoptera: Bruchidae). Oredland PF *et al.* [3] reported the structure of bruchid eggs may explain the ovicidal effect of the oils. Chirajee C *et al.* [4] reported the effect of indigenous plant materials on the fecundity adult emergence and development of pulse beetles *Callosobruchus chinensis* (L.) In black gram. Lale NSE *et al.* [5] worked on evaluation of neem (*Azadirachta indica* A. Juss) Seed oil obtained by different methods and neem powder for management of *Callosobruchus analis* (F.) (Coleoptera: Bruchidae) stored cowpea. Biswas KL *et al.* [6] reported the biological activities and Medicinal properties of Neem (*Azairachta indica*). Ahmed KS *et al.* [7] reported the duration of developmental stages *Callosobruchus analis* L., (Coleoptera: Bruchidae) on Azuki been and their effect of neeem and sesame oils at different stages of their development. [8] worked on assessment of the toxic potentials of some plant powders on survival and development of *Callosobruchus maculates*. Boek SJE *et al.* [9] reported toxicity and repellence of African Plant Traditionally used the protection of stored cowpea against *Callosobruchus maculates*. The present study work on the fecundity effect of phytopesticides *Acorus calamus*, Biosal as compared to pyrethroid deltamethrin. The phytopesticides are easily available in Pakistan and other part of the world, these pesticides stored in along time at room temperature. Synthetic and commercial pesticides are hazardous not only beneficial insects, but also for the environment and especially for human. Therefore present study is a search of phytopesticides.

2. Material and Methods
2.1 Fecundity
The fecundity of *Callosobruchus analis* were studied at 30 1.0 °C on mung grains (*Vigna radiata*). Fifty gm of seeds were taken in six dishes. Then selected volume of pesticides was applied on the dishes by three different method Filter paper Impregnation method, Glass Film

Method and Direct Application Method at LC_{50} dose. Ten pairs of freshly emerged *C. analis* were released for egg laying and hatching. Each experiment was replicated five times after 15 days percent adult died. The total numbers of eggs laid were counted and the insects allowed to develop. Emergences from egg were noted. Reading were noted daily and the calculation of mean developmental period of *C. analis* were calculated.

2.2 Formula Used

$$\text{Percentage} = \frac{\text{No. of adults}}{\text{No. of eggs}} \times 100$$

For inhibition of eggs and emergence following formula was used:

$$= \frac{\text{Control} - \text{Treated}}{\text{Control}} \times 100$$

3. Results

Table 1: Fecundity effect of Biosal against *C. analis* after 15 days of terament at LC_{50} dose

S.No	Method	Treatment	Average no. of eggs	Average no. of adults	Average no. of emergence	Inhibition in egg laying	Inhibition in emergence
1	DAM	Control	100	72	72%	00	00
		Treated	62	42	67.74%	38%	41.66%
2	GFM	Control	180	150	83.33%	00	00
		Treated	103	79	76.69%	42.77%	47.33%
3	FIM	Control	250	222	88.8%	00	00
		Treated	120	95	79.16%	52.00%	57.20%

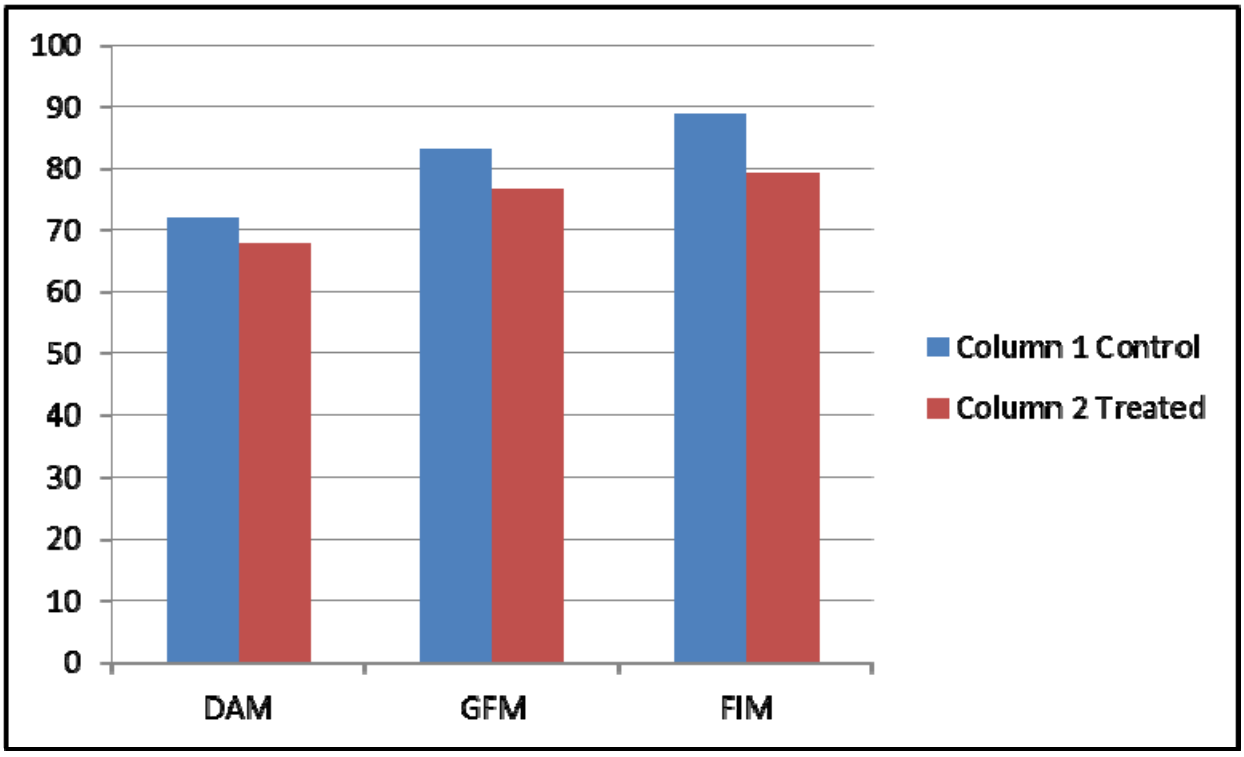

Fig 1: Histogram showing the average number of emergence control and treated *C. analis* after 15 days of treatment of Biosal (Neem Formulation) by three different methods DAM, GFM, FIM.

Table 2: Fecundity effect of Biosal against *C. analis* after 30 days of treament at LC_{50} dose

S. No	Method	Treatment	Average no. of eggs	Average no. of adults	Average no. of emergence	Inhibition in egg laying	Inhibition in emergence
1	DAM	Control	170	145	85.29%	00	00
		Treated	92	64	69.56%	45.88%	55.86%
2	GFM	Control	396	376	94.94%	00	00
		Treated	198	176	88.88%	50.00%	53.19%
3	FIM	Control	667	648	97.15%	00	00
		Treated	278	255	91.72%	58.32%	60.64%

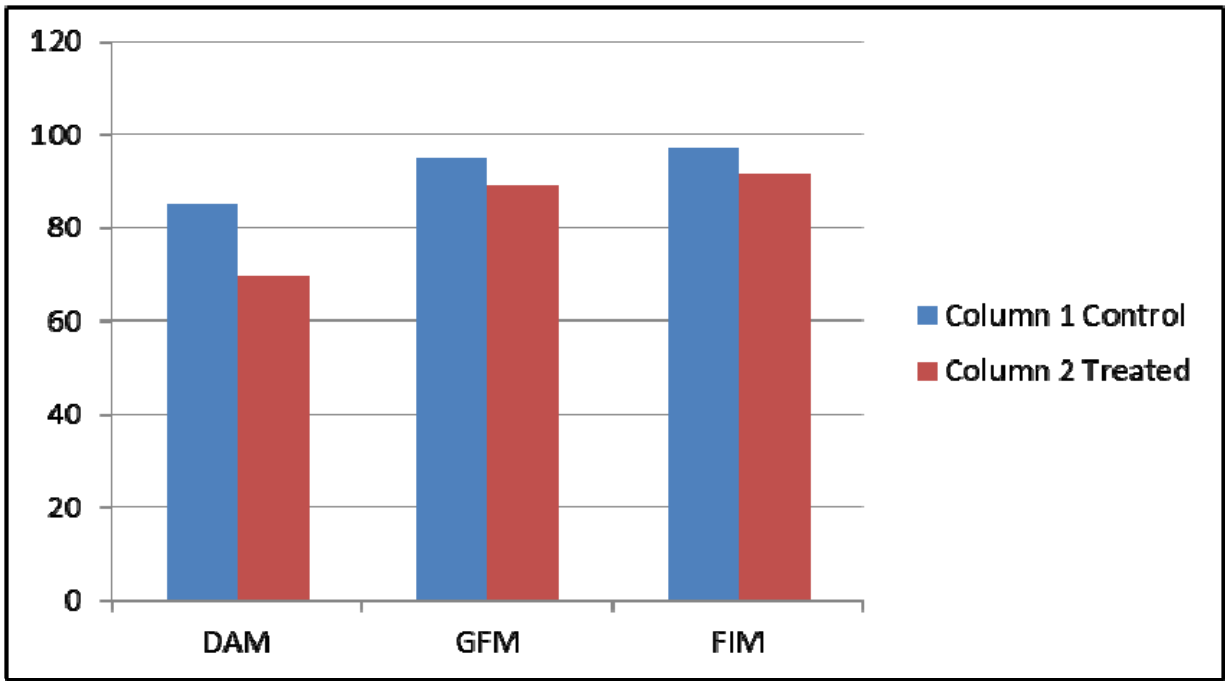

Fig 2: Histogram Showing the average number of emergence control and treated *C. analis* after 30 days of treament of Biosal (Neem Formulation) by three different methods DAM, GFM, FIM.

Fecundity was observed after 15 days of treatment of Biosal against *Callosobruchus analis* number of emergence by three different methods was noted, In direct application method it was 72% and 67.74%, In glass film method it was 83.33% and 76.69%, In filter paper impregnation method 88.8% and 79.16% respectively in treated and control insect, while after 30 days of treatment of Biosal against *Callosobruchus analis* by direct application method average number of emergence observed in control and treated insects was 85.29% and 69.56% respectively, In glass film method emergence was observed in control and treated insects as 94.94% and 88.85% respectively, in filter paper impregnation method average number of emergence was observed in control and treated was 97.15% and 91.72% respectively.

4. Discussion

Boek SJE *et al.* [9] reported the fecundity inhibition but by the former method. It is 36. 20 % at high concentration and by later method, it is 75.21% at highest concentration Neem factor also inhibited the emergence of adults as the restriction of emergence from grains was observed at higher concentration (2.5) while by later method 79.65% in highest inhibition of emergence was observed at highest dose. In the present study fecundity effect of Biosal observed by three different methods DAM, GFM and FIM against *C. analis* after the treatment of LC_{50} dose 1.338 µl/cm^2, 12.174 µl/cm^2 and 6.945µl/cm^2. The variation in result may be due to different doses and methodology used for experiment. Akhtar K *et al.* [10] worked on ten plants and four vegetables oils in managing the Bruchid beetle of legumes i.e, *Callosobruchus chinensis, C. maculates* and *C. rhodesianus*. Four oils were used sunflower and sesame, corn, ground nut. These oils decreased the oviposition of all *Callosobruchus* genus at 10ml/kg and also significantly reduced the longevity of adults of all genus. In present study effect of phytopesticides on 50 gram of seed by three different methods DAM, GFM and FIM against *C. analis* after the treatment of LC 50 dose the result was comparable may be due to a similar genus of insect used and pesticide, the oviposition, egg laying was reduced. [11] observed the fecundity effect of compounds by Nfc (39.28 µg/cm^2) treated insect, egg laying inhibition was 11.67%, whereas in adults emergence in treated *C. analis* was 9.20%. In NC (7.16 µg/cm^2) treated *C. analis* 54.03% inhibition in adults emergence was noted. In the present study fecundity effect after 15 days of treatment of Biosal against *C.analis* number of emergence by three different methods, in DAM it was 67.74%, while in GFM 76.69%, while in FIM 79.16%, similarly after 30 days of treatment of Biosal against *C. analis* by three methods DAM, GFM and FIM average number of emergence was 69.56%, 88.85% and 91.72% respectively. The result is comparable may be due to same insect and method. Tabassum R *et al.* [12] investigated the insecticidal potential of some species against *C.analis* on chickpea with six treatments. They reported mortality, adult emerged number, number of adults and chickpea weight loss. Present study was in agreement with his results through the phytopesticides and test specie was different. This gives the additional support to the opinion that phytopesticides are as effective as a chemical pesticide. Aslam M *et al.* [13] have studied six seed oils extracted with methylene chloride: *Azadirachta indica, Ricinus communis, Thevetia nerifolia, Balanites aegyptiaca, Moringa oleifera* and *Kaya senegalensis*. They observed all these oils reduce significant survival of adults, oviposition and total emergence of adults. They found that most efficient is that of *Thevetia nerifolia* at higher concentrations the treatment effects slightly the germination of seeds which remains over 50%. *Thevetia nerifolia* seed oil good alternative to pesticide against *Callosobruchus maculates* in addition with that of *Azadirachta indica* which effects are well established by many former work. Present work compared due to phytopesticide neem was effective on emergence of adults and emergence of eggs and reduced significantly adult survival. In the present study inhibition in egg laying and inhibition in emergence by three different methods DAM, GFM and FIM after 15 days of treatment of Biosal inhibition in egg laying was observed 38%, 42.77% and 52.00%, while inhibition in emergence by same above methods 41.66%, 47.33% and 57.20%. The present result support that phytopesticides are effective on inhibition

in egg laying. Mbaigunam M *et al*. [14] reported insecticidal effect of ten plant extracts against *Callosobruchus chinensis*. The plant extraction included leaves of olive (*Olea europea*), tea (*Thea chinensis*), bhang (*Cannabis sativa*), elephant (Elephanta sp) neem (*Azadirachta indica*), dharek (*Jacaranda mimosifolia*) and fruit of garlic (*Allium sativum*), cloves (*Syzygium aromaticum*), black pepper (*Piper nigrum*) red chillies (*Capsium annum*). They observed the result that black pepper was the most effective treatment in controlling chickpea beetle attack followed by cloves, neem and garlic. Present result was compared due to similar phytopesticide neem used against *Callosobruchus analis*. Neem was effective against insects. In the present study inhibition in egg laying and emergence after 30 days of treatment of Biosal against *C. analis* by three different methods DAM, GFM and FIM, egg laying was observed 45.88%, 50.00% and 58.33%, while inhibition in emergence was observed as 55.86%, 53.19% and 60.64% by three different methods DAM, GFM and FIM. The present data in the case of Biosal (Neem) confirms the results of [15] in case of neem extract.

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