**Bioactivity assay**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Insect stages | repetition | Sample(N) | Mortality(N) | Mortality (%) | Corrected mortality (%) |
| *Beauveria bassiana* | young nymph | 1-1 | 10 | 10 | 100 | 100 |
| 1-2 | 10 | 8 | 80 | 77.77778 |
| 1-3 | 10 | 9 | 90 | 88.88889 |
| 1Ck-1 | 10 | 1 | 10 |  |
| 1Ck-2 | 10 | 1 | 10 |  |
| 1Ck-3 | 10 | 1 | 10 |  |
| old nymph | 2-1 | 10 | 8 | 80 | 80 |
| 2-2 | 10 | 7 | 70 | 66.66667 |
| 2-3 | 10 | 8 | 80 | 80 |
| 2Ck-1 | 10 | 0 | 0 |  |
| 2Ck-2 | 10 | 1 | 10 |  |
| 2Ck-3 | 10 | 0 | 0 |  |
| adult | 3-1 | 10 | 6 | 60 | 60 |
| 3-2 | 10 | 7 | 70 | 66.66667 |
| 3-3 | 10 | 7 | 70 | 70 |
| 3Ck-1 | 10 | 0 | 0 |  |
| 3Ck-2 | 10 | 1 | 10 |  |
| 3Ck-3 | 10 | 0 | 0 |  |
| *Paecilomyces lilacinus* | young nymph | 4-1 | 10 | 9 | 90 | 90 |
| 4-2 | 10 | 8 | 80 | 77.77777778 |
| 4-3 | 10 | 7 | 70 | 66.66666667 |
| 4Ck-1 | 10 | 0 | 0 |  |
| 4Ck-2 | 10 | 1 | 10 |  |
| 4Ck-3 | 10 | 1 | 10 |  |
| old nymph | 5-1 | 10 | 8 | 80 | 80 |
| 5-2 | 10 | 6 | 60 | 60 |
| 5-3 | 10 | 7 | 70 | 66.66666667 |
| 6Ck-1 | 10 | 0 | 0 |  |
| 6Ck-2 | 10 | 0 | 0 |  |
| 6Ck-3 | 10 | 1 | 10 |  |
| adult | 7-1 | 10 | 6 | 60 | 60 |
| 7-2 | 10 | 7 | 70 | 70 |
| 7-3 | 10 | 6 | 60 | 60 |
| 7Ck-1 | 10 | 0 | 0 |  |
| 7Ck-2 | 10 | 0 | 0 |  |
| 7Ck-3 | 10 | 0 | 0 |  |

ANOVA

|  |
| --- |
| 2014-4-24 16:31:54Result |
| Treatment | sample size | average | SD | SE | 95%confidence interval | 　 |
| 1 | 3 | 88.8889 | 11.1111 | 6.415 | 61.2874 | 116.4904 | 　 |
| 2 | 3 | 75.5556 | 7.698 | 4.4444 | 56.4327 | 94.6785 | 　 |
| 3 | 3 | 65.5556 | 5.0918 | 2.9397 | 52.9069 | 78.2042 | 　 |
| 4 | 3 | 78.1482 | 11.6711 | 6.7383 | 49.1556 | 107.1407 | 　 |
| 5 | 3 | 68.8889 | 10.1835 | 5.8794 | 43.5917 | 94.1861 | 　 |
| 6 | 3 | 63.3333 | 5.7735 | 3.3333 | 48.9912 | 77.6755 | 　 |
| table of variance analysis |
| Source of variation | quadratic sum | df | mean square | F value | palue | 　 | 　 |
| among treatments | 1350.96 | 5 | 270.1921 | 3.364 | 0.0395 | 　 | 　 |
| within treatments | 963.7858 | 12 | 80.3155 | 　 | 　 | 　 | 　 |
| total variation | 2314.746 | 17 | 　 | 　 | 　 | 　 | 　 |
| Duncan | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| No. | average | 1 | 4 | 2 | 5 | 3 | 6 |
| 1 | 88.8889 | 　 | 0.1679 | 0.1079 | 0.0256 | 0.0127 | 0.0081 |
| 4 | 78.1482 | 10.7407 | 　 | 0.7293 | 0.2517 | 0.1362 | 0.0891 |
| 2 | 75.5556 | 13.3333 | 2.5926 | 　 | 0.3802 | 0.2177 | 0.1471 |
| 5 | 68.8889 | 20 | 9.2593 | 6.6667 | 　 | 0.6569 | 0.4842 |
| 3 | 65.5556 | 23.3333 | 12.5926 | 10 | 3.3333 | 　 | 0.7666 |
| 6 | 63.3333 | 25.5556 | 14.8148 | 12.2222 | 5.5556 | 2.2222 | 　 |
| Different letters fllowing the data within a column indicate significant difference |
| Treatment | average | 5% level | 　 | 1% level | 　 | 　 | 　 |
| 1 | 88.8889 | 　a | 　 | 　A | 　 | 　 | 　 |
| 4 | 78.1482 | 　ab | 　 | 　AB | 　 | 　 | 　 |
| 2 | 75.5556 | 　ab | 　 | 　AB | 　 | 　 | 　 |
| 5 | 68.8889 | 　 b | 　 | 　AB | 　 | 　 | 　 |
| 3 | 65.5556 | 　 b | 　 | 　AB | 　 | 　 | 　 |
| 6 | 63.3333 | 　 b | 　 | 　 B | 　 | 　 | 　 |

**LC50 Values**

|  |
| --- |
| **2013-7-8(10d) *Beauveria bassiana*** |
| **Insect stages** | **Treatment** | **sample No** | **Mortality (N)** | **mortality (%)** | **Corrected mortality (%)**  |
| **repetition1** | **repetition2** | **repetition3** |
| young nymph | 6.25 | **10** | **3** | **6** | **4** | **43.33333** | **37.03704** |
| 12.5 | **10** | **4** | **4** | **5** | **43.33333** | **37.03704** |
| 25 | **10** | **8** | **7** | **6** | **70** | **66.66667** |
| 50 | **10** | **8** | **9** | **6** | **76.66667** | **74.07407** |
| 100 | **10** | **10** | **8** | **9** | **90** | **88.88889** |
| **CK** | **10** | **1** | **1** | **1** | **10** | **0** |
| old nymph | 6.25 | **10** | **4** | **4** | **3** | **36.66667** | **34.48276** |
| 12.5 | **10** | **5** | **3** | **7** | **50** | **48.27586** |
| 25 | **10** | **5** | **7** | **8** | **66.66667** | **65.51724** |
| 50 | **10** | **6** | **9** | **7** | **73.33333** | **72.41379** |
| 100 | **10** | **8** | **7** | **8** | **76.66667** | **75.86207** |
| **CK** | **10** | **0** | **1** | **0** | **3.333333** | **0** |
| adult | 6.25 | **10** | **4** | **3** | **3** | **33.33333** | **31.03448** |
| 12.5 | **10** | **4** | **3** | **7** | **46.66667** | **44.82759** |
| 25 | **10** | **5** | **6** | **7** | **60** | **58.62069** |
| 50 | **10** | **5** | **7** | **7** | **63.33333** | **62.06897** |
| 100 | **10** | **6** | **7** | **7** | **66.66667** | **65.51724** |
| **CK** | **10** | **0** | **1** | **0** | **3.333333** | **0** |

|  |
| --- |
| **Result of young nymph 2014-4-25 16:39:46** |
|  | **Dose** | **logarithm of doses** | **treatment effect** | **probit value** |  |  |  |
|  | **6.25** | **0.7959** | **37.037** | **4.6691** |  |  |  |
|  | **12.5** | **1.0969** | **37.037** | **4.6691** |  |  |  |
|  | **25** | **1.3979** | **66.6667** | **5.4307** |  |  |  |
|  | **50** | **1.699** | **74.0741** | **5.6456** |  |  |  |
|  | **100** | **2** | **88.8889** | **6.2206** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **regression intercept A** | **SE** | **regression coefficientB** | **SE** | **correlation coefficient** | **F- inspection value** | **p-** **value** |
|  | **3.4326** | **0.2969** | **1.3552** | **0.2032** | **0.9679** | **44.4929** | **0.0069** |
| **LD50** | **Logarithmic concentration =** | **1.1566** | **95%** **confidence interval** | **1.0128** | **~** | **1.3004** |  |
|  | **concentration =** | **14.3419** | **95%** **confidence interval** | **10.2994** | **~** | **19.9712** |  |
| **Result of** **old nymph 2014-4-25 16:41:20** |
|  | **Dose** | **logarithm of doses** | **treatment effect** | **probit value** |  |  |  |
|  | **6.25** | **0.7959** | **34.4828** | **4.6007** |  |  |  |
|  | **12.5** | **1.0969** | **48.2759** | **4.9568** |  |  |  |
|  | **25** | **1.3979** | **65.5172** | **5.3993** |  |  |  |
|  | **50** | **1.699** | **72.4138** | **5.5952** |  |  |  |
|  | **100** | **2** | **75.8621** | **5.7019** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **regression intercept A** | **SE** | **regression coefficientB** | **SE** | **correlation coefficient** | **F- inspection value** | **p-** **value** |
|  | **3.9315** | **0.1905** | **0.9437** | **0.1304** | **0.9725** | **52.3793** | **0.0054** |
| **LD50** | **Logarithmic concentration =** | **1.1322** | **95%** **confidence interval** | **0.9963** | **~** | **1.2681** |  |
|  | **concentration =** | **13.5586** | **95%** **confidence interval** | **9.9153** | **~** | **18.5405** |  |
| **Result of** **adult 2014-4-25 16:42:00** |
|  | **Dose** | **logarithm of doses** | **treatment effect** | **probit value** |  |  |  |
|  | **6.25** | **0.7959** | **31.0345** | **4.5051** |  |  |  |
|  | **12.5** | **1.0969** | **44.8276** | **4.87** |  |  |  |
|  | **25** | **1.3979** | **58.6207** | **5.2178** |  |  |  |
|  | **50** | **1.699** | **62.069** | **5.3073** |  |  |  |
|  | **100** | **2** | **65.5172** | **5.3993** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **regression intercept A** | **SE** | **regression coefficientB** | **SE** | **correlation coefficient** | **F- inspection value** | **p-** **value** |
|  | **4.0263** | **0.1978** | **0.7394** | **0.1354** | **0.9532** | **29.8361** | **0.0121** |
| **LD50** | **Logarithmic concentration =** | **1.3169** | **95%** **confidence interval** | **1.1614** | **~** | **1.4724** |  |
|  | **concentration =** | **20.7452** | **95%** **confidence interval** | **14.5016** | **~** | **29.677** |  |

|  |
| --- |
| **2013-7-8(10d) *Beauveria bassiana*** |
| **Insect stages** | **Treatment** | **sample No** | **Mortality (N)** | **mortality (%)** | **Corrected mortality (%)**  |
| **repetition1** | **repetition2** | **repetition3** |
| young nymph | 6.25 | **10** | **3** | **6** | **4** | **43.33333** | **37.03704** |
| 12.5 | **10** | **4** | **4** | **5** | **43.33333** | **37.03704** |
| 25 | **10** | **8** | **7** | **6** | **70** | **66.66667** |
| 50 | **10** | **8** | **9** | **6** | **76.66667** | **74.07407** |
| 100 | **10** | **10** | **8** | **9** | **90** | **88.88889** |
| **CK** | **10** | **1** | **1** | **1** | **10** | **0** |
| old nymph | 6.25 | **10** | **4** | **4** | **3** | **36.66667** | **34.48276** |
| 12.5 | **10** | **5** | **3** | **7** | **50** | **48.27586** |
| 25 | **10** | **5** | **7** | **8** | **66.66667** | **65.51724** |
| 50 | **10** | **6** | **9** | **7** | **73.33333** | **72.41379** |
| 100 | **10** | **8** | **7** | **8** | **76.66667** | **75.86207** |
| **CK** | **10** | **0** | **1** | **0** | **3.333333** | **0** |
| adult | 6.25 | **10** | **4** | **3** | **3** | **33.33333** | **31.03448** |
| 12.5 | **10** | **4** | **3** | **7** | **46.66667** | **44.82759** |
| 25 | **10** | **5** | **6** | **7** | **60** | **58.62069** |
| 50 | **10** | **5** | **7** | **7** | **63.33333** | **62.06897** |
| 100 | **10** | **6** | **7** | **7** | **66.66667** | **65.51724** |
| **CK** | **10** | **0** | **1** | **0** | **3.333333** | **0** |

|  |
| --- |
| **Result of young nymph 2014-4-25 16:43:13** |
|  | **Dose** | **logarithm of doses** | **treatment effect** | **probit value** |  |  |  |
|  | **6.25** | **0.7959** | **28.5714** | **4.4341** |  |  |  |
|  | **12.5** | **1.0969** | **35.7143** | **4.6339** |  |  |  |
|  | **25** | **1.3979** | **60.7143** | **5.2719** |  |  |  |
|  | **50** | **1.699** | **71.4286** | **5.5659** |  |  |  |
|  | **100** | **2** | **78.5714** | **5.7916** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **regression intercept A** | **SE** | **regression coefficientB** | **SE** | **correlation coefficient** | **F- inspection value** | **p-** **value** |
|  | **3.4458** | **0.1936** | **1.2116** | **0.1325** | **0.9825** | **83.6009** | **0.0028** |
| **LD50** | **Logarithmic concentration =** | **1.2828** | **95%** **confidence interval** | **1.1883** | **~** | **1.3774** |  |
|  | **concentration =** | **19.1786** | **95%** **confidence interval** | **15.4269** | **~** | **23.8426** |  |
| **Result of old nymph 2014-4-25 16:43:46** |
|  | **Dose** | **logarithm of doses** | **treatment effect** | **probit value** |  |  |  |
|  | **6.25** | **0.7959** | **27.5862** | **4.4048** |  |  |  |
|  | **12.5** | **1.0969** | **48.2759** | **4.9568** |  |  |  |
|  | **25** | **1.3979** | **58.6207** | **5.2178** |  |  |  |
|  | **50** | **1.699** | **65.5172** | **5.3993** |  |  |  |
|  | **100** | **2** | **68.9655** | **5.4949** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **regression intercept A** | **SE** | **regression coefficientB** | **SE** | **correlation coefficient** | **F- inspection value** | **p-** **value** |
|  | **3.8768** | **0.2431** | **0.8712** | **0.1663** | **0.9494** | **27.4361** | **0.0135** |
| **LD50** | **Logarithmic concentration =** | **1.2892** | **95%** **confidence interval** | **1.1248** | **~** | **1.4536** |  |
|  | **concentration =** | **19.4636** | **95%** **confidence interval** | **13.3294** | **~** | **28.4208** |  |
| **Result of** **adult 2014-4-25 16:44:12** |
|  | **Dose** | **logarithm of doses** | **treatment effect** | **probit value** |  |  |  |
|  | **6.25** | **0.7959** | **26.6667** | **4.3771** |  |  |  |
|  | **12.5** | **1.0969** | **43.3333** | **4.8321** |  |  |  |
|  | **25** | **1.3979** | **56.6667** | **5.1679** |  |  |  |
|  | **50** | **1.699** | **60** | **5.2533** |  |  |  |
|  | **100** | **2** | **63.3333** | **5.3407** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **regression intercept A** | **SE** | **regression coefficientB** | **SE** | **correlation coefficient** | **F- inspection value** | **p-** **value** |
|  | **3.9036** | **0.2394** | **0.7801** | **0.1638** | **0.9398** | **22.6761** | **0.0176** |
| **LD50** | **Logarithmic concentration =** | **1.4053** | **95%** **confidence interval** | **1.2301** | **~** | **1.5806** |  |
|  | **concentration =** | **25.4299** | **95%** **confidence interval** | **16.9861** | **~** | **38.0712** |  |