**Supplementary table S1.**Insecticidal effects of *H. lupulus* cones extracts and its principal compound, xanthohumol against *S. oryzae* adults

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Dose  (μg) | Mortality (%)a | | | | | |
| 24h | 48 h | 72 h | | 96 h | 120 h |
| Dichloromethane extract | 5 | 3.33±3.33ab | 6.67±3.33abc | 6.67±3.33a | 6.67±3.33a | | 13.33±6.67a |
| 10 | 3.33±3.33ab | 23.33±6.67\*def | 23.33±6.67\*bc | 43.33±3.33\*cd | | 53.33±6.67\*cde |
| 20 | 13.33±3.33\*bc | 13.33±3.33\*bcd | 26.67±3.33\*bcd | 33.33±3.33\*bc | | 36.67±3.33\*b |
| 40 | 53.33±3.33\*gh | 63.33±3.33\*lm | 70.0±0.00\*hi | 76.67±3.33\*g | | 86.67±3.33\*g |
| Ethyl acetate extract | 5 | 3.33±3.33ab | 13.33±3.33\*bcd | 23.33±3.33\*bc | 26.67±3.33\*b | | 33.33±3.33\*b |
| 10 | 13.33±3.33\*bc | 16.66±3.33\*cde | 30.00±5.77\*bcd | 43.33±3.33\*cd | | 46.67±3.33\*bcd |
| 20 | 30.00±5.77\*de | 40.00±5.77\*hi | 53.33±3.33\*fg | 60.00±0.00\*ef | | 73.33±3.33\*f |
| 40 | 56.67±3.33\*h | 66.67±3.33\*m | 76.67±3.33\*i | 83.33±3.33\*g | | 90.00±5.77\*g |
| Acetone extract | 5 | 3.33±3.33ab | 13.33±5.77\*bcd | 23.33±3.33\*bc | 33.33±3.33\*bc | | 40.00±5.77\*bc |
| 10 | 23.33±3.33\*cd | 26.67±3.33\*efg | 33.33±3.33\*cde | 43.33±3.33\*cd | | 53.33±3.33\*cde |
| 20 | 23.33±3.33\*cd | 33.33±3.33\*fgh | 36.67±3.33\*de | 50.00±0.00\*de | | 56.67±3.33\*de |
| 40 | 33.33±3.33\*def | 43.33±3.33\*hij | 50.00±0.00\*fg | 53.33±3.33\*def | | 66.67±6.67\*ef |
| Ethanol extract | 5 | 0.00±0.00a | 3.33±3.33ab | 6.67±3.33a | 10.00±0.00a | | 20.00±5.77\*ab |
| 10 | 10.00±0.00ab | 23.33±3.33\*def | 26.67±3.33\*bcd | 30.00±5.77\*b | | 33.33±3.33\*b |
| 20 | 30.00±5.77\*de | 36.67±3.33\*ghi | 43.33±3.33\*ef | 46.67±3.33\*d | | 46.67±3.33\*bcd |
| 40 | 36.66±3.33\*ef | 46.67±3.33\*ijk | 50.00±5.77\*fg | 60.00±5.77\*ef | | 66.67±3.33\*ef |
| Methanol extract | 5 | 0.00±0.00a | 3.33±3.33ab | 3.33±3.33a | 6.67±3.33a | | 6.67±3.33a |
| 10 | 3.33±3.33ab | 6.67±3.33abc | 6.67±3.33a | 10.00±5.77a | | 13.33±3.33a |
| 20 | 3.33±3.33ab | 6.67±3.33abc | 20.00±5.77\*b | 26.67±8.82\*b | | 36.67±8.82\*b |
| 40 | 30.00±5.77\*de | 40.0±5.77\*hi | 43.33±8.81\*ef | 46.67±8.82\*d | | 56.67±3.33\*de |
| Xanthohumol | 5 | 43.33±3.33\*fg | 53.33±3.33\*jkl | 60.00±0.00\*gh | 63.33±3.33\*f | | 73.33±3.33\*f |
| 10 | 50.00±5.77\*gh | 56.67±3.33\*klm | 66.67±3.33\*hi | 83.33±3.33\*g | | 93.33±3.33\*g |
| 20 | 76.67±3.33i | 86.67±3.33\*n | 96.67±3.33\*j | 100.00±0.00\*h | | 100.00±0.00\*g |
| 40 | 93.33±3.33\*j | 100.00±0.00\*o | 100.00±0.00\*j | 100.00±0.00\*h | | 100.00±0.00\*g |
| Malathion | 2 | 100.00±0.00\*j | 100.00±0.00\*o | 100.00±0.00\*j | 100.00±0.00\*h | | 100.00±0.00\*g |
| **Control** | **-** | **0.00±0.00a** | **0.00±0.00a** | **3.33±3.33a** | **6.67±3.33a** | | **6.67±3.33a** |

aMean ± SE of three replicates each set up with ten adults . \*: Values differ significantly at p<0.05 from negative control. Means in the same column by the same letter are not significantly different to the test of Duncan (α= 0.05).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Dose  (μg) | Mortality (%)a | | | | | |
| 24 h | 48 h | 72 h | | 96 h | 120 h |
| Dichloromethane extract | 5 | 3.33±3.33ab | 3.33±3.33a | 10.00±0.00ab | 10.00±0.00ab | | 10.00±0.00\*ab |
| 10 | 20.00±0.00\*cd | 36.67±3.33\*e | 40.00±0.00\*de | 40.00±0.00\*ef | | 43.33±3.33\*ef |
| 20 | 53.33±6.67\*gh | 60.00±5.77\*ghi | 63.33±6.67\*gh | 66.67±3.33\*ij | | 66.67±3.33\*hi |
| 40 | 76.67±3.33\*i | 83.33±3.33\*kl | 86.67±3.33\*ijkl | 93.33±3.33\*lm | | 96.67±3.33\*k |
| Ethyl acetate extract | 5 | 13.33±3.33\*bc | 20.00±5.77\*cd | 30.00±5.77\*cd | 33.33±8.82\*de | | 33.33±8.82\*de |
| 10 | 36.67±3.33\*ef | 50.00±5.77\*fg | 60.00±5.77\*gh | 73.33±3.33\*ij | | 76.67±3.33ij |
| 20 | 53.33±3.33\*gh | 66.67±3.33\*hij | 73.33±3.33\*hi | 76.67±3.33\*jk | | 76.67±3.33ij |
| 40 | 86.67±3.33\*ij | 96.67±3.33\*m | 100.00±0.00\*l | 100.00±0.00\*m | | 100.00±0.00\*k |
| Acetone extract | 5 | 20.00±5.77\*cd | 30.00±5.77\*de | 36.67±3.33\*de | 50.00±5.77\*fg | | 50.00±5.77\*f |
| 10 | 30.00±0.00\*de | 40.00±5.77\*ef | 46.67±8.82\*ef | 53.33±6.67\*gh | | 63.33±3.33\*gh |
| 20 | 46.67±3.33\*fg | 50.00±5.77\*fg | 56.67±8.82\*fg | 63.33±6.67\*hi | | 66.67±8.82\*hi |
| 40 | 60.00±5.77\*h | 70.00±5.77\*ij | 86.67±3.33\*ijkl | 93.33±3.33\*lm | | 93.33±3.33\*k |
| Ethanol extract | 5 | 3.33±3.33ab | 16.67±3.33\*bc | 20.00±5.77\*bc | 26.67±6.67\*cd | | 30.00±5.77\*cd |
| 10 | 20.00±0.00\*cd | 33.33±3.33\*e | 43.33±3.33\*de | 53.33±3.33\*gh | | 53.33±3.33\*fg |
| 20 | 46.67±6.67\*fg | 56.67±6.67\*gh | 66.67±3.33\*gh | 73.33±3.33\*ij | | 80.00±0.00j |
| 40 | 60.00±0.00\*h | 66.67±3.33\*hij | 80.00±5.77\*ij | 86.67±3.33\*kl | | 93.33±3.33\*k |
| Methanol extract | 5 | 0.00±0.00a | 0.00±0.00a | 3.33±3.33a | 6.67±3.33a | | 6.67±3.33\*a |
| 10 | 0.00±0.00a | 0.00±0.00a | 3.33±3.33a | 3.33±3.33a | | 10.00±0.00\*ab |
| 20 | 3.33±3.33ab | 6.67±3.33ab | 6.67±3.33ab | 10.00±0.00ab | | 10.00±0.00\*ab |
| 40 | 3.33±3.33ab | 13.33±3.33\*abc | 20.00±5.77\*bc | 20.00±5.77\*bc | | 20.00±5.77\*bc |
| Xanthohumol | 5 | 63.33±3.33\*h | 73.33±3.33\*jk | 83.33±3.33\*ijk | 93.33±3.33\*lm | | 96.67±3.33\*k |
| 10 | 80.00±5.77\*i | 83.33±3.33\*kl | 90.00±0.00\*jkl | 100.00±0.00\*m | | 100.00±0.00\*k |
| 20 | 86.67±3.33\*ij | 93.33±6.67\*lm | 96.67±3.33\*kl | 100.00±0.00\*m | | 100.00±0.00\*k |
| 40 | 96.67±3.33\*jk | 100.00±0.00\*m | 100.00±0.00\*l | 100.00±0.00\*m | | 100.00±0.00\*k |
| Malathion | 2 | 100.00±0.00\*k | 100.00±0.00\*m | 100.00±0.00\*l | 100.00±0.00\*m | | 100.00±0.00\*k |
| **Control** | **-** | **0.00±0.00a** | **0.00±0.00a** | **3.33±3.33a** | **6.67±3.33a** | | **80.00±5.77j** |

**Supplementary table S2.** Insecticidal effects of *H. lupulus* cones extracts and its principal compound, xanthuhumol against *S. granarius* adults

aMean ± SE of three replicates each set up with ten adults . \*: Values differ significantly at p<0.05 from negative control. Means in the same column by the same letter are not significantly different to the test of Duncan (α= 0.05).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Dose  (μg) | Mortality (%)a | | | | | |
| 24 h | 48 h | 72 h | | 96 h | 120 h |
| Dichloromethane extract | 5 | 0.00±0.00a | 3.33±3.33ab | 10.00±5.77\*abc | 20.00±5.77\*bc | | 20.00±5.77\*bc |
| 10 | 6.67±3.33abc | 10.00±5.77abcd | 16.67±3.33\*bcd | 23.33±6.67\*bcd | | 30.00±5.77\*cde |
| 20 | 13.33±3.33\*c | 26.67±3.33\*fgh | 36.67±3.33\*ghi | 43.33±3.33\*fgh | | 53.33±3.33\*hi |
| 40 | 26.67±3.33\*de | 30.00±0.00\*ghi | 43.33±3.33\*hij | 46.67±3.33\*ghi | | 63.33±3.33\*ij |
| Ethyl acetate extract | 5 | 13.33±3.33\*c | 23.33±3.33\*efgh | 30.00±0.00\*efg | 43.33±3.33\*fgh | | 50.00±0.00\*gh |
| 10 | 23.33±3.33\*d | 40.00±5.77\*ij | 50.00±0.00\*jk | 53.33±3.33\*hij | | 53.33±3.33\*hi |
| 20 | 43.33±3.33\*f | 46.67±3.33\*jk | 56.67±3.33\*k | 63.33±3.33\*jk | | 66.67±3.33\*jk |
| 40 | 56.67±3.33\*g | 63.33±3.33\*lm | 66.67±3.33\*l | 76.67±3.33\*l | | 76.67±3.33\*kl |
| Acetone extract | 5 | 3.33±3.33ab | 10.00±5.77abcd | 16.67±3.33\*bcd | 30.00±5.77\*cde | | 40.00±5.77\*efg |
| 10 | 13.33±3.33\*c | 23.33±3.33\*efgh | 26.67±3.33\*defg | 36.67±3.33\*efg | | 46.67±3.33\*fgh |
| 20 | 23.33±3.33\*d | 26.67±3.33\*fgh | 36.67±3.33\*ghi | 43.33±3.33\*fgh | | 50.00±0.00\*gh |
| 40 | 33.33±3.33\*e | 40.00±5.77\*ij | 46.67±3.33\*ij | 56.67±3.33\*ij | | 63.33±3.33\*ij |
| Ethanol extract | 5 | 0.00±0.00a | 3.33±3.33ab | 10.00±0.00\*abc | 16.67±3.33\*b | | 30.00±5.77\*cde |
| 10 | 3.33±3.33ab | 13.33±3.33\*bcde | 20.00±0.00\*cde | 23.33±3.33\*bcd | | 33.33±3.33\*de |
| 20 | 10.00±0.00\*bc | 20.00±5.77\*defg | 20.00±5.77\*cde | 30.00±5.77\*cde | | 40.00±5.77\*efg |
| 40 | 23.33±3.33\*d | 23.33±3.33\*efgh | 33.33±3.33\*fgh | 43.33±3.33\*fgh | | 50.00±0.00\*gh |
| Methanol extract | 5 | 0.00±0.00a | 0.00±0.00a | 6.67±3.33ab | 13.33±3.33\*b | | 16.67±3.33\*b |
| 10 | 0.00±0.00a | 6.67±3.33abc | 10.00±5.77\*abc | 13.33±3.33\*b | | 20.00±5.77\*bc |
| 20 | 6.67±3.33abc | 13.33±3.33\*bcde | 16.67±3.33\*bcd | 20.00±0.00\*bc | | 23.33±3.33\*bcd |
| 40 | 13.33±3.33\*c | 16.67±3.33\*cdef | 23.33±3.33\*def | 33.33±3.33\*def | | 36.67±3.33\*ef |
| Xanthohumol | 5 | 0.00±0.00a | 10.00±5.77abcd | 16.67±3.33\*bcd | 30.00±5.77\*cde | | 33.33±3.33\*de |
| 10 | 23.33±3.33\*d | 33.33±3.33\*hi | 43.33±3.33\*hij | 46.67±3.33\*ghi | | 56.67±3.33\*hij |
| 20 | 43.33±3.33\*f | 53.33±3.33\*kl | 66.67±3.33\*l | 70.00±0.00\*kl | | 80.00±0.00\*l |
| 40 | 60.00±5.77\*g | 66.67±3.33\*m | 83.33±3.33\*m | 90.00±0.00\*m | | 96.67±3.33\*m |
| Malathion | 2 | 100.00±0.00\*h | 100.00±0.00\*n | 100.00±0.00\*n | 100.00±0.00\*m | | 100.00±0.00\*m |
| **Control** | **-** | **0.00±0.00a** | **0.00±0.00a** | **0.00±0.00a** | **0.00**±0.00a | | **0.00**±0.00a |

**Supplementary table S3.** Insecticidal effects of *H. lupulus* cones extracts and its principal compound, xanthuhumol against *A. obtectus* adults

aMean ± SE of three replicates each set up with ten adults . \*: Values differ significantly at p<0.05 from negative control. Means in the same column by the same letter are not significantly different to the test of Duncan (α= 0.05).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Dose  (μg) | Mortality (%)a | | | | | |
| 24 h | 48 h | 72 h | | 96 h | 120 h |
| Dichloromethane extract | 5 | 3.33±3.33ab | 10.00±0.00abc | 20.00±0.00\*bc | 33.33±6.67\*cdef | | 36.67±8.82\*cde |
| 10 | 16.67±6.67\*bcde | 26.67±6.67\*defg | 46.67±6.67\*efgh | 53.33±3.33\*ghi | | 56.67±3.33\*fghi |
| 20 | 20.00±0.00\*cdef | 33.33±3.33\*fghi | 50.00±5.77\*efghi | 60.00±5.77\*hijk | | 66.67±6.67\*hijk |
| 40 | 46.67±3.33\*g | 56.67±3.33\*klmn | 63.33±3.33\*ijkl | 73.33±3.33\*kl | | 76.67±3.33\*jkl |
| Ethyl acetate extract | 5 | 20.00±0.00\*cdef | 33.33±3.33\*fghi | 50.00±0.00\*efghi | 53.33±3.33\*ghij | | 53.33±3.33\*efgh |
| 10 | 30.00±5.77\*ef | 50.00±5.77\*jklm | 60.00±0.00\*hijk | 63.33±3.33\*ijkl | | 63.33±3.33\*ghij |
| 20 | 56.67±3.33\*g | 63.33±3.33\*mno | 66.67±6.67\*jkl | 70.00±5.77\*jkl | | 73.33±8.82\*ijk |
| 40 | 60.00±5.77\*gh | 70.00±5.77\*mo | 76.67±6.67\*lm | 80.00±5.77\*lm | | 83.33±3.33\*klm |
| Acetone extract | 5 | 13.33±3.33abcd | 23.33±3.33\*cdef | 40.00±0.00\*ef | 46.67±3.33\*efghi | | 53.33±3.33\*efgh |
| 10 | 20.00±0.00\*cdef | 26.67±3.33\*defg | 36.67±8.82\*de | 43.33±6.67\*defgh | | 43.33±6.67\*def |
| 20 | 30.00±5.77\*ef | 40.00±0.00\*ghij | 56.67±3.33\*ghijk | 60.00±5.77\*hijk | | 73.33±6.67\*ijk |
| 40 | 33.33±3.33\*f | 60.00±0.00\*lmno | 70.00±0.00\*kl | 73.33±3.33\*klm | | 76.67±3.33\*jkl |
| Ethanol extract | 5 | 3.33±3.33ab | 3.33±3.33ab | 6.67±3.33ab | 30.00±3.33\*bcde | | 40.00±5.33\*cdef |
| 10 | 13.33±3.33abcd | 16.67±3.33\*bcde | 16.67±3.33\*abc | 26.67±3.33\*bcd | | 43.33±3.33\*def |
| 20 | 3.33±3.33ab | 30.00±5.77\*efgh | 36.67±6.67\*de | 40.00±6.67\*defg | | 40.00±3.33\*cdef |
| 40 | 23.33±3.33\*def | 43.33±3.33\*hijk | 53.33±3.33\*fghij | 53.33±3.33\*ghij | | 53.33±3.33\*efgh |
| Methanol extract | 5 | 0.00±0.00a | 10.00±5.77abc | 13.33±6.67abc | 13.33±6.67ab | | 16.67±3.33\*ab |
| 10 | 6.67±6.67abc | 13.33±3.33abcd | 16.67±3.33\*abc | 16.67±3.33\*abc | | 23.33±3.33\*abc |
| 20 | 16.67±6.67\*bcde | 30.00±5.77\*efgh | 43.33±3.33\*efg | 43.33±3.33\*defgh | | 46.67±3.33\*defg |
| 40 | 20.00±3.67\*cdef | 36.67±8.82\*fghij | 43.33±8.82\*efg | 50.00±5.77\*fghi | | 50.00±5.77\*defgh |
| Xanthohumol | 5 | 0.00±0.00a | 16.67±8.82\*bcde | 23.33±3.33\*cd | 26.67±3.33\*bcd | | 33.33±3.33\*bcd |
| 10 | 33.33±6.67\*f | 46.67±8.82\*ijkl | 53.33±6.67\*fghij | 60.00±5.77\*hijk | | 73.33±6.67\*ijk |
| 20 | 50.00±0.00\*g | 63.33±3.33\*mno | 70.00±0.00\*kl | 70.00±0.00\*jkl | | 80.00±0.00\*jkl |
| 40 | 70.00±5.77\*h | 73.33±3.33\*o | 86.67±3.33\*m | 90.00±0.00\*mn | | 93.33±3.33\*lm |
| Malathion | 2 | 100.00±0.00i | 100.00±0.00\*p | 100.00±0.00\*n | 100.00±0.00\*n | | 100.00±0.00\*m |
| **Control** | **-** | **0.00±0.00a** | **00.00±0.00a** | **3.33±3.33a** | **3.33±3.33a** | | **13.33±3.33a** |

**Supplementary table S4.** Insecticidal effects of *H. lupulus* cones extracts and its principal compound, xanthuhumol against *T. castaneum* adults

aMean ± SE of three replicates each set up with ten adults . \*: Values differ significantly at p<0.05 from negative control. Means in the same column by the same letter are not significantly different to the test of Duncan (α= 0.05).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Dose  (μg) | Mortality (%)a | | | | | |
| 24 h | 48 h | 72 h | | 96 h | 120 h |
| Dichloromethane extract | 5 | 0.00±0.00a | 0.00±0.00a | 6.67±3.33a | 6.67±3.33a | | 10.00±0.00a |
| 10 | 10.00±5.77ab | 13.33±3.33\*b | 23.33±3.33\*c | 30.00±5.77\*cd | | 30.00±5.77\*b |
| 20 | 23.33±6.67\*c | 36.67±3.33\*de | 40.00±5.77\*de | 50.00±5.77\*ef | | 53.33±3.33\*e |
| 40 | 46.67±3.33\*d | 56.67±3.33\*g | 60.00±0.00\*g | 66.67±3.33\*gh | | 76.67±3.33\*fg |
| Ethyl acetate extract | 5 | 3.33±3.33a | 13.33±3.33\*b | 30.00±5.77\*cd | 36.67±6.67\*cde | | 46.67±3.33\*de |
| 10 | 20.00±5.77\*bc | 30.00±5.77\*d | 40.00±5.77\*de | 50.00±5.77\*ef | | 53.33±3.33\*e |
| 20 | 46.67±3.33\*d | 53.33±3.33\*fg | 63.33±3.33\*g | 66.67±3.33\*gh | | 73.33±3.33\*f |
| 40 | 73.33±3.33\*e | 76.67±3.33\*h | 83.33±3.33\*hi | 93.33±3.33\*i | | 93.33±3.33\*h |
| Acetone extract | 5 | 10.00±5.77ab | 16.67±3.33\*bc | 23.33±3.33\*c | 33.33±3.33\*cd | | 40.00±0.00\*cd |
| 10 | 10.00±0.00ab | 26.67±3.33\*cd | 43.33±3.33\*e | 43.33±3.33\*def | | 53.00±3.33\*e |
| 20 | 26.67±3.33\*c | 43.33±3.33\*ef | 46.67±3.33\*ef | 50.00±0.00\*ef | | 56.67±3.33\*e |
| 40 | 50.00±5.77\*d | 56.67±3.33\*g | 66.67±3.33\*g | 70.00±5.77\*h | | 70.00±5.77\*f |
| Ethanol extract | 5 | 0.00±0.00a | 10.00±0.00\*ab | 23.33±3.33\*c | 30.00±5.77\*cd | | 36.67±3.33\*bc |
| 10 | 16.67±3.33\*bc | 26.67±3.33\*cd | 36.67±3.33\*de | 53.33±3.33\*fg | | 56.67±3.33\*e |
| 20 | 26.67±3.33\*c | 30.00±5.77\*d | 36.67±3.33\*de | 53.33±6.67\*fg | | 66.67±3.33\*f |
| 40 | 46.67±3.33\*d | 53.33±3.33\*fg | 56.67±3.33\*fg | 66.67±3.33\*gh | | 73.33±3.33\*f |
| Methanol extract | 5 | 0.00±0.00a | 0.00±0.00a | 0.00±0.00a | 6.67±3.33a | | 6.67±3.33a |
| 10 | 0.00±0.00a | 0.00±0.00a | 6.67±3.33a | 6.67±3.33a | | 10.00±0.00a |
| 20 | 0.00±0.00a | 6.67±3.33ab | 10.00±0.00ab | 13.33±3.33ab | | 13.00±3.33a |
| 40 | 3.33±3.33a | 13.33±3.33\*b | 20.00±5.77\*bc | 23.33±6.67\*bc | | 30.00±5.77\*b |
| Xanthohumol | 5 | 43.33±3.33\*d | 53.33±3.33\*fg | 63.33±3.33\*g | 73.33±3.33\*h | | 83.33±3.33\*g |
| 10 | 70.00±5.77\*e | 73.33±3.33\*h | 80.00±0.00\*h | 90.00±0.00\*i | | 100.00±0.00\*h |
| 20 | 76.67±3.33\*e | 83.33±6.67\*h | 93.33±6.67\*ij | 96.67±3.33\*i | | 100.00±0.00\*h |
| 40 | 90.00±5.77\*ff | 96.67±3.33\*i | 100.00±0.00\*j | 100.00±0.00\*i | | 100.00±0.00\*h |
| Malathion | 2 | 100.00±0.00\* | 100.00±0.00\*i | 100.00±0.00\*j | 100.00±0.00\*i | | 100.00±0.00\*h |
| **Control** | **-** | **0.00±0.00a** | **0.00±0.00a** | **0.00±0.00a** | **10.00±0.00a** | | **10.00±0.00a** |

**Supplementary table S5.** Insecticidal effects of *H. lupulus* cones extracts and its principal compound, xanthuhumol against *L. serricorne* adults

aMean ± SE of three replicates each set up with ten adults . \*: Values differ significantly at p<0.05 from negative control. Means in the same column by the same letter are not significantly different to the test of Duncan (α= 0.05).