**SUPPLEMETARY MATERIAL**

**Effect of bitter gourd (Cucurbitaceae) foliar constituents on development and reproduction of *Epilachna dodecastigma* (Weid.) (Coleoptera: Coccinellidae)**

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**Results**

*Food utilization efficiency of first, second and third instar larvae of E. dodecastigma*

The data in Supplementary Table 1a provides food utilization efficiency measures of first instar larvae of *E. dodecastigma* fed on three types of bitter gourd leaves. Greater values of GR were recorded in insects reared on young and mature leaves and were significantly lower on senescent leaves. CR value was greatest in insects fed on mature leaves than young and senescent leaves. RGR values were recorded comparatively higher on young and mature leaves than senescent leaves. There were no significant differences in CI when the insects were fed on three types of leaves. The value of AD was almost same between all the treatments. ECI and ECD values were greater in insects fed on young and mature leaves than senescent leaves. Larval survivability (LS) was best on mature leaves, least on senescent leaves and intermediate on young leaves.

Supplementary Table 1b shows food utilization efficiency measures of second instar larvae of *E. dodecastigma*. Higher GR values were recorded for insects fed on young and mature leaves compared to senescent leaves. There were significant differences in CR between all the treatments. CR value was greatest in insects fed on mature leaves followed by young and senescent bitter gourd leaves. Lower RGR value was found on senescent leaves than mature leaves. CI values were higher for insects fed on young and mature leaves, and lower for those fed on senescent leaves. Based on the value of AD index, three types of leaves can be arranged in order of food quality as mature, young and senescent leaves. ECI and ECD values were highest in young leaves fed insects than those fed on the other two types of bitter gourd leaves. LS were higher on young and mature leaves.

Food utilization efficiency measures of third instar larvae of *E. dodecastigma* are shown in Supplementary Table 1c. The GR value was greatest in insects fed on mature leaves followed by young and senescent leaves. Higher CR value was observed on insects fed on mature leaves and least when fed on young and senescent leaves. The RGR was highest in insects reared on mature leaves followed by young and senescent leaves. A lower value of CI was observed on young leaves. Insects reared on mature and senescent leaves indicated higher value of AD, whereas it was lower on young leaves. Higher ECI and ECD values were evident on young and mature leaves compared to young leaves. Higher LS values were evident on young and mature leaves.

**Supplementary Table 1a.** Food utilization efficiency measures of first instar larvae of *Epilachna dodecastigma* reared on young, mature and senescent bitter gourd leaves

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Young | Mature | Senescent | *F*2, 12 | *P* |
| GR (mg/day) | 0.03 ± 0.00a | 0.04 ± 0.00a | 0.02 ± 0.00b | 15.869 | 0.0001 |
| CR(mg/day) | 0.34 ± 0.00a | 0.39 ± 0.01b | 0.33 ± 0.01a | 38.887 | 0.0001 |
| RGR (mg/day) | 0.27 ± 0.02a | 0.31 ± 0.02a | 0.19 ± 0.01b | 10.118 | 0.003 |
| CI (mg/day) | 3.34 ± 0.04 | 3.52 ± 0.06 | 3.36 ± 0.07 | 2.916 | 0.093 |
| AD (%) | 93.66 ± 0.59 | 94.10 ± 0.37 | 93.88 ± 0.54 | 0.187 | 0.832 |
| ECI (%) | 8.51 ± 0.88a | 9.30 ± 0.60a | 6.11 ± 0.11b | 8.478 | 0.005 |
| ECD (%) | 7.96 ± 0.69a | 8.74 ± 0.53a | 5.73 ± 0.08b | 9.585 | 0.003 |
| LS (%) | 83.52 ± 1.03a | 87.88 ± 1.31b | 73.33 ± 0.73c | 50.427 | 0.0001 |

Mean ±SE of 5 observations. Within the row means followed by same letter(s) are not significantly different by Tukey test.

Food utilization efficiency measures: GR: Growth rate, CR: Consumption rate, RGR: Relative growth rate, CI: Consumption index, AD: Approximate digestibility, ECI: Efficiency of conversion of ingested food, ECD: Efficiency of conversion of digested food, LS: Larval survivability.

**Supplementary Table 1b.** Food utilization efficiency measures of second instar larvae of *Epilachna dodecastigma* reared on young, mature and senescent bitter gourd leaves

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Young | Mature | Senescent | *F*2, 12 | *P* |
|  |  |  |  |  |  |
| GR (mg/day) | 0.14 ± 0.01a | 0.16 ± 0.01a | 0.08 ± 0.00b | 18.044 | 0.0001 |
| CR(mg/day) | 4.48 ± 0.30a | 5.72 ± 0.36b | 2.84 ± 0.09c | 26.936 | 0.0001 |
| RGR (mg/day) | 0.31 ± 0.03ab | 0.33 ± 0.03a | 0.23 ± 0.01b | 4.619 | 0.03 |
| CI (mg/day) | 9.91 ± 0.83a | 11.70 ± 0.92a | 7.96 ± 0.35b | 6.272 | 0.01 |
| AD (%) | 89.37 ± 0.38a | 90.99 ± 0.30b | 85.56 ± 0.41c | 57.706 | 0.0001 |
| ECI (%) | 3.06 ± 0.06a | 2.79 ± 0.04b | 2.84 ± 0.05b | 8.453 | 0.005 |
| ECD (%) | 3.42 ± 0.08a | 3.07 ± 0.05b | 3.32 ± 0.06a | 7.555 | 0.008 |
| LS (%) | 88.63 ± 1.51a | 85.95 ± 3.48ab | 77.58 ± 1.51b | 5.994 | 0.016 |

Mean ±SE of 5 observations. Within the row means followed by same letter(s) are not significantly different by Tukey test.

Food utilization efficiency measures: GR: Growth rate, CR: Consumption rate, RGR: Relative growth rate, CI: Consumption index, AD: Approximate digestibility, ECI: Efficiency of conversion of ingested food, ECD: Efficiency of conversion of digested food, LS: Larval survivability.

**Supplementary Table 1c.** Food utilization efficiency measures of third instar larvae of *Epilachna dodecastigma* reared on young, mature and senescent bitter gourd leaves

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Young | Mature | Senescent | *F*2, 12 | *P* |
|  |  |  |  |  |  |
| GR (mg/day) | 0.53 ± 0.04a | 0.78 ± 0.05b | 0.31 ± 0.02c | 39.395 | 0.0001 |
| CR(mg/day) | 19.29 ± 0.32a | 27.60 ± 0.93b | 18.03 ± 0.74a | 53.277 | 0.0001 |
| RGR (mg/day) | 0.22 ± 0.01a | 0.26 ± 0.01b | 0.15 ± 0.01c | 23.19 | 0.0001 |
| CI (mg/day) | 7.83 ± 0.13a | 9.27 ± 0.31b | 8.68 ± 0.32ab | 7.113 | 0.009 |
| AD (%) | 81.39 ± 0.86a | 83.98 ± 0.35b | 85.23 ± 0.10b | 13.137 | 0.001 |
| ECI (%) | 2.76 ± 0.16a | 2.83 ± 0.10a | 1.71 ± 0.04b | 32.645 | 0.0001 |
| ECD (%) | 3.39 ± 0.23a | 3.37 ± 0.13a | 1.99 ± 0.05b | 26.038 | 0.0001 |
| LS (%) | 90.51 ± 1.31a | 87.16 ± 2.74ab | 78.93 ± 2.89b | 6.062 | 0.015 |

Mean ±SE of 5 observations. Within the row means followed by same letter(s) are not significantly different by Tukey test.

Food utilization efficiency measures: GR: Growth rate, CR: Consumption rate, RGR: Relative growth rate, CI: Consumption index, AD: Approximate digestibility, ECI: Efficiency of conversion of ingested food, ECD: Efficiency of conversion of digested food, LS: Larval survivability.