**INDICATOR 4**

| Treatment → | A | B | C | D | E | F | G | H |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input Data → | 103.498 13.69 45.7843 29.5639 28.7427 55.7859 11.6683 13.3039 76.4926 107.023 61.0041 48.8702 59.3259 64.2066 92.5694 34.6188 52.8293 43.3662 67.3016 36.0409 187.315 231.777 59.1845 62.0188 289.312 127.838 139.719 46.2037 155.782 167.529 140.376 121.197 | 43.0166 30.0915 29.0108 19.9111 33.1675 43.9422 16.7249 160.099 37.4083 37.2928 35.4771 52.9415 79.9523 62.904 13.0448 11.2102 56.1406 197.675 155.799 40.2123 67.9614 44.6701 25.6207 169.006 178.496 54.7476 69.342 110.304 203.915 105.008 75.2546 233.964 | 139.952 50.3102 112.411 29.0059 49.0251 44.741 32.5124 76.3847 26.6438 13.7046 83.6572 56.2958 111.222 124.631 121.578 29.3677 181.62 37.24 85.4073 48.6335 287.006 387.637 22.3876 162.656 217.927 192.186 124.734 79.1243 373.469 264.049 186.782 139.331 | 48.7815 24.6519 92.7073 29.4281 12.8343 90.6035 26.7345 37.5034 74.5441 31.9544 52.8039 56.4718 41.7917 64.785 71.9485 59.1399 159.201 9.38615 64.8845 98.4255 41.6357 274.575 110.113 178.274 359.643 72.8514 76.2476 89.1713 730.393 137.459 74.1337 115.956 | 18.757 32.2607 34.2416 47.5149 17.2197 76.0065 27.7616 24.8821 25.0515 30.6384 42.0048 32.8589 39.9022 37.9775 79.496 25.6638 37.7965 27.2573 107.287 125.655 203.304 191.167 111.623 26.9063 427.439 155.918 21.3863 15.9376 214.161 109.321 188.528 140.672 | 93.0596 27.2066 40.8579 7.27796 35.6681 17.1484 26.5224 19.696 33.4943 14.2487 26.7353 27.5896 39.7796 57.0296 60.7608 18.6611 187.899 61.8584 139.314 30.5659 205.392 51.4382 36.2305 82.4862 58.1718 178.725 87.2146 87.6552 120.128 114.473 192.42 76.7713 | 8.13549 41.3029 11.5169 22.7701 48.5145 32.3052 25.0173 27.5442 26.9978 14.9258 18.6799 31.3161 178.23 81.089 21.0035 25.8999 131.944 45.1734 51.9694 26.2129 50.8505 73.2875 44.1678 32.6024 133.516 181.769 70.7277 119.19 203.932 468.149 96.9749 68.9496 | 5.51421 56.7533 26.7749 13.8668 17.2402 16.8245 49.7877 37.1241 60.2778 29.6793 45.0721 27.8188 42.2534 96.0624 83.0282 24.7766 44.4 150.936 35.9249 60.7018 75.1938 53.3273 47.0509 39.9576 204.735 141.285 57.7505 23.1096 159.978 192.464 178.53 142.705 |

**Descriptive statistics of the k=8 independent treatments:**

| Treatment → | A | B | C | D | E | F | G | H | Pooled Total |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| observations N | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 256 |
| sum ∑xi | 2,773.9376 | 2,494.3109 | 3,891.6321 | 3,409.0337 | 2,696.5962 | 2,256.4791 | 2,414.6647 | 2,240.9037 | 22,177.5579 |
| mean ¯xx¯ | 86.6856 | 77.9472 | 121.6135 | 106.5323 | 84.2686 | 70.5150 | 75.4583 | 70.0282 | 86.6311 |
| sum of squares ∑x2i | 374,030.2105 | 319,228.0671 | 774,878.2994 | 930,204.1702 | 468,114.7149 | 258,950.0778 | 427,733.0838 | 257,095.1030 | 3,810,233.7267 |
| sample variance s2 | 4,308.7066 | 4,025.9186 | 9,729.1383 | 18,291.3538 | 7,770.2014 | 3,220.4685 | 7,920.2148 | 3,231.2438 | 7,407.7169 |
| sample std. dev. s | 65.6407 | 63.4501 | 98.6364 | 135.2455 | 88.1487 | 56.7492 | 88.9956 | 56.8440 | 86.0681 |
| std. dev. of mean SE¯x | 11.6038 | 11.2165 | 17.4366 | 23.9083 | 15.5826 | 10.0319 | 15.7323 | 10.0487 | 5.3793 |

**One-way ANOVA of your k=8 independent treatments:**

| source | sum of squares SS | degrees of freedom νν | mean square MS | F statistic | p-value |
| --- | --- | --- | --- | --- | --- |
| treatment | 75,553.1864 | 7 | 10,793.3123 | 1.4761 | 0.1762 |
| error | 1,813,414.6230 | 248 | 7,312.1557 |  |  |
| total | 1,888,967.8093 | 255 |  |  |  |

**Conclusion from Anova:**

The p-value corresponing to the F-statistic of one-way ANOVA is higher than 0.05, suggesting that the treatments are not significantly different for that level of significance. The Tukey HSD test, as well as other multiple comparison tests like Scheffe or Bonferroni, might not narrow down which of the pairs of treatments are significantly different. Even though your data does not suggest the presence of significatly different treatment pairs in one-way ANOVA, we proceed witht he multiple conparison tests. In some instances, a Bonferroni test of a small set of pairs might show significance, even though 1-way ANOVA suggests that there is too much noise and randomness in your data.