Table S2a. Raw data of the concentrations of individual phenolic compounds detected in different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Samples** | | | | | | | | | | | | | | | |
| **Phenolics** | **Unit** | **Replicate** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** | **Alfalfa2** | **Buckwheat1** | **Clover4** | **Orange2** | **Buckwheat2** | **Buckwheat3** | **Alfalfa3** | **Orange3** |
| Gallic acid | µg/g honey | 1 | 0.0165 | 0.0203 | 0.0174 | 0.0108 | 0.0198 | 0.0219 | 0.0287 | 0.0138 | 0.0536 | 0.0268 | 0.1020 | 0.0571 | 0.0339 | 0.0333 | 0.0814 | 0.0504 |
|  |  | 2 | 0.0203 | 0.0225 | 0.0157 | 0.0097 | 0.0177 | 0.0205 | 0.0255 | 0.0141 | 0.0523 | 0.0376 | 0.0938 | 0.0682 | 0.0356 | 0.0352 | 0.0741 | 0.0498 |
|  |  | 3 | 0.0197 | 0.0148 | 0.0152 | 0.0085 | 0.0248 | 0.0249 | 0.0271 | 0.0141 | 0.0446 | 0.0347 | 0.0977 | 0.0689 | 0.0354 | 0.0318 | 0.0741 | 0.0497 |
| Protocatechuic acid | µg/g honey | 1 | 0.2343 | 0.3135 | 0.2327 | 0.1994 | 0.2165 | 0.5224 | 0.2179 | 0.3811 | 0.3128 | 0.4278 | 0.4359 | 1.0068 | 0.4168 | 0.3930 | 0.3803 | 0.5212 |
|  |  | 2 | 0.2455 | 0.3184 | 0.2179 | 0.1894 | 0.2146 | 0.5040 | 0.2008 | 0.3828 | 0.3156 | 0.4300 | 0.4292 | 1.0291 | 0.3725 | 0.3890 | 0.3686 | 0.5370 |
|  |  | 3 | 0.2371 | 0.2629 | 0.2115 | 0.1737 | 0.2127 | 0.5432 | 0.1993 | 0.3671 | 0.3069 | 0.4159 | 0.4249 | 1.0472 | 0.3723 | 0.3847 | 0.3455 | 0.5422 |
| Neochlorogenic acid | µg/g honey | 1 | 0.0525 | 0.0843 | 0.0729 | 0.0487 | 0.0279 | 0.0730 | 0.0250 | 0.5482 | 0.0220 | 0.0333 | 0.0274 | 0.1858 | 0.1875 | 0.1696 | 0.0285 | 0.0425 |
|  |  | 2 | 0.0469 | 0.0846 | 0.0734 | 0.0479 | 0.0271 | 0.0655 | 0.0240 | 0.5901 | 0.0227 | 0.0303 | 0.0272 | 0.1869 | 0.1785 | 0.1703 | 0.0261 | 0.0412 |
|  |  | 3 | 0.0474 | 0.0765 | 0.0681 | 0.0495 | 0.0257 | 0.0690 | 0.0225 | 0.5452 | 0.0221 | 0.0322 | 0.0254 | 0.1915 | 0.1766 | 0.1740 | 0.0259 | 0.0437 |
| p-Hydroxybenzoic acid | µg/g honey | 1 | 2.9128 | 4.0834 | 1.9265 | 2.2990 | 1.2341 | 0.9143 | 2.3088 | 2.1480 | 2.1861 | 17.5971 | 3.2330 | 1.8669 | 11.1344 | 10.0128 | 1.9565 | 0.6902 |
|  |  | 2 | 2.5346 | 4.1584 | 1.7533 | 2.3480 | 1.2073 | 0.9158 | 2.1362 | 2.1846 | 2.1595 | 17.0223 | 3.0803 | 1.9199 | 9.7916 | 9.9109 | 1.8527 | 0.6969 |
|  |  | 3 | 2.5052 | 4.1771 | 1.7311 | 2.3617 | 1.1289 | 0.9343 | 2.1052 | 2.0839 | 2.1199 | 17.4609 | 2.9154 | 1.8420 | 9.8864 | 9.5271 | 1.7640 | 0.7138 |
| Vanillic acid | µg/g honey | 1 | 0.6105 | 0.3753 | 0.3622 | 0.4972 | 0.1414 | 0.2634 | 0.6501 | 0.6548 | 0.1977 | 0.2594 | 0.6554 | 0.3672 | 0.2209 | 0.2281 | 0.1220 | 0.1854 |
|  |  | 2 | 0.5933 | 0.3698 | 0.3467 | 0.4699 | 0.1563 | 0.2488 | 0.6009 | 0.6409 | 0.1738 | 0.2530 | 0.6506 | 0.3305 | 0.2052 | 0.2361 | 0.1230 | 0.1864 |
|  |  | 3 | 0.5691 | 0.3719 | 0.3691 | 0.4801 | 0.1368 | 0.2662 | 0.5834 | 0.6264 | 0.1593 | 0.2620 | 0.6358 | 0.3491 | 0.1981 | 0.2229 | 0.1216 | 0.1943 |
| Caffeic acid | µg/g honey | 1 | 1.7817 | 0.7439 | 0.6304 | 1.5111 | 7.1583 | 0.3679 | 4.0660 | 1.6317 | 6.6008 | 1.1570 | 0.9179 | 0.6057 | 1.1284 | 0.9973 | 7.7316 | 0.1616 |
|  |  | 2 | 1.5232 | 0.7476 | 0.5644 | 1.5413 | 6.9531 | 0.3605 | 3.6057 | 1.6159 | 6.6219 | 1.1311 | 0.8766 | 0.6336 | 1.1199 | 0.9985 | 7.0277 | 0.1615 |
|  |  | 3 | 1.5131 | 0.7851 | 0.5813 | 1.5489 | 6.5965 | 0.3705 | 3.6308 | 1.5880 | 6.4451 | 1.1596 | 0.8239 | 0.6325 | 1.1384 | 0.9965 | 6.8248 | 0.1623 |
| Chlorogenic acid | µg/g honey | 1 | 0.1110 | 0.3088 | 0.3946 | 0.1226 | 0.0798 | 0.1122 | 0.0832 | 1.3354 | 0.0836 | 0.0943 | 0.0685 | 0.1257 | 0.4802 | 0.4612 | 0.0938 | 0.0688 |
|  |  | 2 | 0.1097 | 0.2983 | 0.3395 | 0.1194 | 0.0791 | 0.1108 | 0.0736 | 1.3214 | 0.0870 | 0.0942 | 0.0532 | 0.1307 | 0.4450 | 0.4590 | 0.0852 | 0.0674 |
|  |  | 3 | 0.1087 | 0.2827 | 0.3167 | 0.1260 | 0.0755 | 0.1149 | 0.0715 | 1.3215 | 0.0840 | 0.0990 | 0.0634 | 0.1357 | 0.4614 | 0.4338 | 0.0885 | 0.0687 |
| Syringic acid | µg/g honey | 1 | 0.2987 | 0.3034 | 0.1856 | 0.2215 | 0.1090 | 0.1089 | 0.2814 | 0.2649 | 0.2180 | 0.3528 | 0.3665 | 0.2588 | 0.1541 | 0.1489 | 0.2339 | 0.0967 |
|  |  | 2 | 0.2855 | 0.2989 | 0.1759 | 0.2174 | 0.1025 | 0.1061 | 0.2561 | 0.2612 | 0.2047 | 0.3675 | 0.3559 | 0.2636 | 0.1529 | 0.1532 | 0.2211 | 0.0968 |
|  |  | 3 | 0.2837 | 0.3072 | 0.1716 | 0.2200 | 0.0973 | 0.1098 | 0.2537 | 0.2600 | 0.2045 | 0.3604 | 0.3515 | 0.2734 | 0.1504 | 0.1530 | 0.2173 | 0.0954 |
| p-Coumaric acid | µg/g honey | 1 | 4.4700 | 2.2650 | 1.0967 | 3.4712 | 1.3736 | 0.5292 | 2.4846 | 1.6954 | 1.7948 | 6.3742 | 3.2291 | 1.5681 | 4.5784 | 3.9754 | 2.0106 | 0.3904 |
|  |  | 2 | 3.8007 | 2.3333 | 1.0084 | 3.5305 | 1.3289 | 0.5186 | 2.2713 | 1.6916 | 1.8221 | 6.2184 | 3.0808 | 1.6644 | 4.2616 | 4.0704 | 1.8903 | 0.3960 |
|  |  | 3 | 3.7732 | 2.3278 | 0.9636 | 3.5092 | 1.2515 | 0.5406 | 2.2283 | 1.6420 | 1.7600 | 6.3262 | 2.9130 | 1.6247 | 4.3550 | 4.0301 | 1.8247 | 0.3953 |
| trans-Ferulic acid | µg/g honey | 1 | 0.8407 | 0.4000 | 0.3368 | 0.9331 | 0.3977 | 0.1536 | 0.6025 | 0.5905 | 0.3586 | 0.3848 | 0.6309 | 0.4011 | 0.3907 | 0.2846 | 0.3828 | 0.1026 |
|  |  | 2 | 0.7963 | 0.3958 | 0.3101 | 0.9270 | 0.3845 | 0.1500 | 0.5540 | 0.5912 | 0.3487 | 0.3619 | 0.6023 | 0.4164 | 0.3600 | 0.2955 | 0.3519 | 0.1062 |
|  |  | 3 | 0.8023 | 0.3978 | 0.3053 | 0.9308 | 0.3556 | 0.1565 | 0.5461 | 0.5835 | 0.3294 | 0.3786 | 0.6050 | 0.4084 | 0.3656 | 0.2938 | 0.3340 | 0.1070 |
| Isoferulic acid | µg/g honey | 1 | 0.4097 | 0.0900 | 0.0972 | 0.3374 | 3.4155 | n.d. | 1.7309 | 0.3437 | 3.1371 | 0.2722 | 0.1169 | n.d. | 0.1397 | 0.1277 | 3.3538 | n.d. |
|  |  | 2 | 0.4237 | 0.0997 | 0.0850 | 0.3470 | 3.5620 | n.d. | 1.5749 | 0.3170 | 2.8964 | 0.2546 | 0.1263 | n.d. | 0.1335 | 0.1255 | 3.4470 | n.d. |
|  |  | 3 | 0.3872 | 0.0854 | 0.0792 | 0.3146 | 3.2886 | n.d. | 1.5340 | 0.3510 | 2.9694 | 0.2868 | 0.0826 | n.d. | 0.1494 | 0.1253 | 3.2904 | n.d. |
| o-Coumaric acid | µg/g honey | 1 | 0.1562 | 0.0845 | 0.0497 | 0.1184 | 0.0147 | 0.0043 | 0.1618 | 0.0447 | 0.0296 | 0.0362 | 0.0518 | 0.0043 | 0.0260 | 0.0253 | 0.0166 | n.d. |
|  |  | 2 | 0.1461 | 0.0854 | 0.0476 | 0.1225 | 0.0136 | 0.0041 | 0.1482 | 0.0425 | 0.0263 | 0.0365 | 0.0528 | 0.0044 | 0.0247 | 0.0257 | 0.0157 | n.d. |
|  |  | 3 | 0.1423 | 0.0796 | 0.0461 | 0.1176 | 0.0125 | 0.0042 | 0.1480 | 0.0407 | 0.0271 | 0.0344 | 0.0515 | 0.0045 | 0.0260 | 0.0258 | 0.0145 | n.d. |
| Ellagic acid | µg/g honey | 1 | 0.1287 | 0.2693 | 0.0856 | 0.0199 | 0.0319 | 0.1391 | 0.0429 | 0.0491 | 0.0380 | 0.1641 | 0.2109 | 0.1433 | 0.0510 | 0.0511 | 0.0501 | 0.0806 |
|  |  | 2 | 0.1216 | 0.2693 | 0.0844 | 0.0207 | 0.0335 | 0.1446 | 0.0381 | 0.0491 | 0.0377 | 0.1588 | 0.2042 | 0.1428 | 0.0482 | 0.0510 | 0.0474 | 0.0797 |
|  |  | 3 | 0.1264 | 0.2557 | 0.0814 | 0.0198 | 0.0341 | 0.1405 | 0.0384 | 0.0469 | 0.0375 | 0.1736 | 0.2053 | 0.1390 | 0.0531 | 0.0480 | 0.0476 | 0.0855 |
| Hesperidin | µg/g honey | 1 | n.d. | n.d. | 0.0393 | n.d. | 0.1956 | 1.7279 | 0.0243 | n.d. | n.d. | n.d. | 0.0235 | 2.0059 | n.d. | n.d. | n.d. | 2.1345 |
|  |  | 2 | n.d. | n.d. | 0.0361 | n.d. | 0.1934 | 1.6929 | 0.0203 | n.d. | n.d. | n.d. | 0.0230 | 2.1162 | n.d. | n.d. | n.d. | 2.1905 |
|  |  | 3 | n.d. | n.d. | 0.0348 | n.d. | 0.1783 | 1.7359 | 0.0214 | n.d. | n.d. | n.d. | 0.0239 | 2.0542 | n.d. | n.d. | n.d. | 2.1754 |
| Myricetin | µg/g honey | 1 | 0.0957 | 0.1727 | 0.1053 | 0.0566 | 0.0591 | 0.0349 | 0.0708 | 0.0759 | 0.0146 | 0.0239 | 0.0249 | 0.0146 | 0.1825 | 0.1867 | 0.1894 | n.d. |
|  |  | 2 | 0.0840 | 0.1766 | 0.1169 | 0.0558 | 0.0528 | 0.0362 | 0.0600 | 0.0737 | 0.0147 | 0.0183 | 0.0290 | 0.0121 | 0.1841 | 0.1821 | 0.1957 | n.d. |
|  |  | 3 | 0.0698 | 0.1840 | 0.1121 | 0.0604 | 0.0603 | 0.0347 | 0.0604 | 0.0743 | 0.0197 | 0.0184 | 0.0245 | 0.0125 | 0.1848 | 0.1840 | 0.1985 | n.d. |
| Kaempferol-rutinoside | µg/g honey | 1 | 0.0375 | 0.0502 | 0.0228 | 0.0511 | 0.0244 | 0.0612 | 0.0275 | 0.0268 | 0.0364 | 0.0237 | 0.0295 | 0.0538 | n.d. | n.d. | n.d. | 0.0327 |
|  |  | 2 | 0.0348 | 0.0478 | 0.0200 | 0.0533 | 0.0233 | 0.0601 | 0.0259 | 0.0265 | 0.0371 | 0.0240 | 0.0255 | 0.0528 | n.d. | n.d. | n.d. | 0.0367 |
|  |  | 3 | 0.0333 | 0.0492 | 0.0197 | 0.0517 | 0.0221 | 0.0598 | 0.0249 | 0.0262 | 0.0376 | 0.0242 | 0.0265 | 0.0538 | n.d. | n.d. | n.d. | 0.0331 |
| P5ME | µg/g honey | 1 | 3.2698 | 0.8841 | 0.5279 | 3.2659 | 1.6461 | 0.1448 | 2.4860 | 1.0704 | 0.9261 | 1.5087 | 1.5161 | 0.8069 | 2.4278 | 2.1288 | 1.9433 | 0.0471 |
|  |  | 2 | 2.6731 | 0.9284 | 0.5035 | 3.3509 | 1.5968 | 0.1439 | 2.2979 | 1.0620 | 0.9380 | 1.5219 | 1.4559 | 0.8178 | 2.2736 | 2.1447 | 1.8277 | 0.0493 |
|  |  | 3 | 2.5938 | 0.8883 | 0.4766 | 3.3888 | 1.4844 | 0.1469 | 2.2802 | 1.0397 | 0.8816 | 1.5463 | 1.3828 | 0.8282 | 2.3076 | 2.1129 | 1.7877 | 0.0482 |
| Pinobanksin | µg/g honey | 1 | 7.7588 | 2.7046 | 1.9807 | 9.7638 | 6.4856 | 0.3874 | 7.0444 | 2.3107 | 8.2238 | 7.2314 | 6.7619 | 2.5014 | 4.5790 | 3.9560 | 7.7706 | 0.1394 |
|  |  | 2 | 6.7199 | 2.7714 | 1.7688 | 9.8729 | 6.2974 | 0.3929 | 6.3529 | 2.2575 | 8.3712 | 6.9956 | 6.4626 | 2.5182 | 4.2759 | 4.0185 | 7.0889 | 0.1399 |
|  |  | 3 | 6.8309 | 2.8463 | 1.7860 | 9.5679 | 6.0003 | 0.3955 | 6.4835 | 2.3427 | 8.2082 | 7.0643 | 6.1565 | 2.4916 | 4.2810 | 3.9899 | 6.8827 | 0.1404 |
| Quercetin | µg/g honey | 1 | 1.1878 | 0.9427 | 0.8116 | 0.9200 | 0.5730 | 0.3455 | 0.8218 | 1.2214 | 0.4717 | 0.7503 | 0.7665 | 0.9084 | 1.1484 | 1.0329 | 0.8111 | 0.3099 |
|  |  | 2 | 1.1425 | 0.9467 | 0.7752 | 0.9381 | 0.5877 | 0.3594 | 0.8006 | 1.2324 | 0.5170 | 0.6641 | 0.8378 | 0.7668 | 1.0356 | 1.0677 | 0.8042 | 0.3081 |
|  |  | 3 | 1.1677 | 0.9566 | 0.7567 | 0.9486 | 0.5588 | 0.3563 | 0.7954 | 1.1583 | 0.5441 | 0.7195 | 0.8160 | 0.7955 | 1.1515 | 0.9801 | 0.7612 | 0.3159 |
| Naringenin | µg/g honey | 1 | 0.2067 | 0.1153 | 0.1070 | 0.1607 | n.d. | n.d. | n.d. | n.d. | 0.1134 | 0.1013 | 0.1109 | 0.0704 | n.d. | n.d. | n.d. | n.d. |
|  |  | 2 | 0.1627 | 0.1039 | 0.1048 | 0.1633 | n.d. | n.d. | n.d. | n.d. | 0.1114 | 0.0996 | 0.1117 | 0.0674 | n.d. | n.d. | n.d. | n.d. |
|  |  | 3 | 0.1504 | 0.1082 | 0.1019 | 0.1561 | n.d. | n.d. | n.d. | n.d. | 0.1058 | 0.0925 | 0.1145 | 0.0659 | n.d. | n.d. | n.d. | n.d. |
| Luteolin | µg/g honey | 1 | 0.1547 | 0.4335 | 0.2788 | 0.1011 | 0.1287 | 0.1542 | 0.1414 | 0.2638 | 0.1485 | 0.1470 | 0.2233 | 0.2949 | 0.1127 | 0.0994 | 0.1594 | 0.1165 |
|  |  | 2 | 0.1465 | 0.4528 | 0.2627 | 0.0990 | 0.1329 | 0.1476 | 0.1304 | 0.2591 | 0.1490 | 0.1447 | 0.2103 | 0.3025 | 0.1048 | 0.1006 | 0.1472 | 0.1153 |
|  |  | 3 | 0.1517 | 0.4311 | 0.2448 | 0.0980 | 0.1250 | 0.1539 | 0.1324 | 0.2448 | 0.1510 | 0.1450 | 0.2100 | 0.2923 | 0.1073 | 0.1017 | 0.1491 | 0.0915 |
| Hesperetin | µg/g honey | 1 | 0.0085 | 0.0078 | 0.0095 | 0.0080 | 0.0506 | 0.1549 | 0.0216 | 0.0100 | 0.0275 | 0.0075 | 0.0133 | 0.2991 | 0.0075 | 0.0067 | 0.0340 | 0.1981 |
|  |  | 2 | 0.0070 | 0.0084 | 0.0088 | 0.0070 | 0.0520 | 0.1529 | 0.0198 | 0.0091 | 0.0285 | 0.0073 | 0.0124 | 0.3021 | 0.0070 | 0.0066 | 0.0319 | 0.1952 |
|  |  | 3 | 0.0081 | 0.0074 | 0.0083 | 0.0076 | 0.0474 | 0.1583 | 0.0194 | 0.0096 | 0.0296 | 0.0070 | 0.0126 | 0.3031 | 0.0071 | 0.0065 | 0.0309 | 0.1996 |
| Kaempferol | µg/g honey | 1 | 6.2179 | 5.9060 | 4.3331 | 4.3438 | 2.4088 | 0.8718 | 4.0544 | 2.8298 | 3.5028 | 4.9260 | 5.5639 | 1.2678 | 4.4344 | 4.0113 | 4.6524 | 0.5883 |
|  |  | 2 | 5.2011 | 5.8998 | 4.0365 | 4.3407 | 2.3817 | 0.8744 | 3.7814 | 2.8670 | 3.4624 | 4.6099 | 5.4456 | 1.2677 | 4.2422 | 4.1883 | 4.4963 | 0.5852 |
|  |  | 3 | 5.1730 | 5.9269 | 3.9881 | 4.4078 | 2.2918 | 0.8807 | 3.7665 | 2.7874 | 3.5646 | 4.6613 | 5.1158 | 1.2411 | 4.4027 | 3.9441 | 4.2370 | 0.5788 |
| Apigenin | µg/g honey | 1 | 0.6923 | 0.6178 | 0.4746 | 0.6229 | 0.5141 | 0.0927 | 0.7579 | 0.5807 | 1.1860 | 0.7237 | 0.6275 | 0.2440 | 0.4787 | 0.4162 | 1.0107 | 0.0411 |
|  |  | 2 | 0.6557 | 0.6020 | 0.4403 | 0.6207 | 0.5207 | 0.0889 | 0.6812 | 0.5821 | 1.1965 | 0.7256 | 0.6045 | 0.2294 | 0.4463 | 0.4288 | 0.9236 | 0.0402 |
|  |  | 3 | 0.6536 | 0.5955 | 0.4424 | 0.6345 | 0.4821 | 0.0924 | 0.6770 | 0.5534 | 1.1383 | 0.6828 | 0.6028 | 0.2420 | 0.4517 | 0.4238 | 0.9137 | 0.0405 |
| Isorhamnetin | µg/g honey | 1 | 0.8893 | 0.4629 | 0.3775 | 0.8662 | 0.4354 | 0.1008 | 0.6852 | 0.4421 | 0.4051 | 0.5026 | 0.6659 | 0.4105 | 0.6876 | 0.6001 | 0.5746 | 0.1006 |
|  |  | 2 | 0.8249 | 0.5074 | 0.3592 | 0.8299 | 0.4490 | 0.1010 | 0.6822 | 0.4725 | 0.4427 | 0.5195 | 0.6992 | 0.4438 | 0.6520 | 0.6082 | 0.5350 | 0.1038 |
|  |  | 3 | 0.8450 | 0.4953 | 0.3285 | 0.8551 | 0.4514 | 0.0987 | 0.6813 | 0.4045 | 0.3756 | 0.5097 | 0.6579 | 0.4206 | 0.6425 | 0.5857 | 0.5513 | 0.1010 |
| Pinocembrin | µg/g honey | 1 | 7.7588 | 2.7046 | 1.9807 | 9.7638 | 5.6304 | 0.3568 | 7.2053 | 2.8398 | 8.2238 | 7.2314 | 6.7619 | 2.5014 | 5.4467 | 4.6113 | 6.1209 | 0.0943 |
|  |  | 2 | 6.7199 | 2.7714 | 1.7688 | 9.8729 | 5.5022 | 0.3532 | 6.5503 | 2.8179 | 8.3712 | 6.9956 | 6.4626 | 2.5182 | 4.9730 | 4.6015 | 5.6792 | 0.0963 |
|  |  | 3 | 6.8309 | 2.8463 | 1.7860 | 9.5679 | 4.9948 | 0.3570 | 6.5228 | 2.7820 | 8.2082 | 7.0643 | 6.1565 | 2.4916 | 5.0189 | 4.6173 | 5.4814 | 0.0915 |
| Chrysin | µg/g honey | 1 | 2.4259 | 1.0478 | 0.7552 | 2.7195 | 1.8514 | 0.1757 | 2.1646 | 1.1961 | 1.9432 | 2.2218 | 1.6926 | 0.4706 | 1.8625 | 1.6699 | 2.4383 | 0.0428 |
|  |  | 2 | 2.0068 | 1.0464 | 0.6919 | 2.8011 | 1.8696 | 0.1758 | 2.0819 | 1.1877 | 1.9705 | 2.1756 | 1.6569 | 0.4709 | 1.6844 | 1.6763 | 2.3312 | 0.0464 |
|  |  | 3 | 2.0835 | 1.0487 | 0.6851 | 2.7082 | 1.8212 | 0.1793 | 2.0143 | 1.1674 | 1.9462 | 2.2613 | 1.5525 | 0.4518 | 1.7328 | 1.6597 | 2.3003 | 0.0436 |
| Galangin | µg/g honey | 1 | 2.3130 | 0.8469 | 0.5015 | 2.4703 | 1.8998 | 0.1321 | 1.9408 | 0.9080 | 1.7541 | 1.9396 | 1.4865 | 0.4230 | 1.6942 | 1.4350 | 2.2550 | 0.0346 |
|  |  | 2 | 1.9549 | 0.8250 | 0.4622 | 2.5455 | 1.9196 | 0.1325 | 1.9419 | 0.9352 | 1.7767 | 1.8186 | 1.5142 | 0.4152 | 1.5907 | 1.5036 | 2.1693 | 0.0342 |
|  |  | 3 | 1.9277 | 0.8314 | 0.4539 | 2.5445 | 1.7740 | 0.1305 | 2.0066 | 0.9019 | 1.7104 | 1.8639 | 1.4085 | 0.4094 | 1.5993 | 1.4570 | 2.1336 | 0.0316 |
| Acacetin | µg/g honey | 1 | 0.0301 | 0.0075 | 0.0052 | 0.0308 | 0.0073 | 0.0019 | 0.0136 | 0.0069 | 0.0099 | 0.0482 | 0.0196 | 0.0060 | 0.4404 | 0.3870 | 0.8001 | 0.0095 |
|  |  | 2 | 0.0280 | 0.0082 | 0.0055 | 0.0301 | 0.0083 | 0.0019 | 0.0145 | 0.0070 | 0.0118 | 0.0459 | 0.0201 | 0.0058 | 0.4126 | 0.3966 | 0.7552 | 0.0092 |
|  |  | 3 | 0.0316 | 0.0090 | 0.0053 | 0.0314 | 0.0080 | 0.0019 | 0.0141 | 0.0065 | 0.0124 | 0.0458 | 0.0191 | 0.0064 | 0.4180 | 0.3852 | 0.7549 | 0.0085 |
| 5-HMF | µg/g honey | 1 | 3.0882 | 2.4285 | 3.8189 | 2.1484 | 6.3206 | 7.3849 | 10.9578 | 5.3312 | 18.2447 | 9.8713 | 8.2655 | 10.1297 | 1.2729 | 2.1871 | 7.0812 | 10.1072 |
|  |  | 2 | 2.9128 | 2.2767 | 3.7084 | 2.0306 | 6.0529 | 8.4756 | 12.1401 | 5.9817 | 15.9152 | 9.3605 | 8.1329 | 10.7223 | 1.4809 | 2.0597 | 7.3877 | 10.2705 |
|  |  | 3 | 2.8063 | 2.4568 | 4.2213 | 2.1883 | 7.1892 | 8.6617 | 12.4075 | 6.3121 | 15.3214 | 10.3824 | 8.7295 | 10.2533 | 1.2882 | 1.7612 | 7.0142 | 10.9162 |
| Furfural | µg/g honey | 1 | 0.4899 | 1.0459 | 0.8089 | 0.6402 | 0.6064 | 1.1538 | 1.4657 | 0.9026 | 1.2925 | 11.2616 | 0.8769 | 0.5246 | 5.8509 | 8.0939 | 0.9911 | 0.9507 |
|  |  | 2 | 0.4759 | 1.0141 | 0.8178 | 0.6335 | 0.5891 | 1.1794 | 1.4632 | 0.9292 | 1.2329 | 10.6511 | 0.8646 | 0.5240 | 5.9681 | 7.6421 | 1.0392 | 0.9040 |
|  |  | 3 | 0.4842 | 1.0370 | 0.8581 | 0.6409 | 0.5994 | 1.1702 | 1.3890 | 0.9352 | 1.2261 | 10.7133 | 0.8679 | 0.5288 | 5.4936 | 7.4391 | 1.0304 | 0.9245 |
| Abscisic acid | µg/g honey | 1 | 2.4772 | 0.9871 | 0.6744 | 0.4840 | 1.6376 | 5.0933 | 0.6213 | 0.7315 | 1.4108 | 1.9875 | 2.1636 | 7.9358 | 0.6706 | 0.6227 | 0.4942 | 9.6220 |
|  |  | 2 | 2.1046 | 0.9746 | 0.5964 | 0.4944 | 1.5807 | 5.0703 | 0.5695 | 0.7355 | 1.3977 | 1.9279 | 2.1182 | 8.0886 | 0.6225 | 0.6327 | 0.4622 | 9.7497 |
|  |  | 3 | 2.1266 | 0.9504 | 0.6068 | 0.4900 | 1.5125 | 5.0985 | 0.5695 | 0.7164 | 1.3799 | 2.0048 | 2.0339 | 7.8616 | 0.6311 | 0.6226 | 0.4482 | 10.1891 |

Table S2b. Raw data of the concentrations of individual amino acids detected in different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **Samples** | | | | | | | | | | | | | | | |
| **Amino acids** | **Unit** |  | **Replicate** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** | **Alfalfa2** | **Buckwheat1** | **Clover4** | **Orange2** | **Buckwheat2** | **Buckwheat3** | **Alfalfa3** | **Orange3** |
| **Free amino acids** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ala | µg/g honey |  | 1 | 14.0213 | 40.6453 | 13.2971 | 14.2453 | 10.4376 | 10.5720 | 11.9607 | 18.4113 | 13.6256 | 24.3767 | 9.6536 | 10.0941 | 35.3295 | 35.9193 | 14.8052 | 9.0041 |
|  |  |  | 2 | 13.5957 | 40.5557 | 13.5733 | 15.1561 | 10.6690 | 10.6914 | 11.7367 | 18.8220 | 14.2677 | 24.2946 | 9.4894 | 11.0274 | 27.4005 | 38.4727 | 16.0222 | 9.6984 |
|  |  |  | 3 | 14.2378 | 40.1675 | 13.3195 | 14.6260 | 10.4898 | 10.5048 | 12.0055 | 18.2844 | 14.6186 | 23.5555 | 9.4969 | 10.5794 | 39.7643 | 35.8820 | 15.4100 | 9.6835 |
| Arg | µg/g honey |  | 1 | 20.3898 | 15.8654 | 14.7118 | 17.8729 | 9.2286 | 11.7455 | 11.8803 | 11.6106 | 13.3784 | 9.8428 | 15.6406 | 20.1201 | 21.8879 | 17.0639 | 18.0077 | 16.7043 |
|  |  |  | 2 | 21.6482 | 16.9141 | 16.6893 | 19.0714 | 8.6443 | 13.0339 | 12.6743 | 13.3485 | 16.8242 | 11.1911 | 15.6556 | 22.4572 | 17.9777 | 13.7829 | 20.3298 | 15.4009 |
|  |  |  | 3 | 20.1051 | 16.6744 | 14.6519 | 19.1014 | 10.1424 | 11.6106 | 12.3148 | 12.7492 | 16.8541 | 11.2211 | 17.6931 | 21.5284 | 18.1126 | 14.3972 | 19.3860 | 18.6669 |
| Asn | µg/g honey |  | 1 | 37.0356 | 102.4381 | 40.5424 | 110.1925 | 33.5867 | 26.4573 | 39.1189 | 42.0701 | 33.0196 | 32.7997 | 28.5637 | 34.0496 | 59.3148 | 59.5347 | 59.6505 | 37.6837 |
|  |  |  | 2 | 34.4778 | 104.3941 | 42.4405 | 107.6694 | 34.7440 | 27.5337 | 40.5656 | 39.4776 | 33.1353 | 35.7278 | 26.2258 | 34.1075 | 55.4145 | 52.8915 | 58.8403 | 38.4129 |
|  |  |  | 3 | 36.9199 | 102.0909 | 40.6234 | 104.5793 | 33.3668 | 26.4110 | 42.9034 | 39.0494 | 35.9245 | 35.7162 | 27.5337 | 36.5379 | 58.9676 | 53.2734 | 44.5816 | 46.4681 |
| Asp | µg/g honey |  | 1 | 23.3831 | 37.1055 | 37.9546 | 24.6911 | 38.7118 | 15.9483 | 23.1995 | 24.5764 | 34.0191 | 20.0673 | 15.4205 | 16.0286 | 25.5860 | 26.4810 | 37.8169 | 17.6119 |
|  |  |  | 2 | 22.5341 | 35.9008 | 36.9105 | 24.1863 | 39.1593 | 17.7840 | 24.7485 | 24.3240 | 36.5548 | 19.6657 | 15.1681 | 18.1397 | 23.2110 | 28.1791 | 40.6738 | 17.0841 |
|  |  |  | 3 | 24.8632 | 35.3845 | 37.7824 | 24.0486 | 40.6279 | 15.5467 | 25.0927 | 24.3125 | 35.3730 | 18.4036 | 15.0189 | 15.4319 | 31.8047 | 27.0547 | 35.9467 | 18.1741 |
| Cys | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.4693 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.5640 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.4693 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Gln | µg/g honey |  | 1 | 23.1897 | 116.2600 | 19.8832 | 30.3147 | 7.9600 | 10.5428 | 15.0627 | 23.3789 | 6.4682 | 37.9184 | 18.4805 | 12.1459 | 100.2176 | 80.8243 | 9.1734 | 14.4727 |
|  |  |  | 2 | 20.2172 | 115.2470 | 19.0705 | 29.7135 | 8.2272 | 10.0863 | 13.9940 | 24.4031 | 5.8893 | 37.7069 | 17.3115 | 11.9566 | 86.4241 | 82.8170 | 9.6856 | 13.2592 |
|  |  |  | 3 | 19.8943 | 114.1225 | 19.6828 | 28.4666 | 7.6260 | 9.4184 | 14.8289 | 23.7352 | 6.8689 | 36.4934 | 16.7883 | 13.3705 | 105.6727 | 79.8891 | 5.6889 | 12.8807 |
| Glu | µg/g honey |  | 1 | 29.1776 | 35.2472 | 25.2556 | 27.3388 | 31.4151 | 8.6286 | 20.4591 | 21.8221 | 24.7283 | 18.9674 | 17.9515 | 13.5536 | 26.1300 | 22.2336 | 20.3305 | 6.9440 |
|  |  |  | 2 | 29.1648 | 35.4272 | 24.8184 | 28.1618 | 31.6338 | 9.1301 | 20.5105 | 21.4492 | 26.5029 | 19.1731 | 17.9001 | 14.6081 | 20.0861 | 23.3010 | 21.9250 | 6.9954 |
|  |  |  | 3 | 29.8463 | 35.3758 | 25.5899 | 27.3773 | 31.0551 | 8.6414 | 21.3592 | 21.7450 | 26.6958 | 18.2473 | 17.7843 | 14.5310 | 29.5634 | 22.2208 | 20.6648 | 7.3298 |
| Gly | µg/g honey |  | 1 | 12.5908 | 15.2002 | 12.7560 | 13.3835 | 12.3728 | 11.6198 | 13.0665 | 13.6808 | 10.4505 | 17.8029 | 12.1284 | 11.8179 | 36.4447 | 37.6272 | 33.5778 | 30.7571 |
|  |  |  | 2 | 13.3902 | 14.8434 | 12.8022 | 13.0202 | 12.4323 | 11.3621 | 12.6371 | 13.3175 | 10.9262 | 17.6047 | 11.9567 | 12.2473 | 35.7313 | 38.8757 | 35.3481 | 31.2459 |
|  |  |  | 3 | 13.1391 | 14.6387 | 12.8287 | 12.6965 | 12.0558 | 10.8997 | 12.6701 | 13.1788 | 12.2209 | 16.9970 | 11.7123 | 11.9435 | 38.7832 | 37.1119 | 30.7240 | 30.8495 |
| His | µg/g honey |  | 1 | 23.8116 | 28.2084 | 24.6391 | 23.1200 | 16.0061 | 11.2759 | 13.4743 | 17.7723 | 14.8082 | 15.0305 | 12.2146 | 17.4511 | 19.6989 | 16.2284 | 17.0559 | 14.9934 |
|  |  |  | 2 | 22.5642 | 30.8513 | 22.5395 | 22.4778 | 15.6233 | 13.3261 | 13.5484 | 15.8826 | 14.1165 | 13.3755 | 13.3385 | 17.0683 | 15.9444 | 15.0922 | 20.6375 | 15.3269 |
|  |  |  | 3 | 22.6754 | 31.3083 | 23.0829 | 23.5152 | 18.1181 | 11.7823 | 14.6970 | 17.8217 | 13.4867 | 12.3751 | 12.9803 | 15.1416 | 17.1424 | 18.0934 | 18.2539 | 16.1667 |
| Ile | µg/g honey |  | 1 | 9.8029 | 29.2625 | 5.9538 | 20.8439 | 3.9392 | 3.7141 | 7.1581 | 11.0747 | 5.8075 | 140.4826 | 9.2402 | 4.3556 | 82.2389 | 73.6403 | 4.0742 | 3.1626 |
|  |  |  | 2 | 9.9267 | 29.9491 | 5.9200 | 20.8327 | 4.0405 | 3.6128 | 6.9892 | 11.1085 | 5.6612 | 142.1145 | 9.1952 | 4.4794 | 65.5255 | 77.8045 | 4.4006 | 3.6803 |
|  |  |  | 3 | 9.8142 | 29.8140 | 6.0213 | 20.4387 | 3.9054 | 3.5340 | 7.0455 | 11.1085 | 5.8300 | 139.5822 | 9.0826 | 4.7495 | 89.0256 | 73.8879 | 4.6820 | 3.6015 |
| Leu | µg/g honey |  | 1 | 14.9812 | 30.9532 | 7.7301 | 27.1317 | 4.7578 | 5.2913 | 8.5032 | 13.8163 | 6.0752 | 169.2357 | 12.6078 | 6.5652 | 93.0883 | 84.8356 | 6.3039 | 5.1498 |
|  |  |  | 2 | 13.8272 | 31.5303 | 7.8935 | 26.9357 | 4.8994 | 5.3240 | 8.1439 | 13.5985 | 6.0861 | 171.3696 | 12.5533 | 6.7829 | 75.4179 | 88.6462 | 6.6849 | 6.0426 |
|  |  |  | 3 | 13.8054 | 31.6936 | 7.8935 | 27.6217 | 4.7470 | 5.1389 | 8.3507 | 13.9578 | 6.1623 | 168.0925 | 12.5315 | 6.8156 | 101.2431 | 85.3691 | 7.2729 | 5.9773 |
| Lys | µg/g honey |  | 1 | 20.0702 | 14.1040 | 17.9662 | 17.1698 | 12.2856 | 7.0182 | 13.9687 | 15.2612 | 13.0821 | 12.0602 | 17.0420 | 10.3695 | 17.5981 | 15.8172 | 12.6763 | 8.1303 |
|  |  |  | 2 | 21.4378 | 14.1115 | 17.0270 | 17.5154 | 12.0752 | 6.2292 | 13.7208 | 16.8842 | 12.9168 | 11.0758 | 16.8542 | 10.5498 | 15.4640 | 14.1791 | 13.5404 | 8.4233 |
|  |  |  | 3 | 21.7008 | 14.1340 | 17.6807 | 17.0495 | 12.4058 | 6.4697 | 14.2693 | 16.2756 | 13.1121 | 10.8203 | 17.2825 | 10.1441 | 14.9606 | 14.3670 | 13.3526 | 9.2048 |
| Met | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.4271 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.4271 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.3634 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Nval | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 53.4882 | n.d. | n.d. | 37.5598 | 32.9166 | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 56.2035 | n.d. | n.d. | 21.7021 | 34.3096 | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 52.9734 | n.d. | n.d. | 33.3204 | 28.3137 | n.d. | n.d. |
| Phe | µg/g honey |  | 1 | 136.4931 | 170.3420 | 66.1776 | 664.9571 | 22.0123 | 56.8745 | 146.4578 | 134.0864 | 50.1188 | 148.0060 | 72.8489 | 93.0456 | 154.3816 | 139.5332 | 25.1227 | 31.3858 |
|  |  |  | 2 | 131.1167 | 171.2568 | 65.4035 | 658.2718 | 22.2234 | 57.0574 | 145.6696 | 133.7768 | 49.0632 | 150.1312 | 72.5955 | 94.9456 | 144.0792 | 138.0413 | 24.4472 | 31.6392 |
|  |  |  | 3 | 131.5249 | 170.3420 | 65.9524 | 651.7835 | 21.7027 | 56.2130 | 147.9356 | 132.4256 | 49.8232 | 147.6682 | 72.1592 | 94.9315 | 161.5033 | 140.5325 | 25.0242 | 31.2732 |
| Pro | µg/g honey |  | 1 | 402.9887 | 661.8183 | 445.0925 | 437.5827 | 330.3690 | 292.2796 | 356.9658 | 434.6274 | 560.0596 | 454.2865 | 279.2831 | 311.4832 | 490.9141 | 481.3282 | 433.7059 | 234.2559 |
|  |  |  | 2 | 397.9257 | 663.3224 | 439.7540 | 438.8643 | 333.5466 | 294.3027 | 355.1546 | 431.7040 | 561.9132 | 459.2330 | 276.9846 | 319.7662 | 398.1693 | 510.5837 | 466.0649 | 260.2172 |
|  |  |  | 3 | 397.5020 | 660.5685 | 444.5947 | 432.0324 | 326.0156 | 290.9132 | 360.6731 | 430.2317 | 570.8106 | 450.3144 | 276.7727 | 320.8996 | 532.7425 | 482.3874 | 460.8748 | 258.3636 |
| Ser | µg/g honey |  | 1 | 19.9288 | 50.0253 | 20.2090 | 24.3303 | 19.0069 | 20.2632 | 20.8055 | 22.4594 | 12.9424 | 30.1056 | 17.1541 | 16.3226 | 36.9293 | 38.8272 | 22.8481 | 18.4827 |
|  |  |  | 2 | 21.5195 | 51.0014 | 18.2748 | 22.2967 | 18.5550 | 19.6396 | 19.6486 | 21.7093 | 13.1051 | 29.6717 | 16.7836 | 16.2051 | 36.4141 | 36.9021 | 23.6073 | 17.9856 |
|  |  |  | 3 | 18.2025 | 48.4979 | 17.6693 | 21.7545 | 17.6783 | 18.2568 | 19.9197 | 21.2303 | 14.7048 | 28.6685 | 16.1328 | 16.3045 | 40.5535 | 35.3386 | 14.8314 | 21.0405 |
| Thr | µg/g honey |  | 1 | 9.2756 | 46.6079 | 8.5451 | 10.4062 | 7.9147 | 5.7134 | 7.3144 | 9.8759 | 8.0148 | 20.6624 | 6.6140 | 6.0536 | 23.6142 | 21.0126 | 8.3350 | 5.9736 |
|  |  |  | 2 | 9.6158 | 46.3978 | 8.2650 | 10.4763 | 8.2249 | 5.6634 | 7.0943 | 10.0560 | 8.1649 | 20.3522 | 6.6840 | 6.0036 | 19.8719 | 22.1233 | 8.8453 | 5.7534 |
|  |  |  | 3 | 9.2555 | 46.1276 | 8.7052 | 10.1761 | 8.0848 | 5.4032 | 7.2543 | 9.5457 | 8.3450 | 19.1315 | 6.7440 | 5.9736 | 25.3952 | 21.4829 | 8.3350 | 6.0036 |
| Trp | µg/g honey |  | 1 | 4.2115 | 2.3319 | 1.8514 | 32.1799 | n.d. | n.d. | 2.0492 | 2.3177 | n.d. | n.d. | 1.2578 | 0.7632 | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 2 | 4.7768 | 2.4167 | 1.7666 | 32.0386 | n.d. | n.d. | 2.0351 | 2.4025 | n.d. | n.d. | 1.3567 | 0.9045 | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 3 | 4.2539 | 2.3743 | 1.8090 | 31.2754 | n.d. | n.d. | 2.0068 | 2.4025 | n.d. | n.d. | 1.1447 | 0.8338 | n.d. | n.d. | n.d. | n.d. |
| Tyr | µg/g honey |  | 1 | 37.2739 | 78.8094 | 29.5573 | 197.3127 | 13.0284 | 17.3509 | 48.6585 | 48.4150 | 18.0510 | 192.9902 | 28.6137 | 31.4751 | 140.7550 | 122.3083 | 9.6495 | 11.0498 |
|  |  |  | 2 | 40.2266 | 79.1290 | 28.1571 | 193.1424 | 13.0740 | 16.3311 | 48.4758 | 49.6478 | 15.6614 | 195.6080 | 28.9181 | 30.2574 | 129.6139 | 130.8772 | 12.0391 | 10.8671 |
|  |  |  | 3 | 39.4199 | 78.4745 | 28.6593 | 191.3768 | 12.8914 | 17.1682 | 49.5108 | 48.5063 | 15.2657 | 192.6401 | 30.8967 | 30.6227 | 146.3407 | 128.1832 | 10.1822 | 10.2279 |
| Val | µg/g honey |  | 1 | 11.9286 | 25.0128 | 10.0384 | 24.8365 | 7.2277 | 6.6302 | 9.9699 | 14.3280 | 9.0786 | 77.2223 | 9.9699 | 6.4833 | 58.1542 | 51.8668 | 8.5008 | 7.6390 |
|  |  |  | 2 | 12.5064 | 25.0520 | 9.7152 | 24.6700 | 7.3746 | 6.4442 | 9.7740 | 15.0625 | 8.7457 | 77.9275 | 9.9699 | 6.7184 | 45.5303 | 59.6135 | 9.4214 | 7.5019 |
|  |  |  | 3 | 12.3595 | 24.9051 | 9.8621 | 23.9649 | 7.1983 | 6.5519 | 9.8817 | 14.7981 | 8.7750 | 76.7131 | 9.9503 | 6.6596 | 65.3623 | 54.8832 | 8.1189 | 8.1972 |
| **Hydrolyzed amino acids** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ala | µg/g honey |  | 1 | 72.1555 | 127.1058 | 65.9338 | 60.1268 | 48.1479 | 50.0559 | 57.6713 | 78.4104 | 70.3304 | 220.3654 | 54.8010 | 55.1162 | 168.3683 | 161.3502 | 45.0287 | 31.4902 |
|  |  |  | 2 | 71.8403 | 129.1300 | 67.9081 | 59.4632 | 48.0649 | 49.9729 | 57.1902 | 77.7468 | 73.6487 | 217.5615 | 53.9051 | 55.6969 | 182.3382 | 119.0756 | 46.0740 | 34.4601 |
|  |  |  | 3 | 70.8282 | 126.1269 | 66.3485 | 60.0770 | 48.7950 | 49.7407 | 56.7920 | 81.4798 | 70.0650 | 218.3081 | 54.3365 | 56.6426 | 163.7560 | 148.9399 | 48.8281 | 33.1325 |
| Arg | µg/g honey |  | 1 | 48.0738 | 74.5078 | 45.4105 | 35.1898 | 29.4302 | 44.6115 | 41.5819 | 63.4548 | 69.3475 | 125.7777 | 66.4511 | 41.6817 | 112.4608 | 106.2019 | 26.3341 | 41.7513 |
|  |  |  | 2 | 47.0085 | 75.1403 | 45.0443 | 35.2564 | 29.5634 | 45.1108 | 41.0492 | 61.7569 | 68.2822 | 125.3116 | 66.0183 | 42.1478 | 114.8911 | 112.7937 | 23.2712 | 36.9210 |
|  |  |  | 3 | 46.0763 | 74.3746 | 44.7113 | 35.0233 | 30.3291 | 44.4783 | 41.1491 | 63.5547 | 65.5855 | 125.5113 | 58.7606 | 42.2810 | 109.6976 | 110.3301 | 25.2354 | 32.2581 |
| Asn | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Asp | µg/g honey |  | 1 | 235.7180 | 442.6756 | 244.4889 | 270.9801 | 196.3509 | 153.9497 | 201.1188 | 237.5793 | 246.5542 | 670.4641 | 176.9989 | 177.0244 | 487.2695 | 461.2118 | 176.3104 | 106.7537 |
|  |  |  | 2 | 232.3269 | 446.3217 | 252.0870 | 268.4814 | 194.8211 | 154.2557 | 203.1076 | 236.0495 | 252.1635 | 662.4581 | 166.5197 | 177.3048 | 507.1571 | 334.9771 | 205.4023 | 122.0277 |
|  |  |  | 3 | 229.8792 | 438.0607 | 246.7836 | 274.3712 | 198.1612 | 154.2047 | 197.3963 | 241.6843 | 240.8174 | 667.2260 | 166.0862 | 179.9565 | 454.6081 | 413.0993 | 217.1308 | 119.2844 |
| Cys | µg/g honey |  | 1 | 21.5649 | 25.0933 | 22.0389 | 17.7996 | 20.1694 | 30.4121 | 23.0658 | 32.0446 | 14.6136 | 28.8322 | 20.3537 | 19.6164 | 23.3554 | 23.1974 | 19.4321 | 27.8541 |
|  |  |  | 2 | 20.8540 | 26.2781 | 22.1179 | 17.7733 | 20.0904 | 29.7275 | 22.9605 | 32.5975 | 13.0337 | 27.0944 | 21.2226 | 19.3005 | 28.9376 | 25.5409 | 19.8798 | 25.8832 |
|  |  |  | 3 | 20.7223 | 25.2249 | 22.5128 | 18.2736 | 20.5907 | 30.2804 | 23.2501 | 31.5706 | 13.6657 | 26.0148 | 22.2232 | 17.1150 | 24.4613 | 24.8826 | 21.0646 | 26.1282 |
| Gln | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Glu | µg/g honey |  | 1 | 203.0904 | 572.0366 | 190.9741 | 180.8582 | 164.2269 | 136.5938 | 168.3419 | 219.2645 | 217.0070 | 558.0628 | 159.5976 | 151.1390 | 519.1708 | 498.8817 | 157.0257 | 97.5660 |
|  |  |  | 2 | 199.0898 | 579.5521 | 195.0319 | 179.9152 | 162.7695 | 137.0510 | 167.1131 | 219.7789 | 219.6074 | 553.0620 | 151.6534 | 151.1962 | 561.2634 | 371.0036 | 166.3701 | 110.2181 |
|  |  |  | 3 | 197.4609 | 567.3787 | 192.1458 | 181.1440 | 165.7414 | 136.4795 | 165.4557 | 222.5793 | 214.0636 | 557.9200 | 152.2821 | 153.6823 | 513.9413 | 463.1044 | 176.4575 | 103.6849 |
| Gly | µg/g honey |  | 1 | 71.1675 | 97.2828 | 67.6297 | 58.4108 | 49.2653 | 51.5994 | 51.6141 | 60.3485 | 62.9028 | 220.5488 | 55.8125 | 55.8712 | 231.6174 | 237.6361 | 126.2754 | 139.1984 |
|  |  |  | 2 | 68.3930 | 97.6939 | 67.6444 | 58.4548 | 49.5295 | 51.2911 | 50.8214 | 59.7760 | 62.6973 | 218.7579 | 53.5958 | 55.9446 | 240.3665 | 197.8980 | 102.9345 | 102.7731 |
|  |  |  | 3 | 68.2316 | 95.9763 | 67.3361 | 58.4108 | 49.6617 | 51.1737 | 50.9094 | 61.2293 | 61.2293 | 220.1819 | 54.0656 | 56.7079 | 222.8389 | 221.6352 | 107.6908 | 114.1538 |
| His | µg/g honey |  | 1 | 36.7219 | 75.1180 | 38.2863 | 34.9105 | 22.1759 | 19.3764 | 20.5291 | 28.6255 | 19.5411 | 72.0441 | 22.6973 | 29.4489 | 63.6184 | 59.9956 | 20.8036 | 29.7063 |
|  |  |  | 2 | 39.9330 | 73.3615 | 38.8352 | 34.0872 | 22.8894 | 20.5840 | 21.4348 | 33.8127 | 20.5291 | 67.5980 | 22.9718 | 30.4369 | 68.0920 | 60.4622 | 22.8345 | 22.4503 |
|  |  |  | 3 | 34.9654 | 69.2996 | 40.4270 | 31.5073 | 20.6664 | 21.1878 | 23.4109 | 33.7853 | 18.9373 | 75.5846 | 19.6783 | 25.8810 | 60.2426 | 66.3904 | 24.6734 | 27.8754 |
| Ile | µg/g honey |  | 1 | 65.1779 | 119.8513 | 57.0244 | 73.5315 | 41.6428 | 37.7912 | 53.2228 | 102.8940 | 59.9006 | 425.9072 | 48.8459 | 43.5186 | 243.4041 | 190.3564 | 44.1939 | 32.0942 |
|  |  |  | 2 | 63.8773 | 121.3019 | 57.1494 | 73.9316 | 41.4928 | 37.2409 | 51.6971 | 99.9678 | 56.0490 | 427.3828 | 48.9710 | 44.8942 | 272.1664 | 178.3763 | 41.0175 | 28.3621 |
|  |  |  | 3 | 63.3521 | 118.7258 | 56.6492 | 73.2063 | 38.5665 | 39.8170 | 52.7976 | 92.4896 | 58.1249 | 425.5070 | 49.0460 | 43.6437 | 236.6763 | 212.9911 | 46.1447 | 27.4307 |
| Leu | µg/g honey |  | 1 | 103.7460 | 167.1840 | 93.5843 | 99.8749 | 63.1235 | 59.6636 | 75.3417 | 108.6333 | 87.4873 | 634.3556 | 75.8014 | 68.0833 | 365.6999 | 356.5060 | 69.3172 | 52.3753 |
|  |  |  | 2 | 105.9719 | 169.7244 | 94.2134 | 99.7539 | 62.4944 | 59.0830 | 74.6158 | 107.6897 | 85.2130 | 626.3230 | 76.3578 | 68.4220 | 398.4834 | 277.4141 | 67.1397 | 42.8485 |
|  |  |  | 3 | 105.1735 | 166.0952 | 93.5117 | 99.4152 | 63.8977 | 59.0588 | 74.4223 | 110.3027 | 84.9469 | 630.8958 | 76.9869 | 67.9865 | 353.4575 | 324.8596 | 69.3656 | 44.6914 |
| Lys | µg/g honey |  | 1 | 93.8596 | 111.3926 | 83.5236 | 73.6884 | 60.0127 | 55.8048 | 58.6769 | 74.1894 | 71.6346 | 139.0111 | 68.4452 | 57.5581 | 135.2207 | 131.6306 | 55.6211 | 50.9697 |
|  |  |  | 2 | 91.2214 | 112.4279 | 87.3641 | 72.8201 | 59.4450 | 55.0367 | 58.1592 | 69.4805 | 75.2580 | 137.1242 | 66.6752 | 58.3095 | 137.2745 | 132.9998 | 51.8474 | 51.9309 |
|  |  |  | 3 | 90.2195 | 110.6913 | 84.9930 | 73.3378 | 60.5638 | 55.1369 | 52.1146 | 71.2171 | 76.4770 | 136.8571 | 62.9683 | 61.8495 | 133.6844 | 138.6605 | 51.0292 | 52.8986 |
| Met | µg/g honey |  | 1 | 23.1345 | 38.1421 | 21.6620 | 19.3967 | 21.2373 | 31.6294 | 25.9095 | 40.3225 | 26.4192 | 101.4009 | 33.9230 | 30.0153 | 79.1159 | 43.3524 | 18.1791 | 17.0610 |
|  |  |  | 2 | 19.1985 | 39.1615 | 22.0868 | 19.4533 | 21.7470 | 32.8753 | 26.6740 | 38.7651 | 27.2687 | 95.5394 | 31.1197 | 29.8171 | 56.2363 | 51.3376 | 19.5383 | 14.1582 |
|  |  |  | 3 | 19.2268 | 38.5952 | 21.6903 | 19.4250 | 21.4921 | 30.9781 | 26.4192 | 39.4447 | 24.4370 | 104.2325 | 31.8276 | 27.1837 | 46.2689 | 38.4819 | 13.9883 | 13.0374 |
| Nval | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 60.3398 | n.d. | n.d. | 33.1084 | 29.4521 | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 51.7935 | n.d. | n.d. | 35.1048 | 32.0093 | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 54.7993 | n.d. | n.d. | 34.8356 | 29.3175 | n.d. | n.d. |
| Phe | µg/g honey |  | 1 | 217.0892 | 356.1751 | 135.1764 | 735.0568 | 66.9627 | 141.6193 | 216.8077 | 241.7036 | 140.5246 | 487.6609 | 134.2381 | 175.2101 | 400.8690 | 394.7076 | 80.9432 | 87.7491 |
|  |  |  | 2 | 211.1467 | 361.7736 | 138.5230 | 738.6849 | 65.8993 | 140.9625 | 215.0562 | 239.1390 | 140.1806 | 480.1233 | 138.7419 | 176.4612 | 415.6627 | 342.5386 | 79.6296 | 72.1858 |
|  |  |  | 3 | 209.6767 | 357.0508 | 137.9913 | 733.6494 | 67.3693 | 140.0242 | 212.3039 | 246.3325 | 136.4900 | 483.4386 | 138.6168 | 175.7731 | 407.4683 | 380.3204 | 80.0049 | 78.3630 |
| Pro | µg/g honey |  | 1 | 481.7778 | 780.2644 | 512.0242 | 449.6483 | 357.8026 | 339.1605 | 378.7280 | 442.8693 | 572.3995 | 661.7030 | 320.5418 | 343.9622 | 665.2808 | 618.8637 | 418.2249 | 254.7718 |
|  |  |  | 2 | 466.9959 | 792.1511 | 518.5678 | 455.4387 | 354.8133 | 338.8780 | 362.7221 | 451.1783 | 567.9508 | 655.1594 | 304.1358 | 343.1619 | 690.8667 | 469.8204 | 416.3419 | 268.4991 |
|  |  |  | 3 | 463.4181 | 774.0268 | 514.2368 | 461.3703 | 361.2392 | 337.7011 | 370.5838 | 444.7053 | 561.3366 | 660.0553 | 294.6264 | 332.7581 | 632.8688 | 566.4679 | 445.0113 | 258.9649 |
| Ser | µg/g honey |  | 1 | 95.3007 | 160.0328 | 87.2669 | 76.8029 | 61.2776 | 58.7671 | 71.8822 | 90.6812 | 84.6559 | 283.7731 | 70.6370 | 64.1698 | 237.2977 | 239.3864 | 87.7288 | 56.6877 |
|  |  |  | 2 | 89.8377 | 161.3986 | 86.7849 | 77.0841 | 61.0768 | 58.4457 | 70.8579 | 93.1918 | 85.8208 | 281.3629 | 68.6888 | 64.2702 | 243.3230 | 178.3900 | 74.8748 | 54.3083 |
|  |  |  | 3 | 89.3356 | 157.6026 | 86.4836 | 76.9033 | 61.8400 | 57.9838 | 71.1391 | 93.6939 | 83.7722 | 284.1145 | 69.0503 | 65.3949 | 227.1349 | 214.3813 | 79.6147 | 52.0607 |
| Thr | µg/g honey |  | 1 | 64.8611 | 137.8604 | 60.5252 | 51.8978 | 40.7800 | 37.7115 | 47.4729 | 63.8605 | 57.7680 | 258.2214 | 53.3875 | 45.0492 | 199.0526 | 182.2870 | 46.9170 | 33.6806 |
|  |  |  | 2 | 61.9038 | 139.1723 | 60.6141 | 51.7199 | 40.6021 | 37.8449 | 47.0504 | 63.6826 | 64.0384 | 254.9305 | 45.7385 | 44.6267 | 208.3248 | 142.1518 | 52.8094 | 37.1111 |
|  |  |  | 3 | 61.5258 | 135.9704 | 59.7469 | 51.7199 | 41.2469 | 37.7115 | 46.7391 | 68.6634 | 56.9452 | 256.9762 | 45.3383 | 44.9380 | 196.1620 | 176.7281 | 54.6327 | 39.5143 |
| Trp | µg/g honey |  | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Tyr | µg/g honey |  | 1 | 64.9727 | 119.5957 | 65.5138 | 147.1947 | 38.8957 | 65.3109 | 83.4735 | 100.7229 | 55.5701 | 319.6886 | 64.9727 | 69.7416 | 202.2237 | 170.2277 | 22.3566 | 24.0082 |
|  |  |  | 2 | 70.9592 | 124.1956 | 64.0933 | 148.5138 | 42.7176 | 62.7404 | 81.0383 | 99.0318 | 48.1968 | 314.2094 | 66.0212 | 69.2005 | 178.2436 | 162.1780 | 21.9169 | 17.6891 |
|  |  |  | 3 | 70.1813 | 121.5912 | 65.7168 | 146.6198 | 43.6984 | 63.4845 | 81.0721 | 93.7555 | 48.4674 | 316.4078 | 65.8859 | 66.6976 | 167.9616 | 163.5986 | 17.6891 | 22.5916 |
| Val | µg/g honey |  | 1 | 84.4206 | 133.1273 | 74.9100 | 79.7850 | 49.2943 | 48.7938 | 58.6091 | 81.2214 | 68.2503 | 394.5939 | 53.1247 | 52.0365 | 280.0527 | 239.0067 | 62.7876834 | 51.3502 |
|  |  |  | 2 | 80.0679 | 134.9337 | 75.3887 | 80.0679 | 49.4031 | 48.0103 | 57.9344 | 80.4379 | 68.2068 | 389.6754 | 56.8898 | 51.9495 | 279.0515 | 211.1930 | 51.6447739 | 52.7112 |
|  |  |  | 3 | 79.5238 | 131.7562 | 75.0841 | 79.6762 | 50.2954 | 47.8579 | 57.4339 | 85.4652 | 69.4038 | 392.1129 | 56.9333 | 54.6481 | 255.6123 | 223.4240 | 52.71118516 | 61.5577 |

Table S2c. Raw data of the concentrations of individual organic acids detected in different honey samples

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Samples** | | | | | | | |
| **Oragnic acids** | **Unit** | **Replicate** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** |
| Acetic acid | µg/g honey | 1 | 94.88 | 294.96 | 301.39 | 262.29 | 237.75 | 235.75 | 244.85 | 246.94 |
|  |  | 2 | 89.53 | 277.25 | 308.83 | 259.69 | 220.20 | 246.58 | 235.83 | 253.10 |
|  |  | 3 | 97.68 | 265.01 | 305.73 | 256.67 | 212.17 | 253.79 | 250.88 | 269.44 |
| Citric acid | µg/g honey | 1 | 84.00 | 251.37 | 133.43 | 77.76 | 57.41 | 80.60 | 59.33 | 139.44 |
|  |  | 2 | 82.53 | 253.04 | 128.25 | 79.55 | 55.99 | 80.02 | 59.69 | 139.41 |
|  |  | 3 | 83.77 | 255.40 | 132.84 | 81.53 | 54.64 | 80.24 | 58.88 | 139.66 |
| Gluconic acid | µg/g honey | 1 | 3738.71 | 6380.36 | 3933.98 | 3173.77 | 3141.15 | 3925.90 | 2557.02 | 3717.12 |
|  |  | 2 | 3766.51 | 6422.20 | 3745.36 | 3138.74 | 3242.94 | 3758.44 | 2614.21 | 3802.62 |
|  |  | 3 | 3777.42 | 6490.21 | 3752.73 | 3179.02 | 3130.59 | 3831.11 | 2552.50 | 3637.94 |
| Malic acid | µg/g honey | 1 | 29.87 | 76.97 | 68.88 | 76.30 | 55.23 | 346.10 | 38.91 | 94.82 |
|  |  | 2 | 28.44 | 74.00 | 68.01 | 77.14 | 54.81 | 346.16 | 40.14 | 92.60 |
|  |  | 3 | 29.09 | 76.29 | 70.53 | 81.89 | 54.66 | 334.86 | 41.65 | 95.73 |
| Succinic acid | µg/g honey | 1 | 11.19 | 17.30 | 13.39 | 15.32 | 10.77 | 35.44 | 7.56 | 16.06 |
|  |  | 2 | 8.92 | 19.52 | 12.66 | 15.12 | 10.61 | 36.29 | 9.70 | 17.75 |
|  |  | 3 | 10.34 | 15.77 | 13.21 | 16.38 | 9.53 | 35.69 | 10.11 | 17.14 |
| Lactic acid | µg/g honey | 1 | 53.01 | 109.67 | 44.30 | 51.26 | 53.14 | 84.28 | 19.68 | 46.91 |
|  |  | 2 | 44.16 | 113.60 | 49.36 | 43.29 | 46.94 | 80.72 | 24.23 | 47.98 |
|  |  | 3 | 38.98 | 120.98 | 47.43 | 52.36 | 45.39 | 81.42 | 23.15 | 48.83 |
| Maleic acid | µg/g honey | 1 | 2.15 | 2.24 | 1.72 | 2.24 | 2.14 | 2.19 | 1.30 | 1.40 |
|  |  | 2 | 2.39 | 2.01 | 1.84 | 2.16 | 1.75 | 2.01 | 1.49 | 1.56 |
|  |  | 3 | 2.54 | 1.85 | 2.25 | 2.34 | 1.94 | 2.27 | 1.77 | 1.49 |
| Malonic acid | µg/g honey | 1 | 100.56 | 79.99 | 59.36 | 64.87 | 52.15 | 30.31 | 37.31 | 56.02 |
|  |  | 2 | 91.62 | 73.89 | 61.51 | 70.29 | 47.00 | 33.86 | 45.79 | 63.20 |
|  |  | 3 | 104.60 | 70.05 | 68.40 | 73.43 | 40.54 | 27.01 | 55.21 | 60.78 |
| Gluctaric acid | µg/g honey | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Glycolic acid | µg/g honey | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Oxalic acid | µg/g honey | 1 | 159.33 | 219.35 | 147.87 | 181.15 | 124.41 | 150.60 | 190.43 | 154.96 |
|  |  | 2 | 153.87 | 218.25 | 147.32 | 182.24 | 125.50 | 150.05 | 195.34 | 151.14 |
|  |  | 3 | 152.78 | 216.07 | 147.32 | 181.15 | 123.86 | 148.41 | 195.34 | 150.60 |
| Formic acid | µg/g honey | 1 | 6.35 | 8.64 | 8.29 | 10.41 | 4.94 | 8.64 | 8.47 | 8.29 |
|  |  | 2 | 11.29 | 13.23 | 12.52 | 8.64 | 10.23 | 8.99 | 11.29 | 8.11 |
|  |  | 3 | 5.47 | 8.99 | 15.34 | 4.76 | 7.23 | 7.05 | 6.88 | 7.05 |
| Propionic acid | µg/g honey | 1 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  | 2 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
|  |  | 3 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |

Table S2d. Raw data of the concentrations of minerals detected in different honey samples

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Samples | | | | | | | |
| **Minerals** | **Unit** | **Replicate** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** |
| Calcium | % | 1 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
|  |  | 2 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
|  |  | 3 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Iron | ppm | 1 | <7 | 7.14 | <7 | <7 | <7 | <7 | <7 | <7 |
|  |  | 2 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 |
|  |  | 3 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 |
| Magnesium | % | 1 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 |
|  |  | 2 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 |
|  |  | 3 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 | <0.012 |
| Phosphorus | % | 1 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 |
|  |  | 2 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 |
|  |  | 3 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 | <0.014 |
| Potassium | % | 1 | <0.03 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | 0.03 | 0.04 |
|  |  | 2 | <0.03 | 0.05 | <0.03 | <0.03 | 0.03 | <0.03 | <0.03 | 0.04 |
|  |  | 3 | <0.03 | 0.05 | 0.03 | <0.03 | 0.03 | <0.03 | <0.03 | 0.03 |
| Sodium | % | 1 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
|  |  | 2 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
|  |  | 3 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
| Zinc | ppm | 1 | <7 | 7.38 | <7 | <7 | <7 | <7 | <7 | <7 |
|  |  | 2 | 9.52 | 7.95 | <7 | <7 | <7 | <7 | <7 | <7 |
|  |  | 3 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 |

Table S2e. Raw data of the total phenolic contents (TPC) of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Samples** | | | | | | | | | | | | | | | |
| **Replicate** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** | **Alfalfa2** | **Buckwheat1** | **Clover4** | **Orange2** | **Buckwheat2** | **Buckwheat3** | **Alfalfa3** | **Orange3** |
| 1 | 392.2 | 591.1 | 363.3 | 552.2 | 334.4 | 448.9 | 415.6 | 421.1 | 394.4 | 1584.4 | 347.8 | 420.0 | 1111.1 | 1120.0 | 406.7 | 377.8 |
| 2 | 393.3 | 600.0 | 367.8 | 557.8 | 332.2 | 448.9 | 417.8 | 427.8 | 393.3 | 1575.6 | 343.3 | 421.1 | 1088.9 | 1126.7 | 414.4 | 376.7 |
| 3 | 383.3 | 585.6 | 355.6 | 545.6 | 328.9 | 443.3 | 411.1 | 416.7 | 394.4 | 1600.0 | 344.4 | 415.6 | 1088.9 | 1126.7 | 415.6 | 378.9 |

Table S2f. Raw data of the total protein contents of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Samples** | | | | | | | | | | | | | | | |
| **Protein** | **Unit** | **Replicate** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** | **Alfalfa2** | **Buckwheat1** | **Clover4** | **Orange2** | **Buckwheat2** | **Buckwheat3** | **Alfalfa3** | **Orange3** |
| Protein | µg/g honey | 1 | 3483.1 | 5408.2 | 3269.2 | 4124.8 | 2984.0 | 3768.3 | 3910.9 | 4267.4 | 4410.0 | 8759.4 | 3910.9 | 3483.1 | 8188.9 | 9187.2 | 3483.1 | 4909.1 |
|  |  | 2 | 4053.5 | 4909.1 | 3697.0 | 4623.9 | 3910.9 | 4909.1 | 4837.8 | 5479.5 | 4338.7 | 9044.6 | 3910.9 | 3269.2 | 8188.9 | 9044.6 | 3625.7 | 5051.7 |
|  |  | 3 | 3982.2 | 5693.4 | 3697.0 | 4695.2 | 3697.0 | 4766.5 | 4695.2 | 5194.3 | 4124.8 | 9472.4 | 3839.6 | 3697.0 | 8260.2 | 9329.8 | 3697.0 | 5265.6 |

Table S2g. Raw data of the enzyme activities of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Samples** | | | | | | | |
| **Enzymes** | **Unit** | **Sample** | **Clover1** | **Wildflower1** | **Golden1** | **Clover2** | **Alfalfa1** | **Orange1** | **Clover3** | **Wildflower2** |
| Amylase | U/100g honey | 1 | 1.6144 | 1.5695 | 1.3001 | 1.8837 | 1.2792 | 1.1826 | 2.7768 | 2.5353 |
|  |  | 2 | 1.5246 | 1.7939 | 1.3001 | 1.8837 | 1.2792 | 1.0860 | 2.7285 | 2.6319 |
|  |  | 3 | 1.4348 | 1.5695 | 1.2103 | 1.7042 | 1.2792 | 1.3758 | 2.9700 | 2.6802 |
| Diastase | Diastase unit (DN) | 1 | 7.0862 | 7.4246 | 7.1144 | 8.4962 | 5.2062 | 4.8114 | 7.6878 | 6.7290 |
|  |  | 2 | 7.1708 | 7.3682 | 6.9452 | 9.0884 | 5.0652 | 4.8396 | 7.6032 | 6.8700 |
|  |  | 3 | 6.9452 | 7.3118 | 6.9734 | 9.0038 | 5.4600 | 4.7268 | 7.9698 | 6.8700 |
| Glucose Oxidase | U/100g honey | 1 | 0.6894 | 1.2722 | 1.0021 | 0.7605 | 0.6795 | 1.1913 | 0.9610 | 0.9098 |
|  |  | 2 | 0.6752 | 1.2864 | 0.9879 | 0.7605 | 0.6667 | 1.1529 | 0.9354 | 0.8970 |
|  |  | 3 | 0.6894 | 1.2722 | 1.0306 | 0.7747 | 0.6923 | 1.1785 | 0.9994 | 0.9482 |
| Catalase | U/100g honey | 1 | 170.8301 | 148.4180 | 158.3789 | 149.2480 | 41.8061 | 41.5170 | 53.3707 | 90.9558 |
|  |  | 2 | 168.3398 | 162.5293 | 159.2090 | 174.9805 | 44.9864 | 42.6735 | 53.8044 | 93.5578 |
|  |  | 3 | 176.6406 | 157.5488 | 155.8887 | 167.5098 | 43.5408 | 34.5782 | 54.2381 | 89.5102 |
| Invertase (alpha glucosidase) | mU/100g honey | 1 | 29.4070 | 58.6129 | 35.6827 | 26.8324 | 16.6405 | 26.8786 | 18.7833 | 23.6829 |
|  |  | 2 | 25.7865 | 51.6132 | 32.3035 | 26.1083 | 15.6881 | 24.7357 | 20.2119 | 24.8257 |
|  |  | 3 | 29.4070 | 51.3718 | 35.1999 | 26.8324 | 15.9262 | 24.4976 | 19.4976 | 25.3971 |
| Acid Phosphatase | mg P/100g honey/24 h | 1 | 54.5372 | 49.6000 | 55.8032 | 61.0569 | 55.8665 | 60.4872 | 59.6643 | 55.8665 |
|  |  | 2 | 57.3856 | 51.4989 | 59.9808 | 58.3984 | 52.4484 | 59.7276 | 61.7531 | 59.4744 |
|  |  | 3 | 54.5372 | 51.6888 | 58.0819 | 56.8792 | 48.0809 | 60.2973 | 58.7149 | 59.8542 |

Table S2h. Raw data of sugar concentrations of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sugar** | **Unit** | **Sample** | **Replicates** | **Clover 1** | **Buckwheat** | **Orange 1** | **Alfalfa 1** | **Wildflower 1** | **Golden** | **Clover 2 (main)** | **Clover 3 (2022)** | **Clover 4 (raw)** | **Wildflower 2** | **Alfalfa 2** | **Orange 2** |
| Fructose | g/100g | 1 | 1 | 37.712 | 35.370 | 37.656 | 34.413 | 43.169 | 36.584 | 36.292 | 42.205 | 44.050 | 43.771 | 42.560 | 44.630 |
|  |  |  | 2 | 37.909 | 35.290 | 38.101 | 35.057 | 42.449 | 37.154 | 35.228 | 42.106 | 42.195 | 44.068 | 40.666 | 41.655 |
|  |  |  | 3 | 38.140 | 35.756 | 37.670 | 35.420 | 41.637 | 37.359 | 37.039 | 41.719 | 40.942 | 44.071 | 41.161 | 40.609 |
|  |  | 2 | 1 | 38.557 | 37.858 | 38.286 | 37.718 | 40.645 | 38.208 | 37.525 | 38.529 | 40.837 | 40.509 | 40.213 | 38.448 |
|  |  |  | 2 | 38.451 | 38.405 | 38.283 | 37.910 | 39.584 | 38.518 | 37.522 | 37.857 | 40.053 | 39.594 | 39.690 | 38.851 |
|  |  |  | 3 | 38.635 | 38.410 | 38.226 | 37.402 | 39.249 | 37.934 | 38.238 | 37.533 | 38.798 | 41.019 | 39.410 | 39.646 |
|  |  | 3 | 1 | 39.592 | 38.585 | 38.804 | 37.054 | 38.928 | 37.303 | 39.182 | 40.731 | 39.839 | 41.014 | 37.575 | 38.504 |
|  |  |  | 2 | 38.315 | 39.026 | 38.836 | 36.982 | 38.066 | 37.278 | 39.657 | 40.581 | 39.334 | 39.841 | 38.084 | 38.628 |
|  |  |  | 3 | 38.984 | 38.494 | 38.356 | 37.406 | 38.076 | 37.278 | 39.845 | 41.978 | 40.199 | 39.874 | 37.581 | 39.188 |
| Glucose | g/100g | 1 | 1 | 34.388 | 32.017 | 31.261 | 30.461 | 35.666 | 33.077 | 30.806 | 31.017 | 40.370 | 36.251 | 41.296 | 40.941 |
|  |  |  | 2 | 34.421 | 32.049 | 31.587 | 31.830 | 35.392 | 33.403 | 30.551 | 32.611 | 38.541 | 36.914 | 36.530 | 34.818 |
|  |  |  | 3 | 34.601 | 32.609 | 31.306 | 32.289 | 35.355 | 33.461 | 32.847 | 32.685 | 36.984 | 38.764 | 37.457 | 34.275 |
|  |  | 2 | 1 | 34.513 | 33.920 | 31.840 | 33.336 | 34.338 | 34.049 | 32.918 | 31.304 | 36.976 | 36.939 | 36.521 | 33.620 |
|  |  |  | 2 | 34.266 | 34.128 | 31.934 | 33.397 | 34.046 | 34.121 | 32.772 | 30.944 | 36.847 | 36.121 | 35.732 | 32.836 |
|  |  |  | 3 | 34.583 | 33.938 | 31.797 | 32.830 | 33.920 | 33.831 | 33.146 | 31.073 | 35.242 | 37.006 | 35.320 | 34.277 |
|  |  | 3 | 1 | 35.122 | 34.611 | 32.162 | 32.739 | 33.692 | 33.592 | 33.770 | 32.641 | 36.050 | 37.616 | 33.467 | 32.588 |
|  |  |  | 2 | 34.504 | 34.600 | 32.267 | 32.823 | 33.480 | 33.597 | 34.167 | 32.450 | 35.768 | 36.881 | 34.219 | 32.446 |
|  |  |  | 3 | 34.729 | 34.166 | 31.867 | 32.662 | 33.434 | 33.449 | 34.190 | 33.522 | 35.678 | 36.289 | 34.174 | 33.111 |
| Sucrose | g/100g | 1 | 1 | 0.708 | 0.097 | 0.678 | 0.504 | 0.258 | 0.722 | 1.092 | 0.592 | 0.130 | 0.102 | 0.168 | 0.153 |
|  |  |  | 2 | 0.712 | 0.110 | 0.669 | 0.445 | 0.272 | 0.664 | 1.042 | 0.335 | 0.131 | 0.102 | 0.171 | 0.162 |
|  |  |  | 3 | 0.715 | 0.113 | 0.660 | 0.387 | 0.258 | 0.708 | 1.023 | 0.556 | 0.134 | 0.103 | 0.169 | 0.154 |
|  |  | 2 | 1 | 0.724 | 0.119 | 0.672 | 0.406 | 0.281 | 0.657 | 1.081 | 0.558 | 0.132 | 0.115 | 0.171 | 0.165 |
|  |  |  | 2 | 0.713 | 0.121 | 0.671 | 0.411 | 0.278 | 0.592 | 1.077 | 0.571 | 0.136 | 0.108 | 0.172 | 0.161 |
|  |  |  | 3 | 0.717 | 0.122 | 0.672 | 0.404 | 0.263 | 0.542 | 1.116 | 0.553 | 0.132 | 0.109 | 0.170 | 0.162 |
|  |  | 3 | 1 | 0.740 | 0.127 | 0.703 | 0.402 | 0.228 | 0.587 | 1.149 | 0.592 | 0.135 | 0.109 | 0.171 | 0.163 |
|  |  |  | 2 | 0.715 | 0.126 | 0.713 | 0.401 | 0.249 | 0.511 | 1.165 | 0.607 | 0.126 | 0.099 | 0.165 | 0.160 |
|  |  |  | 3 | 0.722 | 0.123 | 0.680 | 0.396 | 0.232 | 0.541 | 1.169 | 0.596 | 0.130 | 0.099 | 0.170 | 0.163 |
| Maltose | g/100g | 1 | 1 | NA | NA | NA | NA | 1.753 | 1.540 | 2.480 | 2.257 | 1.345 | 1.351 | 1.103 | 1.439 |
|  |  |  | 2 | NA | NA | NA | NA | 1.827 | 1.443 | 2.517 | 2.227 | 1.370 | 1.369 | 1.103 | 1.407 |
|  |  |  | 3 | NA | NA | NA | NA | 1.913 | 1.429 | 2.503 | 2.201 | 1.312 | 1.337 | 1.131 | 1.432 |
|  |  | 2 | 1 | NA | NA | NA | NA | 1.744 | 1.427 | 2.466 | 2.215 | 1.414 | 1.308 | 1.107 | 1.380 |
|  |  |  | 2 | NA | NA | NA | NA | 1.779 | 1.462 | 2.440 | 2.165 | 1.431 | 1.296 | 1.118 | 1.368 |
|  |  |  | 3 | NA | NA | NA | NA | 1.787 | 1.468 | 2.484 | 2.225 | 1.427 | 1.313 | 1.128 | 1.395 |
|  |  | 3 | 1 | NA | NA | NA | NA | 1.797 | 1.443 | 2.474 | 2.165 | 1.468 | 1.257 | 1.116 | 1.339 |
|  |  |  | 2 | NA | NA | NA | NA | 1.938 | 1.427 | 2.424 | 2.192 | 1.489 | 1.257 | 1.131 | 1.344 |
|  |  |  | 3 | NA | NA | NA | NA | 1.726 | 1.441 | 2.450 | 2.168 | 1.461 | 1.259 | 1.106 | 1.372 |
| Isomaltose | g/100g | 1 | 1 | NA | NA | NA | NA | 0.547 | 0.563 | 0.517 | 0.559 | 0.535 | 0.423 | 0.547 | 0.838 |
|  |  |  | 2 | NA | NA | NA | NA | 0.559 | 0.525 | 0.529 | 0.547 | 0.541 | 0.433 | 0.554 | 0.813 |
|  |  |  | 3 | NA | NA | NA | NA | 0.578 | 0.519 | 0.524 | 0.542 | 0.516 | 0.423 | 0.569 | 0.810 |
|  |  | 2 | 1 | NA | NA | NA | NA | 0.515 | 0.524 | 0.506 | 0.557 | 0.553 | 0.414 | 0.549 | 0.782 |
|  |  |  | 2 | NA | NA | NA | NA | 0.525 | 0.530 | 0.503 | 0.536 | 0.565 | 0.410 | 0.559 | 0.779 |
|  |  |  | 3 | NA | NA | NA | NA | 0.530 | 0.534 | 0.515 | 0.558 | 0.555 | 0.414 | 0.563 | 0.796 |
|  |  | 3 | 1 | NA | NA | NA | NA | 0.533 | 0.530 | 0.509 | 0.543 | 0.576 | 0.389 | 0.557 | 0.767 |
|  |  |  | 2 | NA | NA | NA | NA | 0.573 | 0.514 | 0.494 | 0.541 | 0.590 | 0.386 | 0.566 | 0.755 |
|  |  |  | 3 | NA | NA | NA | NA | 0.504 | 0.522 | 0.501 | 0.532 | 0.569 | 0.383 | 0.548 | 0.780 |
| Turanose | g/100g | 1 | 1 | NA | NA | NA | NA | 1.452 | 1.584 | 1.439 | 1.565 | 1.503 | 1.377 | 1.976 | 2.453 |
|  |  |  | 2 | NA | NA | NA | NA | 1.517 | 1.453 | 1.452 | 1.538 | 1.542 | 1.395 | 1.981 | 2.488 |
|  |  |  | 3 | NA | NA | NA | NA | 1.577 | 1.437 | 1.446 | 1.515 | 1.456 | 1.346 | 2.067 | 2.441 |
|  |  | 2 | 1 | NA | NA | NA | NA | 1.408 | 1.454 | 1.408 | 1.565 | 1.564 | 1.321 | 1.952 | 2.308 |
|  |  |  | 2 | NA | NA | NA | NA | 1.437 | 1.459 | 1.392 | 1.512 | 1.576 | 1.303 | 1.987 | 2.311 |
|  |  |  | 3 | NA | NA | NA | NA | 1.434 | 1.475 | 1.435 | 1.552 | 1.572 | 1.330 | 2.014 | 2.384 |
|  |  | 3 | 1 | NA | NA | NA | NA | 1.429 | 1.425 | 1.421 | 1.470 | 1.628 | 1.230 | 1.983 | 2.253 |
|  |  |  | 2 | NA | NA | NA | NA | 1.534 | 1.410 | 1.380 | 1.527 | 1.654 | 1.226 | 1.995 | 2.249 |
|  |  |  | 3 | NA | NA | NA | NA | 1.346 | 1.411 | 1.391 | 1.511 | 1.627 | 1.223 | 1.950 | 2.321 |
| Palatinose (isomaltulose) | g/100g | 1 | 1 | NA | NA | NA | NA | 0.244 | 0.252 | 0.165 | 0.157 | 0.235 | 0.189 | 0.326 | 0.456 |
|  |  |  | 2 | NA | NA | NA | NA | 0.259 | 0.220 | 0.162 | 0.146 | 0.240 | 0.192 | 0.329 | 0.478 |
|  |  |  | 3 | NA | NA | NA | NA | 0.262 | 0.214 | 0.176 | 0.146 | 0.223 | 0.179 | 0.351 | 0.469 |
|  |  | 2 | 1 | NA | NA | NA | NA | 0.231 | 0.225 | 0.158 | 0.161 | 0.239 | 0.170 | 0.319 | 0.420 |
|  |  |  | 2 | NA | NA | NA | NA | 0.236 | 0.217 | 0.151 | 0.158 | 0.236 | 0.165 | 0.324 | 0.419 |
|  |  |  | 3 | NA | NA | NA | NA | 0.222 | 0.222 | 0.150 | 0.155 | 0.231 | 0.172 | 0.334 | 0.435 |
|  |  | 3 | 1 | NA | NA | NA | NA | 0.221 | 0.217 | 0.143 | 0.148 | 0.242 | 0.145 | 0.329 | 0.398 |
|  |  |  | 2 | NA | NA | NA | NA | 0.227 | 0.208 | 0.136 | 0.158 | 0.248 | 0.145 | 0.323 | 0.412 |
|  |  |  | 3 | NA | NA | NA | NA | 0.198 | 0.206 | 0.139 | 0.151 | 0.240 | 0.146 | 0.305 | 0.410 |
| Nigerose | g/100g | 1 | 1 | NA | NA | NA | NA | 0.298 | 0.269 | 0.282 | 0.303 | 0.286 | 0.248 | 0.288 | 0.413 |
|  |  |  | 2 | NA | NA | NA | NA | 0.315 | 0.240 | 0.272 | 0.307 | 0.300 | 0.244 | 0.285 | 0.409 |
|  |  |  | 3 | NA | NA | NA | NA | 0.321 | 0.251 | 0.277 | 0.301 | 0.284 | 0.240 | 0.293 | 0.410 |
|  |  | 2 | 1 | NA | NA | NA | NA | 0.303 | 0.235 | 0.283 | 0.315 | 0.309 | 0.235 | 0.280 | 0.383 |
|  |  |  | 2 | NA | NA | NA | NA | 0.290 | 0.261 | 0.287 | 0.309 | 0.310 | 0.231 | 0.282 | 0.380 |
|  |  |  | 3 | NA | NA | NA | NA | 0.297 | 0.246 | 0.278 | 0.318 | 0.305 | 0.236 | 0.299 | 0.376 |
|  |  | 3 | 1 | NA | NA | NA | NA | 0.299 | 0.263 | 0.284 | 0.306 | 0.325 | 0.219 | 0.289 | 0.374 |
|  |  |  | 2 | NA | NA | NA | NA | 0.316 | 0.264 | 0.289 | 0.300 | 0.326 | 0.224 | 0.291 | 0.385 |
|  |  |  | 3 | NA | NA | NA | NA | 0.290 | 0.254 | 0.292 | 0.302 | 0.310 | 0.218 | 0.276 | 0.379 |
| Trehalose | g/100g | 1 | 1 | NA | NA | NA | NA | 0.147 | 0.100 | 0.056 | 0.403 | NA | NA | NA | NA |
|  |  |  | 2 | NA | NA | NA | NA | 0.158 | 0.096 | 0.059 | 0.442 | NA | NA | NA | NA |
| Kojibiose | g/100g | 1 | 1 | NA | NA | NA | NA | 1.598 | 1.559 | 1.455 | 1.701 | NA | NA | NA | NA |
|  |  |  | 2 | NA | NA | NA | NA | 1.558 | 1.588 | 1.484 | 1.657 | NA | NA | NA | NA |
| Melezitoze | g/100g | 1 | 1 | NA | NA | NA | NA | 2.034 | 2.841 | 1.224 | 2.201 | NA | NA | NA | NA |
|  |  |  | 2 | NA | NA | NA | NA | 1.593 | 2.546 | 1.361 | 2.505 | NA | NA | NA | NA |
| Isomaltotriose | g/100g | 1 | 1 | NA | NA | NA | NA | 0.023 | 0.016 | 0.013 | 0.016 | NA | NA | NA | NA |
|  |  |  | 2 | NA | NA | NA | NA | 0.030 | 0.029 | 0.015 | 0.028 | NA | NA | NA | NA |
| Maltotriose | g/100g | 1 | 1 | NA | NA | NA | NA | 0.381 | 0.381 | 0.472 | 0.309 | NA | NA | NA | NA |
|  |  |  | 2 | NA | NA | NA | NA | 0.364 | 0.364 | 0.493 | 0.326 | NA | NA | NA | NA |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NA: not available |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Table S2i. Raw data of total carbohydrate concentrations of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sugar** | **Unit** | **Sample** | **Replicates** | **Clover 1** | **Buckwheat** | **Orange 1** | **Alfalfa 1** | **Wildflower 1** | **Golden** | **Clover 2 (main)** | **Clover 3 (2022)** | **Clover 4 (raw)** | **Wildflower 2** | **Alfalfa 2** | **Orange 2** |
| Total Carbohydrate Content | g/100g | 1 | 1 | 80.825 | 78.697 | 78.869 | 78.805 | 79.959 | 83.338 | 82.780 | 80.825 | 80.256 | 80.080 | 80.834 | 80.773 |
|  |  |  | 2 | 78.193 | 75.434 | 77.776 | 88.313 | 81.955 | 78.432 | 77.026 | 78.193 | 76.836 | 77.277 | 80.834 | 79.304 |
|  |  |  | 3 | 82.581 | 81.824 | 75.999 | 88.188 | 78.894 | 82.617 | 80.955 | 82.581 | 77.745 | 81.599 | 81.354 | 81.441 |
|  |  | 2 | 1 | 80.069 | 79.558 | 77.431 | 76.532 | 80.983 | 79.213 | 85.623 | 80.069 | 78.647 | 82.416 | 85.929 | 79.748 |
|  |  |  | 2 | 75.990 | 81.469 | 75.916 | 73.127 | 81.509 | 82.207 | 84.913 | 75.990 | 76.947 | 81.997 | 78.374 | 81.784 |
|  |  |  | 3 | 78.321 | 77.101 | 77.982 | 81.072 | 82.956 | 82.350 | 86.759 | 78.321 | 78.610 | 80.021 | 80.434 | 80.698 |
|  |  | 3 | 1 | 75.553 | 78.114 | 78.496 | 74.847 | 87.411 | 84.493 | 76.163 | 75.553 | 86.146 | 82.205 | 84.102 | 81.292 |
|  |  |  | 2 | 77.884 | 80.551 | 81.789 | 75.977 | 80.624 | 82.472 | 80.635 | 77.884 | 79.202 | 81.022 | 81.679 | 79.385 |
|  |  |  | 3 | 77.301 | 77.707 | 80.829 | 76.857 | 81.689 | 81.751 | 76.163 | 77.301 | 79.321 | 79.445 | 82.756 | 80.747 |
|  |  | Mean |  | 78.52 | 78.94 | 78.34 | 79.30 | 81.78 | 81.87 | 81.22 | 78.52 | 79.30 | 80.67 | 81.81 | 80.57 |
|  |  | SD |  | 2.28 | 2.11 | 1.97 | 5.55 | 2.42 | 1.91 | 4.11 | 2.28 | 2.80 | 1.66 | 2.21 | 0.90 |

Table S2j. Raw data of moisture contents of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sugar** | **Unit** | **Sample** | **Replicates** | **Clover 1** | **Buckwheat** | **Orange 1** | **Alfalfa 1** | **Wildflower 1** | **Golden** | **Clover 2 (main)** | **Clover 3 (2022)** | **Clover 4 (raw)** | **Wildflower 2** | **Alfalfa 2** | **Orange 2** |
| Moisture | percent | 1 | 1 | 18.2 | 20 | 18.2 | 17 | 16.1 | 16.8 | 16.67 | 16 | 14.4 | 16.3 | 15.5 | 15.3 |
|  |  |  | 2 | NA | NA | NA | NA | NA | NA | NA | NA | 14.6 | 16.3 | 15.4 | 15.4 |
|  |  |  | 3 | NA | NA | NA | NA | NA | NA | NA | NA | 15.2 | 14.7 | 15.6 | 15.3 |
|  |  | 2 | 1 | 17.4 | 18.6 | 17.4 | 17 | 16.1 | 16.8 | 16.67 | 14.8 | 15.6 | 15.3 | 15.4 | 15.3 |
|  |  |  | 2 | NA | NA | NA | NA | NA | NA | NA | NA | 15.6 | 15.6 | 15.4 | 15.3 |
|  |  |  | 3 | NA | NA | NA | NA | NA | NA | NA | NA | 15.8 | 15.8 | 15.4 | 15.3 |
|  |  | 3 | 1 | 17.6 | 19 | 18.2 | 17 | 16.1 | 16.8 | 16.67 | 15.8 | 15.4 | 15.8 | 15.8 | 15.3 |
|  |  |  | 2 | NA | NA | NA | NA | NA | NA | NA | NA | 15.4 | 15.9 | 15.8 | 15.4 |
|  |  |  | 3 | NA | NA | NA | NA | NA | NA | NA | NA | 15.4 | 16.1 | 15.8 | 15.4 |
|  |  | Mean |  | 17.73 | 19.20 | 17.93 | 17.00 | 16.10 | 16.80 | 16.67 | 15.53 | 15.27 | 15.76 | 15.57 | 15.33 |
|  |  | SD |  | 0.42 | 0.72 | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.64 | 0.47 | 0.51 | 0.19 | 0.05 |

Table S2k. Raw data of USDA color (Pfund Scale, mm) of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Absorbance at 560 nm** | **Unit** | **Sample** | **Replicates** | **Clover 1** | **Buckwheat** | **Orange 1** | **Alfalfa 1** | **Wildflower 1** | **Golden** | **Clover 2 (main)** | **Clover 3 (2022)** | **Clover 4 (raw)** | **Wildflower 2** | **Alfalfa 2** | **Orange 2** |
|  | absorbance | 1 |  | 3.310 | 5.000 | 0.711 | 0.409 | 0.410 | 0.332 | 0.171 | 0.146 | 0.224 | 0.189 | 0.153 | 0.322 |
|  |  | 2 |  | 3.090 | 5.000 | 0.718 | 0.4 | 0.412 | 0.313 | 0.160 | 0.150 | 0.199 | 0.192 | 0.146 | 0.318 |
|  |  | 3 |  | 2.953 | 5.000 | 0.729 | 0.442 | 0.382 | 0.282 | 0.163 | 0.154 | 0.208 | 0.190 | 0.162 | 0.328 |
|  |  | 4 |  | NA | NA | NA | NA | NA | NA | NA | NA | 0.213 | 0.198 | 0.148 | 0.320 |
|  |  | 5 |  | NA | NA | NA | NA | NA | NA | NA | NA | 0.217 | 0.206 | 0.149 | 0.333 |
|  | Mean (absorbance at 560 nm) | | | 3.118 | 5.000 | 0.719 | 0.417 | 0.400 | 0.310 | 0.160 | 0.150 | 0.212 | 0.195 | 0.152 | 0.324 |
|  | SD |  |  | 0.180 | 0.000 | 0.009 | 0.022 | 0.017 | 0.025 | 0.006 | 0.004 | 0.009 | 0.007 | 0.006 | 0.006 |
|  | Pfund factor constant | |  | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 |
|  | Pfund honey colour (absorption x Pfund factor constant [3.15]) | | | 9.82 | 15.75 | 2.27 | 1.31 | 1.26 | 0.98 | 0.50 | 0.47 | 0.67 | 0.61 | 0.48 | 1.02 |
|  | USDA Colour desingation | |  | *Dark Amber* | *Dark Amber* | *Amber* | *Light Amber* | *Light Amber* | *Light Amber* | *Extra Light Amber* | *Extra Light Amber* | *Light Amber* | *Light Amber* | *Extra Light Amber* | *Light Amber* |
| *Pfund scale (mm), USDA colour:  i) 0 to 0.094, ≤8, Water White;  ii) 0.094 to 0.189, >8 to ≤17, Extra White;  iii) 0.189 to 0.0.378, >17 to ≤34, White;  iv) 0.378 to 0.595, >34 to ≤50, Extra Light Amber;  v) 0.595 to 1.389, >50 to ≤85, Light Amber;  vi) 1.389 to 3.008, >85 to ≤114, Amber;  vii) >3.008, >114, Dark Amber.* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Table S2l. Raw data of ash contents of different honey samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Ash content** | **Unit** | **Sample** | **Replicates** | **Clover 1** | **Buckwheat** | **Orange 1** | **Alfalfa 1** | **Wildflower 1** | **Golden** | **Clover 2 (main)** | **Clover 3 (2022)** | **Clover 4** | **Wildflower 2** | **Alfalfa 2** | **Orange 2** |
|  | g/100 g | 1 |  | 0.126 | 0.509 | 0.098 | 0.094 | 0.118 | 0.082 | 0.130 | 0.094 | 0.071 | 0.114 | 0.112 | 0.103 |
|  |  | 2 |  | 0.124 | 0.528 | 0.106 | 0.128 | 0.150 | 0.120 | 0.162 | 0.183 | 0.079 | 0.127 | 0.124 | 0.107 |
|  |  | 3 |  | 0.130 | 0.250 | 0.076 | 0.118 | 0.136 | 0.134 | 0.066 | 0.114 | 0.072 | 0.132 | 0.104 | 0.096 |
|  |  | 4 |  | NA | NA | NA | NA | NA | NA | NA | NA | 0.075 | 0.132 | 0.100 | 0.099 |
|  |  | 5 |  | NA | NA | NA | NA | NA | NA | NA | NA | 0.075 | 0.109 | 0.111 | 0.111 |
|  |  | 6 |  | NA | NA | NA | NA | NA | NA | NA | NA | 0.074 | 0.124 | 0.129 | 0.112 |
|  | mean |  |  | 0.127 | 0.429 | 0.093 | 0.113 | 0.135 | 0.112 | 0.119 | 0.130 | 0.074 | 0.123 | 0.113 | 0.105 |
|  | SD |  |  | 0.003 | 0.155 | 0.015 | 0.017 | 0.016 | 0.027 | 0.049 | 0.047 | 0.003 | 0.009 | 0.011 | 0.006 |