**Table S1.** qPCR performance of target genes and internal controls (*GAPDH*, *EIF3K* and *UXT*)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Gene | Median Ct1 | Median ∆Ct2 | Slope | (R2)3 | Efficiency4 |
| *ACACA* | 27.35 | 3.50 | -3.32 | 0.997 | 1.99 |
| *ACSL1* | 28.83 | 4.98 | -3.37 | 0.997 | 1.97 |
| *ACSS2* | 22.75 | -1.10 | -3.1 | 0.937 | 2.00 |
| *DGAT1* | 23.09 | -0.77 | -3.51 | 0.996 | 1.92 |
| *DGAT2* | 21.78 | -2.07 | -3.47 | 0.995 | 1.94 |
| *FABP3* | 29.05 | 5.20 | -3.38 | 0.994 | 1.97 |
| *FABP4* | 29.22 | 5.36 | -3.29 | 0.961 | 2.00 |
| *FADS2* | 27.00 | 3.14 | -3.51 | 0.999 | 1.92 |
| *FASN* | 28.91 | 5.06 | -3.76 | 0.998 | 1.84 |
| *INSIG1* | 30.14 | 6.28 | -3.32 | 0.987 | 1.99 |
| *LPIN1* | 28.68 | 4.82 | -3.53 | 0.995 | 1.91 |
| *LPL* | 27.09 | 3.23 | -3.38 | 0.995 | 1.97 |
| *PLIN2 (ADFP)* | 27.24 | 3.39 | -3.56 | 0.995 | 1.90 |
| *PPARG* | 22.55 | -1.31 | -3.43 | 0.996 | 1.95 |
| *SCAP* | 29.46 | 5.60 | -3.54 | 0.998 | 1.91 |
| *SCD* | 28.27 | 4.41 | -3.62 | 0.997 | 1.88 |
| *SLC27A6* | 25.12 | 1.26 | -3.42 | 0.996 | 1.96 |
| *SREBF1* | 22.96 | -0.89 | -3.32 | 0.996 | 1.99 |
| *THRSP* | 20.06 | -3.80 | -3.44 | 0.995 | 1.95 |
| *VLDLR* | 22.36 | -1.50 | -3.38 | 0.995 | 1.97 |
| *GAPDH* | 21.09 | - | -3.63 | 0.998 | 1.88 |
| *EIF3K* | 24.12 | - | -3.4 | 0.994 | 1.96 |
| *UXT* | 26.36 | - | -3.4 | 0.995 | 1.96 |

1The median is calculated considering all samples.

2The median of ΔCt is calculated as [Ct gene – geometric mean of Ct internal controls] for each sample.

3R2 represents the coefficient of determination of the standard curve.

4Efficiency was calculated as [10(-1 / Slope)].

**Table S2.** Relative expression of genes involved in lipid metabolism in milk somatic cells from cows fed control (no fat supplementation) on days 42 and 63 using the relative abundance of day 21 as a reference condition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Gene |  | Day | Relative abundance | Standard error | P-value | Regulation |
| *ACACA* |  | 42 | 0.329 | 0.020 - 4.69 | 0.274 |  |
|  |  | 63 | 2.485 | 0.396 - 11.4 | 0.101 |  |
| *FADS2* |  | 42 | 0.167 | 0.072 - 0.389 | <0.001 | DOWN |
|  |  | 63 | 3.916 | 0.180 - 137.8 | 0.189 |  |
| *FASN* |  | 42 | 1.392 | 0.058 - 44.7 | 0.772 |  |
|  |  | 63 | 11.268 | 0.888 - 155.4 | <0.001 | UP |
| *SCD* |  | 42 | 0.171 | 0.024 - 1.96 | <0.001 | DOWN |
|  |  | 63 | 2.152 | 0.199 - 24.5 | 0.252 |  |
| *ADFP (PLIN2)* |  | 42 | 0.716 | 0.141 - 5.91 | 0.642 |  |
|  |  | 63 | 2.251 | 0.307 - 10.7 | 0.117 |  |
| *INSIG1* |  | 42 | 2.361 | 0.421 - 7.38 | 0.084 |  |
|  |  | 63 | 15.834 | 2.18 - 546.3 | <0.001 | UP |
| *SCAP* |  | 42 | 0.046 | 0.016 - 0.109 | <0.001 | DOWN |
|  |  | 63 | 0.469 | 0.114 - 2.67 | 0.128 |  |
| *SREBF1* |  | 42 | 1.815 | 0.152 - 12.8 | 0.363 |  |
|  |  | 63 | 10.979 | 1.79 - 108.3 | <0.001 | UP |
| *THRSP* |  | 42 | 0.541 | 0.219 - 1.32 | 0.054 |  |
|  |  | 63 | 8.051 | 0.417 - 1.00 | 0.158 |  |
| *PPARG* |  | 42 | 0.17 | 0.026 - 0.902 | <0.001 | DOWN |
|  |  | 63 | 2.744 | 1.09 - 7.92 | <0.001 | UP |
| *DGAT1* |  | 42 | 0.562 | 0.037 - 12.3 | 0.583 |  |
|  |  | 63 | 9.123 | 1.07 - 62.9 | <0.001 | UP |
| *DGAT2* |  | 42 | 1.917 | 0.266 - 8.45 | 0.247 |  |
|  |  | 63 | 8.284 | 0.631 - 75.0 | <0.001 | UP |
| *LPIN1* |  | 42 | 2.313 | 0.098 - 54.7 | 0.432 |  |
|  |  | 63 | 19.127 | 2.72 - 117.0 | <0.001 | UP |
| *LPL* |  | 42 | 5.565 | 0.924 - 33.1 | <0.001 | UP |
|  |  | 63 | 5.048 | 0.789 - 17.6 | <0.001 | UP |
| *FATP* |  | 42 | 1.946 | 0.213 - 14.5 | 0.340 |  |
|  |  | 63 | 7.856 | 1.32 - 40.5 | <0.001 | UP |
| *VLDLR* |  | 42 | 2.194 | 0.779 - 7.78 | <0.001 | DOWN |
|  |  | 63 | 4.497 | 1.26 - 14.8 | <0.001 | UP |
| *ACSL1* |  | 42 | 9.677 | 2.61 - 30.2 | <0.001 | UP |
|  |  | 63 | 2.914 | 1.03 - 14.2 | <0.001 | UP |
| *ACSS2* |  | 42 | 8.539 | 3.36 - 28.8 | <0.001 | UP |
|  |  | 63 | 2.46 | 0.620 - 9.34 | <0.001 | DOWN |
| *FABP3* |  | 42 | 1.512 | 0.605 - 4.43 | 0.185 |  |
|  |  | 63 | 1.057 | 0.517 - 2.06 | 0.766 |  |
| *FABP4* |  | 42 | 0.552 | 0.085 - 4.59 | 0.358 |  |
|  |  | 63 | 1.487 | 0.276 - 4.81 | 0.431 |  |

**Table S3.** Relative abundance of genes involved in lipid metabolism in milk somatic cells from cows

fed with olive oil (OO) on days 42 and 63 using the relative abundance of day 21 as a reference condition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Gene | Day | Abundance | Standard Error | P-Value | Regulation |
| *ACACA* | 42 | 19.803 | 0.478 - 4.912.875 | 0.037 | UP |
|  | 63 | 2.286 | 0.356 - 18.930 | 0.239 |  |
| *FADS2* | 42 | 1.496 | 0.194 - 16.142 | 0.544 |  |
|  | 63 | 0.824 | 0.060 - 38.501 | 0.843 |  |
| *FASN* | 42 | 1.994 | 0.168 - 74.288 | 0.445 |  |
|  | 63 | 0.041 | 0.002 - 0.515 | 0.001 | DOWN |
| *SCD* | 42 | 0.881 | 0.367 - 2.172 | 0.652 |  |
|  | 63 | 2.337 | 0.369 - 21.641 | 0.204 |  |
| *ADFP (PLIN2)* | 42 | 2.326 | 1.296 - 4.679 | 0.001 | UP |
|  | 63 | 0.579 | 0.168 - 1.900 | 0.16 |  |
| *INSIG1* | 42 | 1.148 | 0.072 - 17.507 | 0.88 |  |
|  | 63 | 0.959 | 0.039 - 25.668 | 0.962 |  |
| *SCAP* | 42 | 1.13 | 0.164 - 6.585 | 0.844 |  |
|  | 63 | 0.322 | 0.028 - 2.949 | 0.155 |  |
| *SREBF1* | 42 | 0.593 | 0.098 - 9.093 | 0.489 |  |
|  | 63 | 0.136 | 0.025 - 0.992 | 0.003 | DOWN |
| *THRSP* | 42 | 0.915 | 0.245 - 3.531 | 0.875 |  |
|  | 63 | 0.186 | 0.043 - 1.169 | 0.015 | DOWN |
| *PPARG* | 42 | 1.409 | 0.149 - 8.976 | 0.615 |  |
|  | 63 | 0.35 | 0.048 - 2.145 | 0.098 |  |
| *DGAT1* | 42 | 7.379 | 2.437 - 23.592 | <0.001 | UP |
|  | 63 | 0.168 | 0.022 - 1.072 | 0.01 | DOWN |
| *DGAT2* | 42 | 1.455 | 0.306 - 14.246 | 0.54 |  |
|  | 63 | 0.147 | 0.017 - 0.806 | 0.003 | DOWN |
| *LPIN1* | 42 | 2.442 | 0.469 - 14.763 | 0.117 |  |
|  | 63 | 0.537 | 0.122 - 2.350 | 0.233 |  |
| *LPL* | 42 | 2.429 | 0.883 - 7.908 | 0.011 | UP |
|  | 63 | 0.458 | 0.168 - 1.516 | 0.048 | DOWN |
| *FATP* | 42 | 2.455 | 0.569 - 9.738 | 0.068 |  |
|  | 63 | 1.187 | 0.559 - 3.334 | 0.569 |  |
| *VLDLR* | 42 | 0.246 | 0.063 - 1.089 | 0.008 | DOWN |
|  | 63 | 0.528 | 0.167 - 1.514 | 0.09 |  |
| *ACSL1* | 42 | 28.495 | 4.217 - 180.201 | <0.001 | UP |
|  | 63 | 0.705 | 0.140 - 2.961 | 0.54 |  |
| *ACSS2* | 42 | 2.636 | 0.734 - 16.940 | 0.1 |  |
|  | 63 | 0.268 | 0.044 - 2.152 | 0.036 | DOWN |
| *FABP3* | 42 | 1.512 | 0.260 - 5.239 | 0.519 |  |
|  | 63 | 0.489 | 0.089 - 1.677 | 0.197 |  |
| *FABP4* | 42 | 1.181 | 0.390 - 3.941 | 0.672 |  |
|  | 63 | 2.206 | 0.293 - 13.372 | 0.175 |  |

**Table S4.** Relative abundance of genes involved in lipid metabolism in milk somatic cells from cows fed with hydrogenated vegetable oil (HVO) on days 42 and 63 using the relative abundance of day 21 as a reference condition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Gene | Day | Abundance | Standard error | P- Value | Regulation |
| *ACACA* | 42 | 2.955 | 0.361 - 26.228 | 0.135 |  |
|  | 63 | 6.719 | 1.797 - 47.276 | 0.023 | UP |
| *FADS2* | 42 | 0.256 | 0.043 - 1.896 | 0.044 | DOWN |
|  | 63 | 0.172 | 0.015 - 3.036 | 0.071 |  |
| *FASN* | 42 | 3.652 | 0.233 - 58.763 | 0.118 |  |
|  | 63 | 43.966 | 2.382 - 1.384.567 | <0.001 | UP |
| *SCD* | 42 | 0.67 | 0.320 - 1.853 | 0.253 |  |
|  | 63 | 3.091 | 0.569 - 14.437 | 0.062 |  |
| *ADFP (PLIN2)* | 42 | 1.228 | 0.282 - 5.536 | 0.607 |  |
|  | 63 | 4.811 | 1.849 - 12.244 | <0.001 | UP |
| *INSIG1* | 42 | 1.103 | 0.196 - 3.505 | 0.83 |  |
|  | 63 | 0.935 | 0.159 - 2.972 | 0.876 |  |
| *SCAP* | 42 | 0.305 | 0.057 - 2.118 | 0.055 |  |
|  | 63 | 1.473 | 0.129 - 17.374 | 0.569 |  |
| *SREBF1* | 42 | 0.371 | 0.091 - 2.319 | 0.123 |  |
|  | 63 | 7.777 | 0.614 - 140.607 | 0.017 | UP |
| *THRSP* | 42 | 2.543 | 0.225 - 131.930 | 0.365 |  |
|  | 63 | 0.259 | 0.012 - 4.184 | 0.158 |  |
| *PPARG* | 42 | 0.076 | 0.017 - 0.288 | <0.001 | DOWN |
|  | 63 | 1.206 | 0.167 - 7.902 | 0.755 |  |
| *DGAT1* | 42 | 2.821 | 0.303 - 13.662 | 0.106 |  |
|  | 63 | 13.996 | 1.617 - 55.742 | <0.001 | UP |
| *DGAT2* | 42 | 1.117 | 0.190 - 12.477 | 0.882 |  |
|  | 63 | 20.255 | 3.898 - 69.142 | <0.001 | UP |
| *LPIN1* | 42 | 0.216 | 0.086 - 0.463 | 0.001 | DOWN |
|  | 63 | 2.338 | 0.837 - 7.286 | 0.028 | UP |
| *LPL* | 42 | 1.118 | 0.519 - 2.527 | 0.718 |  |
|  | 63 | 3.974 | 1.917 - 12.158 | <0.001 | UP |
| *FATP* | 42 | 3.259 | 1.358 - 7.567 | 0 | UP |
|  | 63 | 3.183 | 1.029 - 14.975 | 0.018 | UP |
| *VLDLR* | 42 | 0.804 | 0.474 - 1.347 | 0.244 |  |
|  | 63 | 1.872 | 1.029 - 3.219 | 0.011 | UP |
| *ACSL1* | 42 | 11.963 | 1.774 - 223.026 | 0 | UP |
|  | 63 | 5.809 | 0.947 - 108.280 | 0.023 | UP |
| *ACSS2* | 42 | 1.901 | 0.904 - 4.131 | 0.035 | UP |
|  | 63 | 3.824 | 0.622 - 11.613 | 0.011 | UP |
| *FABP3* | 42 | 2.512 | 0.656 - 8.561 | 0.075 |  |
|  | 63 | 1.42 | 0.247 - 7.227 | 0.513 |  |
| *FABP4* | 42 | 2.099 | 0.317 - 21.543 | 0.242 |  |
|  | 63 | 0.635 | 0.245 - 2.848 | 0.331 |  |