

Supplementary figure 1. Example of a fitted data into a non-linear model using postprandial plasma lactate concentration of a pig in experimental group NS—Unli during the TN period sampled on the 12th of February 2021. The black dashed line (- - - -) corresponds to the predicted values at minute (time; t) obtained with the equation: adapted from van Milgen et al. (1) from and the red dashed line (- - - -) represents the baseline considering the dynamics of the change in the steady state concentration from Cinitial to Cfinal. Cinitial: initial or preprandial concentration, Cfinal: target postprandial concentration, λ: shape factor of the curve, AUC: area under the curve and above the dashed red line; Cmax: maximum concentration; and Tmax: time in min at Cmax.

Supplementary table 1. Parameter estimates describing the postprandial kinetics of plasma insulin and plasma metabolites of entire male finishing pigs exposed to high ambient temperature.1,2,3

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Items |  | NS—Unli | LY—Unli | NS—2FW | LY—2FW | NS—8FW | LY—8FW | RSD4 | Statistics |
| Insulin, μU/mL |  |  |  |  |  |  |  |  |  |
| Cinitial | TN# || | 3.49 | 7.51 | 0.74 | 2. 20 | 2.67 | 2.35 | 2.20 | FW×P\*, D×FW×P\* |
| HS | 3.81 | 0.88 | 3.03 | 3.05 | 1.50 | 4.35 |
| λ | TN🞪#|| | 0.068 | 0.108 | 0.044 | 0.044 | 0.054 | 0.066 | 0.021 | FWT, D×PT, FW×P\* |
| HS | 0.058 | 0.050 | 0.058 | 0.057 | 0.061 | 0.053 |
| AUC | TN✝||§ | 2051 | 544 | 5885 | 2590 | 2234 | 1134 | 2103 | FW\* |
| HS✝§ | 1327 | 4245 | 5853 | 2270 | 1609 | 1693 |
| Cfinal | TN | 10.8 | 16.1 | 12.7 | 10.6 | 6.9 | 8.6 | 6.8 | ns |
| HS | 9.4 | 2.7 | 8.9 | 14.2 | 11.5 | 4.7 |
| Cmax | TN✝§ | 49.4 | 31.3 | 84.6 | 39.1 | 33.5 | 25.3 | 17.0 | FW\* |
| HS✝§ | 31.2 | 60.0 | 82.4 | 43.8 | 38.6 | 26.6 |
| Tmax | TN# | 30.7 | 20.5 | 47.2 | 48.2 | 43.2 | 35.4 | 14.2 | FW\* |
| HS | 34.8 | 40.3 | 44.7 | 37.7 | 33.3 | 40.1 |
| Glucose, mg/L |  |  |  |  |  |  |  |  |  |
| Cinitial | TN | 963 | 970 | 883 | 929 | 925 | 940 | 68 | ns |
| HS🞪 | 1039 | 874 | 893 | 952 | 896 | 953 |
| λ | TN | 0.017 | 0.025 | 0.014 | 0.017 | 0.017 | 0.014 | 0.035 | ns |
| HS | 0.017 | 0.025 | 0.014 | 0.017 | 0.017 | 0.014 |
| AUC | TN | 11901 | 5448 | 9774 | 11110 | 9278 | 5003 | 6554 | ns |
| HS | 8214 | 13318 | 11955 | 11870 | 11945 | 10053 |
| Cfinal | TN | 943 | 925 | 1008 | 961 | 955 | 972 | 75 | PT |
| HS | 1015 | 980 | 1022 | 1022 | 982 | 1005 |
| Cmax | TN | 1227 | 1092 | 1208 | 1120 | 1146 | 1098 | 47 | P\*\* |
| HS | 1249 | 1253 | 1258 | 1225 | 1243 | 1233 |
| Tmax | TN | 22.6 | 18.4 | 26.9 | 34.7 | 26.3 | 20.5 | 11.6 | FWT |
| HS | 20.1 | 26.5 | 31.1 | 29.5 | 27.9 | 24.9 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Items |  | NS—Unli | LY—Unli | NS—2FW | LY—2FW | NS—8FW | LY—8FW | RSD4 | Statistics |
| Insulin :Glucose, μU/g |  |  |  |  |  |  |  |  |
| Cinitial | TN# || | 3.90 | 7.48 | 0.71 | 3.21 | 3.12 | 2.56 | 1.97 | FW×P\*, D×FW×P\* |
| HS | 3.98 | 1.22 | 3.04 | 3.62 | 2.07 | 4.51 |
| λ | TN||§ | 0.094 | 0.063 | 0.041 | 0.040 | 0.057 | 0.046 | 0.02 | FW×P\* |
| HS | 0.048 | 0.048 | 0.057 | 0.054 | 0.058 | 0.051 |
| AUC | TN✝||§ | 1696 | 697 | 5755 | 2256 | 2293 | 1277 | 1791 | FWT |
| HS✝ | 1391 | 3621 | 4889 | 1969 | 1304 | 1410 |
| Cfinal | TN | 10.99 | 16.08 | 10.64 | 10.09 | 5.83 | 7.96 | 6.23 | ns |
| HS | 7.75 | 3.83 | 7.94 | 12.85 | 11.45 | 4.71 |
| Cmax | TN§ | 39.5 | 29.8 | 74.6 | 32.0 | 30.0 | 24.3 | 11.7 | FW\*, D×P\* |
| HS§ | 26.6 | 50.7 | 66.2 | 37.0 | 32.0 | 22.0 |
| Tmax | TN# | 33.2 | 26.3 | 51.0 | 54.1 | 47.6 | 40.5 | 14.8 | FWT |
| HS | 41.9 | 42.1 | 45.7 | 39.3 | 34.8 | 41.6 |
| Lactate, µmol/L |  |  |  |  |  |  |  |  |  |
| Cinitial | TN‡ | 788 | 870 | 928 | 936 | 969 | 763 | 97 | D×FW×P\*\* |
| HS | 831 | 752 | 933 | 797 | 822 | 966 |
| λ | TN | 0.042 | 0.032 | 0.028 | 0.031 | 0.035 | 0.036 | 0.007 | FW\* |
| HS||§ | 0.042 | 0.038 | 0.029 | 0.032 | 0.034 | 0.041 |
| AUC | TN✝ | 68181 | 115145 | 161516 | 83168 | 116839 | 95949 | 40930 | ns |
| HS | 67267 | 121939 | 128668 | 107366 | 108418 | 82191 |
| Cfinal | TN | 762 | 446 | 392 | 592 | 435 | 485 | 240 | ns |
| HS | 714 | 406 | 626 | 607 | 493 | 639 |
| Cmax | TN🞻✝ | 1516 | 1240 | 1597 | 1197 | 1469 | 1370 | 163 | P\*, D× P\*\* |
| HS | 1450 | 1651 | 1576 | 1448 | 1466 | 1485 |
| Tmax | TN | 48.7 | 73.4 | 72.3 | 71.3 | 59.3 | 57.3 | 12.6 | FW\* |
| HS||§ | 48.9 | 52.9 | 73.6 | 64.8 | 59.4 | 50.1 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Items |  | NS—Unli | LY—Unli | NS—2FW | LY—2FW | NS—8FW | LY—8FW | RSD4 | Statistics |
| α-amino N, mg/L |  |  |  |  |  |  |  |  |  |
| Cinitial | TN#|| | 579 | 693 | 547 | 514 | 566 | 525 | 56 | FW\*, D×FW×PT |
| HS# | 647 | 592 | 557 | 535 | 585 | 597 |
| λ | TN | 0.041 | 0.024 | 0.034 | 0.039 | 0.032 | 0.029 | 0.011 | ns |
| HS|| | 0.040 | 0.045 | 0.032 | 0.025 | 0.031 | 0.035 |
| AUC | TN | 18240 | 31164 | 25471 | 15261 | 36914 | 31920 | 17323 | PT |
| HS | 10270 | 11602 | 16195 | 19108 | 22907 | 16553 |
| Cfinal | TN | 629 | 671 | 647 | 583 | 520 | 528 | 129 | FWT |
| HS | 675 | 731 | 642 | 574 | 482 | 610 |
| Cmax | TN✝ | 818 | 878 | 847 | 685 | 812 | 780 | 22 | P\* |
| HS | 779 | 873 | 761 | 714 | 671 | 718 |
| Tmax | TN | 50.5 | 91.5 | 63.2 | 60.7 | 64.9 | 72.1 | 31.5 | ns |
| HS | 53.8 | 45.1 | 77.3 | 69.0 | 64.3 | 94.5 |

1A total of 27 pigs were allocated to 6 experimental groups in 9 replicates with 2 blocks per replicate. All pigs were housed under thermoneutral conditions (TN; 22°C) from d -5 to -1 and then under heat stressed conditions (HS; 28°C) from d 0 to 4. Serial blood sampling was done on d -2 (TN period) and on d 1 (HS period). Plasma kinetic profile per variable were then analyzed using non-linear regression using a modified Erlang model that was parameterized to estimate Cinitial, λ, AUC and Cfinal (as described in Supplementary figure 1).

2The predicted values for each parameter per pig and per period from the non-linear regression were analyzed using PROC MIXED model with feeding window (FW), diet (D), period (P), and their interactions as fixed effects, and with pig as a repeated unit per period. \*\*P < 0.01, \* P < 0.05, TP < 0.10.

3Contrast statements within period (P<0.05): 🞻[NS—Unli, NS—2FW, NS—8FW] vs. [LY—Unli, LY—2FW, LY—8FW]; 🞪(NS—Unli vs. LY—Unli); ✝(NS—2FW vs. LY—2FW); and ‡(NS—8FW vs. LY—8FW)] for diet effect. #[NS—Unli, LY—Unli] vs. [NS—2FW, LY—2FW]; ||[NS—Unli, LY—Unli] vs. [NS—8FW, LY—8FW]; §[NS—2FW, LY—2FW] vs. [NS—8FW, LY—8FW] for FW effect.

4RSD: residual standard deviation.

References:

1. van Milgen J, Eugenio FA & Le Floc’h N (2022) A model to analyse the postprandial nutrient concentration in the plasma of pigs. *Anim. - Open Sp.* **1**, 100007.