This file bundle includes the data used in the analyses reported in the paper and its Supplementary Online Material. For ease of access, all data are compiled as Sheets in a single Excel workbook (Danielsson\_et\_al\_DataS1.xlsx), with individual variables named using the same names and abbreviations as defined in the manuscript, section Statistical analyses, and Supplementary Online Material, Table S1.

The workbook includes the following sheets:

1. Exp1\_Intake: Data on nutrient intake from Experiment 1 (Finland)
2. Exp1\_Digestibility: Data on digestibility from Experiment 1 (Finland)
3. Exp1\_Milk: Data on milk production from Experiment 1 (Finland)
4. Exp1\_Rumen\_fermentation: Data on rumen fermentation from Experiment 1 (Finland)
5. Exp1\_Methane\_CO2: Data on gas fluxes from enteric fermentation from Experiment 1 (Finland)
6. Exp1\_Field\_pats: Data on Gas fluxes from dung under pasture conditions from Experiment 1 (Finland)
7. Experiment2\_cows: Data on all responses recorded at the cow level in Experiment 2 (Sweden)
8. Exp2\_GasProduction: Data on gas production from feces in vitro in Experiment 2 (Sweden)

In data from Experiment 1 (Finland),

* Treatments are coded as
  + 1=control
  + 2= penicillin intramuscularly
* Periods are coded as
  + 1=baseline period
  + 2=post-treatment period 1
  + 3=post-treatment period 2

In data from Experiment 2 (Sweden)

* Treatments are coded as
  + 1 [in yellow] = penicillin intramammary
  + 2 [in blue] = penicillin intramuscularly
  + 3 [in red] = tetracycline intramuscularly
  + 4 [in green] = control

For each response *i*, data on response-specific levels recorded during the baseline period are included as covariates named

* Pre\_*i* (for Pre-experiment level of *i* in Experiment 1, Finland)
* BL\_*i* (for Base-Line level of *i* in Experiment 2, Sweden).