**Prediction of enteric methane emissions from Holstein dairy cows fed various forage sources**

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**Supplementary Table S1** *Partial matrix of correlations between test variables (% of total fatty acids [****FA****] unless otherwise specified) from a dataset including 81 observations from 27 lactating Holstein dairy cows fed various forage sources. Only associations with P-values < 0.10 are shown.*1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | CH4 | ∑  FA<16C2 | ∑  16C3 | ∑  FA>16C4 | PUFA5 | ∑  OC FA6 | ∑  BCFA7 | ∑  OBCFA8 | *t*10:*t*11 | ∑  15C | FI | MY | DMI | OM | NDF | ADF | CP | Starch | EE | NFE |
| 4:0 | - | - | - | -0.50 | -0.65 | -0.45 | - | -0.46 | -0.36 | -0.33 | - | 0.34 | - | -0.43 | 0.30 | 0.53 | - | -0.68 | - | -0.32 |
| \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\* |
| 6:0 | - | 0.40 | - | -0.64 | -0.55 | -0.43 | - | -0.45 | -0.38 | -0.20 | - | 0.32 | - | -0.45 | - | 0.39 | - | -0.55 | -0.26 | - |
|  | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | † | \*\* | \*\*\* | \*\*\* | \*\*\* | \* |
| 8:0 | 0.20 | 0.72 | - | -0.69 | -0.40 | -0.33 | -0.19 | -0.35 | -0.35 | - | 0.42 | 0.32 | 0.42 | -0.23 | - | 0.21 | - | -0.34 | -0.33 | - |
| † | \*\*\* | \*\*\* | \*\*\* | \*\* | † | \*\* | \*\* | \*\*\* | \*\* | \*\*\* | \* | † | \*\* | \*\* |
| 10:0 | 0.38 | 0.96 | -0.19 | -0.49 | - | - | -0.22 | - | - | 0.24 | 0.67 | - | 0.67 | 0.23 | - | -0.19 | - | *-* | -0.32 | 0.28 |
| \*\*\* | \*\*\* | † | \*\*\* | † | \* | \*\*\* | \*\*\* | \* | † | \*\* | \* |
| *cis-*9 10:1 | *-* | 0.50 | 0.19 | -0.56 | - | - | -0.39 | - | - | 0.40 | 0.47 | 0.23 | 0.47 | - | -0.35 | -0.29 | - | 0.22 | -0.32 | 0.43 |
| \*\*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\* | \*\* | † | \*\* | \*\*\* |
| 11:0 | - | 0.44 | - | -0.30 | 0.38 | 0.73 | -0.44 | 0.72 | 0.39 | 0.85 | 0.52 | - | 0.52 | 0.59 | -0.35 | -0.65 | -0.26 | 0.69 | -0.36 | 0.57 |
| \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* |
| 12:0 | 0.34 | 0.89 | -0.21 | -0.34 | 0.27 | 0.20 | -0.22 | - | - | 0.42 | 0.67 | - | 0.67 | 0.45 | -0.25 | -0.44 | -0.21 | 0.47 | -0.30 | 0.43 |
| \*\* | \*\*\* | † | \*\* | \* | † | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | † | \*\*\* | \*\* | \*\*\* |
| *iso* 13:0 | *-* | - | -0.33 | 0.32 | - | - | 0.47 | - | - | - | - | -0.30 | - | - | - | - | - | - | - | - |
| \*\* | \*\* | \*\*\* | \*\* |
| *anteiso* 13:0 | -0.24 | - | -0.28 | 0.31 | 0.28 | 0.24 | 0.26 | 0.25 | - | 0.18 | -0.21 | -0.24 | -0.21 | - | -0.25 | -0.19 | - | 0.26 | - | 0.19 |
| \* | \* | \*\* | \* | \* | \* | \* | † | † | \* | † | \* | † | \* | † |
| *cis*-9 12:1 | *-* | 0.69 | - | -0.36 | 0.34 | 0.38 | -0.31 | 0.36 | 0.20 | 0.58 | 0.61 | - | 0.61 | 0.53 | -0.36 | -0.57 | -0.23 | 0.60 | -0.35 | 0.56 |
| \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* | \*\*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\* | \*\*\* |
| 13:0 | - | 0.45 | - | -0.25 | 0.42 | 0.78 | -0.38 | 0.77 | 0.42 | 0.89 | 0.47 | - | 0.47 | 0.57 | -0.39 | -0.66 | -0.25 | 0.71 | -0.39 | 0.61 |
| \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* |
| *iso* 14:0 | 0.20 | - | - | - | -0.31 | -0.39 | 0.50 | -0.39 | -0.42 | -0.28 | - | -0.24 | - | -0.45 | - | 0.32 | 0.38 | -0.35 | - | -0.20 |
| † | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \* | \*\*\* | \*\* | \*\*\* | \*\* | † |
| 14:0 | 0.29 | 0.93 | -0.33 | -0.40 | - | - | - | - | - | 0.21 | 0.50 | 0.24 | 0.50 | - | - | - | - | - | -0.34 | 0.25 |
| \*\* | \*\*\* | \*\* | \*\*\* | † | \*\*\* | \* | \*\*\* | \*\* | \* |
| *iso* 15:0 | *-* | - | -0.29 | 0.31 | - | - | 0.75 | - | - | - | - | -0.37 | - | - | 0.36 | - | - | - | - | -0.37 |
| \*\* | \*\* | \*\*\* | \*\*\* | \*\* | \*\*\* |
| *anteiso* 15:0 | *-* | 0.23 | -0.31 | - | - | - | 0.67 | - | -0.21 | - | - | - | - | - | - | - | 0.21 | - | - | - |
| \* | \*\* | \*\*\* | † | † |
| *cis*-9 14:1 | -0.30 | 0.19 | - | -0.34 | - | 0.30 | -0.35 | 0.29 | 0.30 | 0.43 | - | 0.23 | - | - | -0.32 | -0.28 | - | 0.25 | -0.33 | 0.39 |
| \*\* | † | \*\* | \*\* | \*\* | \*\* | \*\* | \*\*\* | \* | \*\* | \* | \* | \*\* | \*\*\* |
| *cis-*11 14:1 | 0.35 | 0.69 | -0.41 | - | 0.38 | 0.22 | - | 0.21 | - | 0.32 | 0.59 | - | 0.59 | 0.51 | - | -0.39 | - | 0.44 | - | 0.26 |
| \*\* | \*\*\* | \*\*\* | \*\*\* | \* | † | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* |
| 15:0 | -0.31 | 0.23 | 0.28 | -0.34 | 0.33 | 0.86 | -0.47 | 0.85 | 0.47 | 0.97 | 0.28 | - | 0.28 | 0.35 | -0.46 | -0.56 | - | 0.59 | -0.33 | 0.57 |
| \*\* | \* | \* | \*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* |
| *iso* 16:0 | 0.26 | - | -0.27 | 0.24 | -0.19 | -0.40 | 0.75 | -0.39 | -0.34 | -0.43 | - | -0.30 | - | -0.27 | - | 0.26 | 0.33 | -0.24 | - | -0.27 |
| \* | \* | \* | † | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* | \* | \* | \*\* | \* | \* |
| 16:0 | - | -0.19 | 1.00 | -0.69 | -0.43 | - | -0.45 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| † | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| *trans-*9 16:1 | *-* | - | - | -0.24 | - | -0.37 | - | -0.38 | -0.39 | - | - | 0.24 | - | -0.44 | - | 0.23 | 0.27 | -0.36 | - | - |
| \* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \* | \* | \*\*\* |
| *iso* 17:09 | -0.30 | -0.37 | -0.39 | 0.60 | 0.20 | 0.40 | 0.51 | 0.42 | 0.40 | - | -0.40 | - | -0.40 | 0.29 | 0.33 | - | -0.19 | - | - | -0.19 |
| \*\* | \*\*\* | \*\*\* | \*\*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* | † | † |
| *cis*-9 16:110 | -0.26 | -0.35 | 0.71 | -0.29 | - | 0.27 | -0.36 | 0.26 | 0.36 | 0.28 | - | -0.21 | - | 0.23 | - | -0.26 | - | 0.31 | -0.25 | 0.28 |
| \* | \*\* | \*\*\* | \*\* | \* | \*\* | \* | \*\*\* | \* | † | \* | \* | \*\* | \* | \* |
| *anteiso* 17:011 | *-* | -0.35 | -0.28 | 0.41 | -0.21 | - | 0.74 | - | - | -0.27 | -0.27 | - | -0.27 | - | 0.62 | 0.31 | - | -0.28 | - | -0.55 |
| \*\* | \* | \*\*\* | † | \*\*\* | \* | \* | \* | \*\*\* | \*\* | \* | \*\*\* |
| *cis-*11 16:1 | -0.30 | -0.21 | -0.45 | 0.53 | 0.34 | 0.22 | - | 0.24 | 0.38 | - | -0.22 | - | -0.22 | - | - | - | - | - | - | - |
| \*\* | † | \*\*\* | \*\*\* | \*\* | \* | \* | \*\*\* | \* | \* |
| *cis*-13 16:1 | 0.21 | 0.60 | - | - | 0.39 | 0.38 | -0.23 | 0.37 | - | 0.51 | 0.57 | - | 0.57 | 0.58 | -0.27 | -0.54 | - | 0.62 | -0.23 | 0.45 |
| † | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \* | \*\*\* |
| 17:0 | -0.42 | -0.59 | - | 0.56 | 0.22 | 0.59 | - | 0.62 | 0.49 | 0.26 | -0.45 | - | -0.45 | - | - | - | - | - | 0.29 | -0.21 |
| \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\* | † |
| *iso* 18:0 | *-* | -0.65 | -0.35 | 0.82 | - | - | 0.46 | - | - | -0.35 | -0.44 | -0.24 | -0.44 | - | 0.27 | 0.23 | - | - | 0.51 | -0.42 |
| \*\*\* | \*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \* | \*\*\* | \* | \* | \*\*\* | \*\*\* |
| *cis*-7 17:1 | *-* | - | - | -0.33 | -0.55 | -0.23 | - | -0.23 | -0.20 | -0.19 | - | - | - | -0.55 | - | 0.55 | 0.35 | -0.59 | - | -0.33 |
| \*\* | \*\*\* | \* | \* | † | † | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* |
| *cis*-8 17:1 | *-* | - | - | -0.19 | -0.61 | -0.19 | 0.27 | -0.19 | -0.21 | -0.24 | -0.19 | - | -0.19 | -0.29 | 0.52 | 0.50 | 0.23 | -0.62 | - | -0.51 |
| † | \*\*\* | † | \* | † | † | \* | † | † | \*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* |
| *cis*-9 17:1 | -0.58 | -0.65 | - | 0.35 | 0.21 | 0.55 | - | 0.57 | 0.65 | 0.29 | -0.47 | - | -0.47 | - | - | - | - | - | - | - |
| \*\*\* | \*\*\* | \*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\*\* |
| 18:0 | - | -0.33 | -0.59 | 0.79 | - | -0.25 | 0.48 | -0.22 | -0.23 | -0.47 | -0.36 | -0.24 | -0.36 | -0.21 | 0.23 | 0.25 | - | -0.21 | 0.53 | -0.40 |
| \*\* | \*\*\* | \*\*\* | \* | \*\*\* | \* | \* | \*\*\* | \*\* | \* | \*\* | † | \* | \* | † | \*\*\* | \*\*\* |
| *trans*-4 18:1 | -0.37 | - | - | 0.19 | 0.58 | 0.28 | -0.29 | 0.28 | 0.25 | 0.33 | - | - | - | - | -0.65 | -0.46 | - | 0.49 | - | 0.61 |
| \*\*\* | † | \*\*\* | \* | \*\* | \* | \* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| *trans-*5 18:1 | -0.40 | - | - | - | 0.51 | 0.22 | -0.22 | 0.21 | 0.29 | 0.32 | - | - | - | - | -0.48 | -0.29 | - | 0.24 | - | 0.41 |
| \*\*\* | \*\*\* | \* | † | † | \*\* | \*\* | \*\*\* | \*\* | \* | \*\*\* |
| *trans*-6-8 18:1 | -0.25 | -0.21 | -0.42 | 0.67 | 0.83 | 0.39 | - | 0.40 | 0.47 | 0.23 | - | - | - | 0.28 | -0.28 | -0.44 | - | 0.53 | 0.31 | 0.23 |
| \* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \* | \* | \*\*\* | \*\*\* | \*\* | \* |
| *trans*-9 18:1 | -0.19 | -0.50 | -0.40 | 0.83 | 0.60 | 0.23 | 0.22 | 0.25 | 0.30 | - | -0.32 | -0.30 | -0.32 | - | - | - | - | - | 0.61 | -0.21 |
| † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | † | \* | \*\* | \*\* | \*\* | \*\* | \*\*\* | † |
| *trans*-10 18:1 | -0.41 | - | - | 0.28 | 0.53 | 0.56 | - | 0.57 | 0.93 | 0.39 | - | - | - | 0.39 | - | -0.39 | - | 0.43 | - | 0.22 |
| \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* |
| *trans*-11 18:1 | *-* | - | -0.25 | - | - | -0.31 | - | -0.31 | -0.47 | -0.20 | - | - | - | -0.24 | - | - | 0.24 | -0.22 | 0.35 | -0.22 |
| \* | \*\* | \*\* | \*\*\* | † | \* | \* | \* | \*\* | † |
| *trans-*12 18:1 | -0.28 | 0.23 | -0.21 | - | 0.71 | 0.26 | -0.35 | 0.25 | - | 0.39 | 0.19 | 0.19 | 0.19 | - | -0.55 | -0.46 | - | 0.41 | - | 0.46 |
| \* | \* | † | \*\*\* | \* | \*\* | \* | \*\*\* | † | † | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| *cis*-6-8 18:1 | *-* | -0.32 | -0.25 | 0.62 | 0.41 | - | - | 0.20 | 0.25 | - | -0.21 | -0.37 | -0.21 | - | - | - | - | 0.26 | 0.49 | - |
| \*\* | \* | \*\*\* | \*\*\* | † | \* | † | \*\*\* | † | \* | \*\*\* |
| *trans*-13-14 18:1 | -0.32 | - | -0.21 | 0.25 | 0.66 | 0.31 | -0.28 | 0.30 | 0.25 | 0.34 | - | - | - | - | -0.51 | -0.38 | - | 0.37 | 0.19 | 0.41 |
| \*\* | † | \* | \*\*\* | \*\* | \* | \*\* | \* | \*\* | \*\*\* | \*\*\* | \*\*\* | † | \*\*\* |
| *cis*-9 18:112 | *-* | -0.61 | -0.53 | 0.93 | 0.36 | - | 0.48 | - | - | -0.30 | -0.46 | -0.20 | -0.46 | - | 0.25 | - | - | - | 0.36 | -0.28 |
| \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* | \*\*\* | † | \*\*\* | \* | \*\* | \* |
| *trans*-15 18:1 | *-* | - | - | -0.41 | -0.62 | -0.38 | - | -0.40 | -0.33 | -0.29 | - | 0.35 | - | -0.34 | 0.34 | 0.51 | - | -0.64 | - | -0.34 |
| \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* | \*\* | \*\* | \*\* | \*\*\* | \*\*\* | \*\* |
| *cis*-11 18:1 | -0.26 | - | - | -0.20 | -0.25 | - | - | - | - | - | - | 0.49 | - | - | 0.19 | - | -0.22 | -0.20 | -0.43 | - |
| \* | † | \* | \*\*\* | † | \* | † | \*\*\* |
| *cis-*12 18:1 | *-* | 0.38 | - | -0.39 | -0.19 | -0.25 | - | -0.27 | -0.25 | - | 0.29 | 0.35 | 0.29 | - | - | - | - | -0.25 | -0.21 | - |
| \*\*\* | \*\*\* | † | \* | \* | \* | \*\* | \*\* | \*\* | \* | † |
| *cis-*13 18:1 | -0.25 | - | - | - | - | - | - | - | - | -0.21 | - | 0.29 | - | -0.24 | - | 0.27 | - | -0.30 | - | - |
| \* | † | \*\* | \* | \* | \*\* |
| *cis-*14 18:1 | - | - | - | - | 0.50 | 0.22 | - | 0.21 | - | 0.22 | 0.29 | - | 0.29 | 0.31 | - | -0.29 | - | 0.26 | 0.29 | - |
| \*\*\* | † | † | † | \*\* | \*\* | \*\* | \*\* | \* | \*\* |
| *trans*-16 18:1 | - | - | -0.44 | 0.51 | 0.66 | - | - | - | - | - | - | - | - | - | -0.38 | -0.21 | - | 0.24 | 0.46 | - |
| \*\*\* | \*\*\* | \*\*\* | \*\*\* | † | \* | \*\*\* |
| *cis-*15 18:1 | - | - | - | - | - | -0.27 | - | -0.27 | - | - | - | - | - | -0.44 | -0.19 | 0.24 | 0.33 | -0.26 | 0.39 | - |
| \* | \* | \*\*\* | † | \* | \*\* | \* | \*\*\* |
| 19:0 | - | - | -0.30 | 0.26 | 0.20 | -0.25 | - | -0.25 | - | -0.23 | -0.25 | - | -0.25 | -0.37 | -0.23 | - | - | - | - | - |
| \*\* | \* | † | \* | \* | \* | \* | \* | \*\*\* | \* |
| *trans*-9*,* 12 18:2 | -0.20 | - | - | -0.34 | -0.32 | -0.32 | - | -0.33 | -0.27 | -0.19 | - | 0.26 | - | -0.60 | - | 0.40 | 0.23 | -0.51 | - | - |
| † | \*\* | \*\* | \*\* | \*\* | \* | † | \* | \*\*\* | \*\*\* | \* | \*\*\* |
| *cis*-9, *trans*-13 18:2 | - | - | - | 0.24 | 0.58 | 0.22 | - | 0.22 | - | 0.23 | - | - | - | 0.25 | -0.25 | -0.38 | - | 0.40 | - | 0.23 |
| \* | \*\*\* | \* | \* | \* | \* | \* | \*\*\* | \*\*\* | \* |
| *trans*-8*, cis*-12 18:2 | -0.31 | - | -0.20 | - | 0.67 | 0.32 | -0.19 | 0.31 | 0.33 | 0.33 | - | 0.20 | - | 0.35 | -0.34 | -0.46 | - | 0.42 | - | 0.38 |
| \*\* | † | \*\*\* | \*\* | † | \*\* | \*\* | \*\* | † | \*\* | \*\* | \*\*\* | \*\*\* | \*\*\* |
| *trans*-8*, cis*-13 18:2 | -0.51 | - | - | - | 0.62 | 0.20 | -0.31 | 0.20 | 0.23 | 0.32 | - | - | - | - | -0.66 | -0.38 | - | 0.35 | - | 0.57 |
| \*\*\* | \*\*\* | † | \*\* | † | \* | \*\* | \*\*\* | \*\*\* | \*\* | \*\*\* |
| *cis*-9*, trans-*12 18:2 | -0.28 | 0.25 | -0.20 | - | 0.52 | - | -0.38 | - | - | 0.24 | - | 0.20 | - | - | -0.47 | -0.30 | - | 0.20 | - | 0.37 |
| \* | \* | † | \*\*\* | \*\*\* | \* | † | \*\*\* | \*\* | † | \*\*\* |
| *trans*-9*, cis*-12 18:2 | -0.19 | -0.28 | - | 0.30 | 0.33 | - | -0.21 | - | 0.19 | - | -0.24 | - | -0.24 | - | -0.24 | - | - | - | 0.22 | - |
| † | \*\* | \*\* | \*\* | † | † | \* | \* | \* | \* |
| *trans*-11*, cis*-15 18:2 | -0.19 | - | - | -0.32 | -0.30 | -0.32 | - | -0.33 | -0.33 | - | - | 0.25 | - | -0.67 | - | 0.49 | 0.41 | -0.59 | - | -0.25 |
| † | \*\* | \*\* | \*\* | \*\* | \*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* |
| *cis*-9, 12 18:2 | - | 0.21 | -0.34 | 0.26 | 0.85 | 0.43 | - | 0.43 | 0.49 | 0.40 | 0.33 | - | 0.33 | 0.65 | -0.29 | -0.66 | -0.36 | 0.71 | -0.23 | 0.52 |
| † | \*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* |
| 20:0 | - | -0.47 | -0.38 | 0.81 | 0.40 | - | 0.38 | - | - | - | -0.32 | -0.43 | -0.32 | - | - | - | - | - | 0.56 | -0.21 |
| \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* | \*\*\* | † |
| *cis*-6, 9, 12 18:3 | 0.20 | - | - | - | - | -0.23 | 0.26 | -0.24 | - | -0.26 | - | - | - | - | 0.42 | - | - | -0.20 | - | -0.29 |
| † | \* | \* | \* | \* | \*\*\* | † | \*\* |
| *cis*-9 20:1 | -0.44 | - | - | - | 0.41 | - | -0.19 | - | - | - | -0.31 | - | -0.31 | -0.31 | -0.61 | -0.22 | - | 0.22 | - | 0.44 |
| \*\*\* | \*\*\* | † | \*\* | \*\* | \*\* | \*\*\* | \* | \* | \*\*\* |
| *cis*-11 20:1 | 0.22 | -0.38 | -0.30 | 0.64 | 0.22 | - | 0.41 | 0.21 | - | - | - | -0.25 | - | 0.36 | 0.40 | - | - | - | 0.44 | -0.37 |
| † | \*\*\* | \*\* | \*\*\* | † | \*\*\* | † |  |  |  | \* |  | \*\* | \*\*\* |  |  |  | \*\*\* | \*\*\* |
| *cis*-9, 12, 15 18:3 | -0.33 | - | -0.25 | 0.30 | 0.36 | -0.21 | - | -0.20 | - | - | -0.33 | - | -0.33 | -0.65 | -0.37 | 0.20 | 0.32 | -0.24 | 0.42 | - |
| \*\* | \* | \*\* | \*\*\* | † | † | \*\* | \*\* | \*\*\* | \*\*\* | † | \*\* | \* | \*\*\* |
| *cis*-9, *trans*-11 18:212 | *-* | - | -0.23 | 0.39 | 0.70 | - | - | - | - | - | - | - | - | 0.24 | -0.20 | -0.33 | - | 0.39 | 0.30 | - |
| \* | \*\*\* | \*\*\* | \* | † | \*\* | \*\*\* | \*\* |
| *trans*-10, *cis*-12 18:2 | -0.22 | -0.42 | -0.29 | 0.69 | 0.53 | 0.35 | 0.26 | 0.37 | 0.42 | - | -0.39 | -0.36 | -0.39 | - | - | - | - | 0.34 | 0.31 | - |
| \* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* |
| *cis-*6,9, 12, 15 18:4 | -0.45 | - | - | 0.32 | 0.56 | 0.39 | -0.19 | 0.39 | 0.50 | 0.29 | -0.21 | - | -0.21 | - | -0.32 | -0.39 | - | 0.40 | -0.20 | 0.39 |
| \*\*\* | \*\* | \*\*\* | \*\*\* | † | \*\*\* | \*\*\* | \*\* | † | † | \*\* | \*\*\* | \*\*\* | † | \*\*\* |
| *cis-*11*,* 14 20:2 | - | -0.36 | -0.36 | 0.72 | 0.64 | 0.35 | 0.28 | 0.38 | 0.33 | - | - | -0.25 | - | 0.30 | - | -0.28 | - | 0.42 | 0.38 | - |
| \*\* | \*\* | \*\*\* | \*\*\* | \*\* | \* | \*\*\* | \*\* | \* | \*\* | \* | \*\*\* | \*\*\* |
| *cis*-9, *trans*-11, *cis*-15 18:3 | - | - | - | - | 0.19 | - | - | - | -0.20 | - | - | - | - | -0.44 | -0.23 | - | 0.27 | - | 0.28 | - |
| † | † | \*\*\* | \* | \* | \* |
| 22:0 | - | -0.50 | -0.33 | 0.78 | 0.36 | - | 0.36 | - | - | - | -0.39 | -0.46 | -0.39 | - | - | - | - | - | 0.55 | -0.23 |
| \*\*\* | \*\* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* |
| *cis-*8*,* 11*,* 14 20:3 | - | - | -0.21 | 0.45 | 0.69 | 0.44 | - | 0.46 | 0.41 | 0.31 | - | -0.33 | - | 0.52 | -0.22 | -0.52 | -0.20 | 0.69 | - | 0.30 |
|  |  | † | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\* |  | \*\* |  | \*\*\* | \* | \*\*\* | † | \*\*\* |  | \*\* |
| *cis*-13 22:1 | - | -0.32 | -0.36 | 0.65 | 0.39 | 0.26 | 0.38 | 0.28 | 0.29 | - | - | -0.18 | - | 0.38 | 0.30 | - | - | 0.25 | 0.30 | -0.22 |
| \*\* | \*\* | \*\*\* | \*\*\* | \* | \*\*\* | \* | \*\* | † | \*\*\* | \*\* | \* | \*\* | † |
| *cis-*11*,* 14*,* 17 20:3 | -0.46 | -0.19 | - | 0.24 | 0.49 | - | - | - | 0.28 | - | -0.33 | - | -0.33 | -0.33 | -0.55 | -0.20 | - | 0.19 | - | 0.36 |
| \*\*\* | † | \* | \*\*\* | \* | \*\* | \*\* | \*\* | \*\*\* | † | † | \*\*\* |
| *cis-*5*,* 8*,* 11*,* 14 20:4 | - | - | -0.26 | 0.54 | 0.78 | 0.49 | - | 0.50 | 0.45 | 0.33 | - | -0.21 | - | 0.51 | -0.29 | -0.58 | -0.22 | 0.72 | - | 0.37 |
| \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | † | \*\*\* | \*\* | \*\*\* | † | \*\*\* | \*\*\* |
| *cis-*8*,*11*,* 14, 17 20:4 | - | -0.35 | -0.32 | 0.57 | 0.34 | - | - | - | - | - | -0.18 | - | -0.18 | - | - | - | - | - | - | - |
| \*\* | \*\* | \*\*\* | \*\* | † | † |
| *cis*-13, 16 22:2 | - | - | -0.24 | 0.24 | - | - | - | - | - | - | -0.19 | - | -0.19 | -0.25 | - | - | - | - | - | - |
| \* | \* | † | † | \* |
| *cis*-5, 8, 11, 14, 17 20:5 | - | -0.37 | -0.30 | 0.68 | 0.58 | - | - | - | - | - | -0.26 | -0.25 | -0.26 | - | - | -0.25 | - | 0.37 | 0.37 | - |
| \*\*\* | \*\* | \*\*\* | \*\*\* | \* | \* | \* | \* | \*\*\* | \*\*\* |
| 24:0 | - | 0.36 | - | -0.52 | -0.39 | -0.29 | - | -0.31 | -0.28 | - | - | 0.34 | - | -0.41 | - | 0.31 | 0.25 | -0.46 | -0.21 | - |
| \*\* | \*\*\* | \*\*\* | \*\* | \*\* | \* | \*\* | \*\*\* | \*\* | \* | \*\*\* | † |
| *cis*-9 24:1 | 0.21 | -0.28 | -0.28 | 0.58 | 0.27 | 0.23 | 0.35 | 0.25 | - | - | - | -0.25 | - | 0.42 | 0.30 | - | - | 0.27 | 0.37 | -0.24 |
| † | \* | \* | \*\*\* | \* | \* | \*\* | \* | \* | \*\*\* | \*\* | \* | \*\*\* | \* |
| *cis*-13, 16, 19 22:3 | -0.41 | - | - | 0.29 | 0.55 | 0.26 | - | 0.27 | 0.30 | 0.26 | -0.31 | - | -0.31 | - | -0.58 | -0.36 | - | 0.41 | - | 0.47 |
| \*\*\* | \*\* | \*\*\* | \* | \* | \*\* | \* | \*\* | \*\* | \*\*\* | \*\* | \*\*\* | \*\*\* |
| *cis*-7, 10, 13, 16 22:4 | - | - | -0.21 | 0.45 | 0.68 | 0.53 | - | 0.54 | 0.37 | 0.39 | - | -0.27 | - | 0.47 | -0.30 | -0.58 | - | 0.70 | - | 0.37 |
| † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* |
| *cis-*4*,* 7, 10, 13, 16 22:5 | -0.44 | - | - | - | 0.32 | - | -0.27 | - | - | - | -0.34 | - | -0.34 | -0.40 | -0.59 | - | - | - | - | 0.42 |
| \*\*\* | \*\* | \* | \*\* | \*\* | \*\*\* | \*\*\* | \*\*\* |
| *cis*-7, 10, 13, 16, 19 22:5 | -0.21 | -0.29 | -0.22 | 0.56 | 0.71 | 0.35 | - | 0.37 | 0.31 | 0.23 | -0.20 | -0.24 | -0.20 | 0.21 | -0.43 | -0.48 | - | 0.58 | - | 0.38 |
| † | \*\* | † | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* | \* | † | \* | † | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| *cis*-4, 7, 10, 13, 16, 19 22:6 | -0.48 | - | - | 0.19 | 0.47 | 0.21 | - | 0.22 | 0.22 | 0.23 | -0.30 | - | -0.30 | - | -0.58 | -0.34 | - | 0.35 | - | 0.50 |
| \*\*\* | † | \*\*\* | † | † | \* | \* | \*\* | \*\* | \*\*\* | \*\* | \*\* | \*\*\* |
| ∑ FA < 16C1 | 0.34 | 1.00 | -0.21 | -0.53 | - | - | - | - | - | 0.27 | 0.64 | 0.20 | 0.64 | 0.21 | - | -0.20 | - | - | -0.37 | 0.32 |
| \*\* | \*\*\* | † | \*\*\* | \* | \*\*\* | † | \*\*\* | † | † | \*\*\* | \*\* |
| ∑ 16C2 | - | -0.21 | 1.00 | -0.67 | -0.40 | - | -0.45 | - | - | 0.20 | - | - | - | - | - | - | - | - | -0.19 | - |
| † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | † | † |
| ∑ FA > 16C3 | - | -0.53 | -0.67 | 1.00 | 0.46 | - | 0.46 | - | - | -0.31 | -0.44 | - | -0.44 | - | - | - | - | - | 0.46 | -0.27 |
| \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \* |
| PUFA4 | -0.28 | - | -0.40 | 0.46 | 1.00 | 0.35 | - | 0.35 | 0.37 | 0.32 | - | - | - | 0.32 | -0.46 | -0.55 | - | 0.61 | - | 0.46 |
| \* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* | \*\*\* | \*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| ∑ odd chain FA5 | -0.39 | - | - | - | 0.35 | 1.00 | - | 1.00 | 0.57 | 0.90 | - | - | - | 0.40 | -0.20 | -0.47 | - | 0.52 | -0.22 | 0.34 |
| \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | † | \*\*\* | \*\*\* | \* | \*\* |
| ∑ branched chain FA6 | - | - | -0.45 | 0.46 | - | - | 1.00 | - | - | -0.28 | -0.26 | -0.21 | -0.26 | - | 0.38 | 0.24 | 0.24 | -0.22 | - | -0.42 |
| \*\*\* | \*\*\* | \*\*\* | \* | \* | † | \* | \*\*\* | \* | \* | \* | \*\*\* |
| ∑ OBCFA7 | -0.39 | - | - | - | 0.35 | 1.00 | - | 1.00 | 0.57 | 0.89 | - | - | - | 0.40 | -0.19 | -0.46 | - | 0.52 | -0.20 | 0.32 |
| \*\*\* |  |  | \*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | \*\*\* | † | \*\*\* | \*\*\* | † | \*\* |
| ∑ *trans* 18:1 FA | -0.36 | - | -0.35 | 0.20 | 0.42 | - | - | - | 0.22 | - | - | 0.34 | - | - | - | - | - | - | 0.21 | - |
| \*\* | \*\* | † | \*\*\* | \* | \*\* | † |
| *trans*-10 18:1 to *trans*-11 ratio | -0.42 | - | - | - | 0.37 | 0.57 | - | 0.57 | 1.00 | 0.42 | - | - | - | 0.34 | - | -0.37 | - | 0.43 | -0.22 | 0.29 |
| \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\*\* | \* | \*\* |
| *trans*-10 18:1 to *trans*-10+*trans*-11 ratio | -0.37 | -0.23 | - | 0.25 | 0.42 | 0.65 | - | 0.66 | 0.86 | 0.44 | - | - | - | 0.47 | - | -0.44 | -0.28 | 0.52 | - | 0.30 |
| \*\*\* | \* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\* |
| ∑ even chain iso FA | 0.24 | - | -0.28 | 0.25 | -0.21 | -0.40 | 0.73 | -0.39 | -0.36 | -0.43 | - | -0.31 | - | -0.35 | - | 0.31 | 0.37 | -0.30 | 0.19 | -0.31 |
| \* | \* | \* | † | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\* | \*\* | \*\* | \*\*\* | \*\* | † | \*\* |
| ∑ odd chain iso FA | - | -0.27 | -0.42 | 0.56 | - | 0.27 | 0.70 | 0.29 | - | - | -0.35 | - | -0.35 | 0.21 | 0.38 | - | - | - | - | -0.28 |
| \* | \*\*\* | \*\*\* | \* | \*\*\* | \*\* | \*\* | \*\* | † | \*\*\* | \* |
| ∑ anteiso FA | - | - | -0.35 | 0.29 | - | - | 0.83 | - | - | - | - | - | - | - | 0.40 | - | - | - | - | -0.35 |
| \*\* | \*\* | \*\*\* | \*\*\* | \*\* |
| ∑ 15C | -0.29 | 0.27 | 0.20 | -0.31 | 0.32 | 0.90 | -0.28 | 0.89 | 0.42 | 1.00 | 0.28 | - | 0.28 | 0.37 | -0.43 | -0.56 | - | 0.58 | -0.34 | 0.54 |
| \*\* | \* | † | \*\* | \*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\*\* |
| ∑ 17C | -0.40 | -0.62 | -0.21 | 0.60 | - | 0.49 | 0.45 | 0.52 | 0.44 | - | -0.52 | - | -0.52 | - | 0.38 | - | - | - | 0.19 | -0.35 |
| \*\*\* | \*\*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | † | \*\* |
| ∑ 17:1 | -0.60 | -0.61 | - | 0.24 | - | 0.45 | - | 0.47 | 0.55 | 0.20 | -0.52 | - | -0.52 | - | - | - | - | - | - | - |
| \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | † | \*\*\* | \*\*\* |
| 15C to 17C ratio | - | 0.64 | 0.30 | -0.64 | 0.19 | 0.40 | -0.49 | 0.38 | - | 0.75 | 0.59 | - | 0.59 | 0.26 | -0.58 | -0.54 | - | 0.51 | -0.38 | 0.64 |
| \*\*\* | \*\* | \*\*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| Forage intake, kg/d | 0.60 | 0.64 | - | -0.44 | - | - | -0.26 | - | - | 0.28 | 1.00 | 0.24 | 1.00 | 0.42 | - | -0.29 | -0.19 | 0.25 | -0.22 | 0.25 |
| \*\*\* | \*\*\* | \*\*\* | \* | \* | \*\*\* | \* | \*\*\* | \*\*\* | \*\* | † | \* | † | \* |
| Milk yield, kg/d | - | 0.20 | - | - | - | - | -0.21 | - | - | - | 0.24 | 1.00 | 0.24 | - | - | - | -0.26 | - | -0.24 | - |
| † | † | \* | \*\*\* | \* | \* | \* |
| DMI, kg/d | 0.60 | 0.64 | - | -0.44 | - | - | -0.26 | - | - | 0.28 | 1.00 | 0.24 | 1.00 | 0.42 | - | -0.29 | -0.19 | 0.25 | -0.22 | 0.25 |
| \*\*\* | \*\*\* | \*\*\* | \* | \* | \*\*\* | \* | \*\*\* | \*\*\* | \*\* | † | \* | † | \* |
| Organic matter, % of DM | - | 0.21 | - | - | 0.32 | 0.40 | - | 0.40 | 0.34 | 0.37 | 0.42 | - | 0.42 | 1.00 | - | -0.65 | -0.45 | 0.71 | -0.39 | 0.43 |
| † | \*\* | \*\*\* | \*\*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| NDF, % of DM | 0.23 | - | - | - | -0.46 | -0.20 | 0.38 | -0.19 | - | -0.43 | - | - | - | - | 1.00 | 0.66 | - | -0.60 | - | -0.84 |
| \* | \*\*\* | † | \*\*\* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| ADF, % of DM | - | -0.20 | - | - | -0.55 | -0.47 | 0.24 | -0.46 | -0.37 | -0.56 | -0.29 | - | -0.29 | -0.65 | 0.66 | 1.00 | - | -0.91 | 0.41 | -0.83 |
| † | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \*\* | \*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| CP, % of DM | - | - | - | - | - | - | 0.24 | - | - | - | -0.19 | -0.26 | -0.19 | -0.45 | - | - | 1.00 | -0.20 | 0.37 | -0.27 |
| \* | † | \* | † | \*\*\* | \*\*\* | † | \*\*\* | \* |
| Starch, % of DM | - | - | - | - | 0.61 | 0.52 | -0.22 | 0.52 | 0.43 | 0.58 | 0.25 | - | 0.25 | 0.71 | -0.60 | -0.91 | -0.20 | 1.00 | -0.36 | 0.79 |
| \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* | \* | \* | \*\*\* | \*\*\* | \*\*\* | † | \*\*\* | \*\*\* | \*\*\* |
| Ether extract, % of DM | - | -0.37 | -0.19 | 0.46 | - | -0.22 | - | -0.20 | -0.22 | -0.34 | -0.22 | -0.24 | -0.22 | -0.39 | - | 0.41 | 0.37 | -0.36 | 1.00 | -0.58 |
| \*\*\* | † | \*\*\* | \* | † | \* | \*\* | † | \* | † | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |
| Nitrogen free extract, % of DM | - | 0.32 | - | -0.27 | 0.46 | 0.34 | -0.42 | 0.32 | 0.29 | 0.54 | 0.25 | - | 0.25 | 0.43 | -0.84 | -0.83 | -0.27 | 0.79 | -0.58 | 1.00 |
| \*\* | \* | \*\*\* | \*\* | \*\*\* | \*\* | \*\* | \*\*\* | \* | \* | \*\*\* | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \*\*\* |

1Forage intake (FI), milk yield (MY) and dry matter intake (DMI), expressed as kg/d. Organic matter (OM), Neutral detergent fiber (NDF), acid detergent fiber (ADF), crude protein (CP), ether extract (EE), Nitrogen-free extract (NFE), expressed as % of dry matter.

2∑ FA<16C: FA originated from de novo mammary synthesis

3∑ 16C: FA originated from both circulation and de novo mammary synthesis

4∑ FA>16C: FA originated from circulation (preformed)

5PUFA: Sum of polyunsaturated FA > 16 C.

6∑OCFA: Odd-chain FA (13:0 and 15:0)

7∑BCFA:Sum of branched-chain FA (iso 13:0, iso 14:0, iso 15:0, anteiso 15:0, iso 16:0, iso 17:0, and anteiso 17:0)

8∑OBCFA: Sum of odd- and branched-chain FA.

9 *t*10:*t*11: *trans*-10 18:1 to *trans*-11 ratio

Co-elution with minor concentration of *trans*-10 16:1.

10Co-elution with minor concentration of *trans*-13 16:1.

11Co-elution with minor concentration of *cis*-10 16:1.

12Co-elution with minor concentration of *cis*-10 18:1.

13Co-elution with minor concentration of *trans*-7, *cis*-9 18:2.

\*\*\* *P* < 0.001

\*\* *P* < 0.01

\* *P* < 0.05

† *P* < 0.10

**Supplementary Figure S1** Partial chromatogram of the 18:1 – 18:2 region. Separation of 18:2 fatty acid isomers was achieved in an isothermal program at 150 °C in a gas chromatograph (7890A GC; Agilent Technologies Canada Inc., Mississauga, ON, Canada) equipped with a 100-m CP-Sil 88 capillary column (0.25-mm i.d., 0.20-μm film thickness; Agilent Technologies Canada Inc.) and a flame ionization detector.

