**Online Supporting Material**

**Supplemental Table S1.** Chemical composition of silage, concentrates and sunflower oil\*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Silage | Concentrates | | | | Sunflower oil |
| Composition, *g/kg DM* |  | L | LSO | H | HSO |  |
| Organic matter | 930 | 884 | 867 | 928 | 923 | 1000 |
| Crude protein | 136 | 186 | 196 | 158 | 162 | - |
| Neutral detergent fibre | 508 | 160 | 160 | 138 | 140 | - |
| Indigestible neutral detergent fibre | 103 | 44·2 | 45·8 | 35·6 | 36·9 | - |
| Fatty acid |  |  |  |  |  |  |
| 16 : 0 | 2·41 | 2·89 | 2·86 | 2·92 | 2·94 | 58·5 |
| 16 : 1 *trans-*3 | 0·22 | ND | ND | ND | ND | ND |
| 18 : 0 | 0·20 | 0·39 | 0·42 | 0·29 | 0·31 | 37·2 |
| 18 : 1 *cis*-9 | 0·45 | 9·34 | 10·4 | 5·92 | 6·44 | 266 |
| 18 : 1 *cis*-11 | 0·08 | 1·11 | 1·26 | 0·66 | 0·74 | 6·28 |
| 18 : 2 *cis*-9, *cis-*12 | 2·46 | 9·72 | 10·2 | 9·53 | 9·66 | 564 |
| 18 : 3 *cis*-9, *cis-*12, *cis-*15 | 5·89 | 1·93 | 2·30 | 1·45 | 1·58 | 1·05 |
| 20 : 1 *cis*-11 | 0·30 | 0·18 | 0·18 | 0·13 | 0·14 | 1·49 |
| 22 : 0 | 0·15 | 0·06 | 0·06 | 0·05 | 0·05 | 6·77 |
| *∑* Other†,‡,§ | 0·88 | 0·71 | 0·76 | 0·49 | 0·54 | 11·8 |
| *∑* SFA | 3·46 | 3·63 | 3·65 | 3·49 | 3·55 | 109 |
| *∑* MUFA | 1·16 | 10·9 | 12·2 | 6·89 | 7·52 | 276 |
| *∑* PUFA | 8·40 | 11·8 | 12·6 | 11·0 | 11·3 | 568 |
| *∑* Fatty acids | 13·0 | 26·3 | 28·4 | 21·4 | 22·4 | 952 |

L, low concentrate diet (FC ratio 65:35 on a DM basis) with no additional lipid; LSO, low concentrate diet (FC ratio 65:35) containing 50 g sunflower oil/kg diet DM; H, high concentrate diet (FC ratio 35:65 on a DM basis) with no additional lipid; HSO, high concentrate diet (FC ratio 35:65) containing 50 g sunflower oil/kg diet DM; FC, forage to concentrate; ND, not detected.

\* Values are means of *n* = 4 determinations.

† For silage, sum of 12 : 0, 14 : 0, 15 : 0, *cis*-9-16 : 1, 17 : 0, *trans*-11-18 : 1, *cis*-9,*trans*-12-18 : 2, *cis*-6,*cis-*9,*cis-*12-18 : 3, 20 : 0, *cis-*11,*cis-*14-20 : 2, 21 : 0, *cis*-13-22 : 1, 23 : 0, 24 : 0, *cis*-15-24 : 1, 25 : 0, 26 : 0, 27 : 0, 28 : 0 and 30 : 0.

‡ For concentrate ingredients, sum of 12 : 0, 14 : 0, 15 : 0, *cis*-6-16 : 1, *cis*-9-16 : 1, *cis*-11-16 : 1, 17 : 0, *iso*-18 : 0, *cis*-9-17 : 1, *cis*-9,*cis*-12-16 : 2, *trans*-9-18 : 1, *trans*-16/*cis*-14-18 : 1, *cis*-9,*trans*-12-18 : 2, *trans*-9,*cis*-12-18 : 2, *trans*-9,*trans*-12-18 : 2, *trans*-9,*trans*-12,*cis*-15-18 : 3/ *cis*-9,*cis*-12,*trans*-15-18 : 3, 20 : 0, *cis-*11,*cis-*14-20 : 2, 21 : 0, *cis*-13-22 : 1, 23 : 0, 24 : 0, *cis*-15-24 : 1, 25 : 0, 26 : 0, 28 : 0 and unidentified (n = 2) fatty acids.

§ For sunflower oil, sum of 14 : 0, 15 : 0, *cis*-6-16 : 1, *cis*-9-16 : 1, 17 : 0, *cis*-9-17 : 1, *cis*-9,*cis*-12-16 : 2, *trans*-9-18 : 1, *trans*-16/*cis*-14-18 : 1, *cis*-9,*trans*-12-18 : 2, *trans*-9,*cis*-12-18 : 2, *trans*-9,*trans*-12-18 : 2, *cis*-6,*cis*-9,*cis-*12,*cis-*15-18 : 4, 20 : 0, 21 : 0, 23 : 0, 24 : 0, *cis*-15-24 : 1, 25 : 0, 26 : 0 and 27 : 0.

**Online Supporting Material**

**Supplemental Table S2.** Effect of dietary forage to concentrate ratio and sunflower oil on the flow of 20-, 21- and 22-carbon fatty acids at the omasum in lactating cows\*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Treatment | | | |  | *P*† | | |
| Flow, *g/d* | L | LSO | H | HSO | SEM | FC | SO | FC×SO |
| 20 : 0 | 5·19 | 7·85 | 5·55 | 7·19 | 0·442 | 0·74 | <0·01 | 0·29 |
| 20 : 1 *cis*-9 + *trans*-14 | 0·11 | 0·17 | 0·17 | 0·22 | 0·012 | <0·01 | 0·001 | 0·55 |
| 20 : 1 *cis*-11 | 0·57 | 0·80 | 1·10 | 1·59 | 0·114 | 0·001 | 0·02 | 0·27 |
| 20 : 1 *cis*-12 | 0·15 | 0·16 | 0·16 | 0·19 | 0·021 | 0·41 | 0·31 | 0·70 |
| 20 : 1 *cis*-13 | 0·13 | 0·12 | 0·13 | 0·11 | 0·019 | 0·94 | 0·54 | 0·91 |
| 20 : 1 *cis*-16 | 0·07 | 0·09 | 0·15 | 0·10 | 0·033 | 0·16 | 0·49 | 0·28 |
| 20 : 1 *trans*-9 + *trans*-10 | 0·11 | 0·13 | 0·13 | 0·14 | 0·018 | 0·45 | 0·33 | 0·81 |
| 20 : 1 *trans*-11 + *cis*-15 | 0·16 | 0·18 | 0·22 | 0·24 | 0·020 | <0·01 | 0·12 | 0·81 |
| 20 : 1 *trans*-12 | 0·08 | 0·12 | 0·11 | 0·20 | 0·012 | <0·01 | 0·001 | 0·05 |
| 20 : 1 *trans*-13 | 0·12 | 0·15 | 0·15 | 0·20 | 0·017 | 0·05 | 0·05 | 0·79 |
| 20 : 2 *cis-*11, *cis-*14 | 0·08 | 0·09 | 0·15 | 0·12 | 0·021 | 0·03 | 0·50 | 0·42 |
| 21 : 0 | 0·25 | 0·27 | 0·23 | 0·22 | 0·018 | 0·16 | 0·85 | 0·41 |
| 22 : 0 | 3·64 | 9·69 | 3·21 | 9·14 | 0·414 | 0·25 | <0·001 | 0·88 |
| 22 : 1 *cis*-13 | 0·23 | 0·22 | 0·28 | 0·28 | 0·021 | 0·03 | 0·74 | 0·66 |
| 22 : 1 *cis*-15 | 0·05 | 0·06 | 0·06 | 0·04 | 0·008 | 0·79 | 0·53 | 0·07 |

L, low concentrate diet (FC ratio 65:35 on a DM basis) with no additional lipid; LSO, low concentrate diet (FC ratio 65:35) containing 50 g sunflower oil/kg diet DM; H, high concentrate diet (FC ratio 35:65) with no additional lipid; HSO, high concentrate diet (FC ratio 35:65) containing 50 g sunflower oil/kg diet DM; SEM, standard error of the mean; FC, forage to concentrate; SO, sunflower oil.

\* Values are least square means and pooled SEM, *n* = 16. Values represent the mean over d22 to d24 of each omasal digesta sampling.

† Significance of effects due to dietary forage to concentrate ratio (FC), supplements of sunflower oil (SO), and their interaction (FC×SO).