**Supplementary Material:**

**Table S1:** Listing of all samples and data used in this study. Hydrogen data represent an average value of two samples per individual, while carbon and nitrogen data are based on one sample per individual. Statistical overview data for each group are given in Table 3.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Group | Individual number | Generation | Hydrogen isotopic exchangeability (% ) of collagen | *δ*2H (‰ ) collagen | 2Hatom % in collagen | Nitrogen in collagen (wt. %) | Carbon in collagen (wt. %) | *δ* 15N (‰) collagen | *δ* 13C (‰) collagen | Collagen atomic C/N ratio | *δ*2H (‰) water | *δ*2H (‰) bulk dry food | *δ*13C (‰) bulk dry food | *δ*15N (‰) bulk dry food |
|
|
| **A** | 1 | mother | 23.1 | -142 | 0.0134 | 14.0 | 44.1 | 5.5 | -18.1 | 3.2 | -36 | -52 | -22.2 | 1.0 |
| **A** | 2 | mother | 21.6 | -135 | 0.0135 | 14.0 | 44.3 | 5.2 | -19.0 | 3.2 | -36 | -52 | -22.2 | 1.0 |
| **A** | 3 | pup | 20.4 | -135 | 0.0135 | 14.1 | 44.8 | 4.5 | -19.4 | 3.2 | -36 | -52 | -22.2 | 1.0 |
| **A** | 4 | pup | 22.9 | -119 | 0.0137 | 14.3 | 44.1 | 4.4 | -19.3 | 3.1 | -36 | -52 | -22.2 | 1.0 |
| **A** | 5 | pup | 22.9 | -123 | 0.0137 | 15.9 | 44.6 | 5.1 | -19.3 | 2.8 | -36 | -52 | -22.2 | 1.0 |
| **A** | 6 | pup | 23.5 | -111 | 0.0138 | 15.8 | 44.6 | 5.5 | -19.4 | 2.8 | -36 | -52 | -22.2 | 1.0 |
| **A** | 7 | pup | 22.0 | -129 | 0.0136 | 14.4 | 45.4 | 4.9 | -19.6 | 3.2 | -36 | -52 | -22.2 | 1.0 |
| **A** | 8 | pup | 23.9 | -112 | 0.0138 | 14.3 | 44.2 | 4.9 | -19.3 | 3.1 | -36 | -52 | -22.2 | 1.0 |
| **A** | 9 | pup | 22.7 | -132 | 0.0135 | 14.1 | 44.6 | 4.6 | -19.5 | 3.2 | -36 | -52 | -22.2 | 1.0 |
| **A** | 10 | pup | 23.2 | -122 | 0.0137 | 15.1 | 45.4 | 5.1 | -19.8 | 3.0 | -36 | -52 | -22.2 | 1.0 |
| **A** | 11 | pup | 23.6 | -122 | 0.0137 | 15.1 | 43.1 | 4.8 | -19.6 | 2.9 | -36 | -52 | -22.2 | 1.0 |
| **A** | 12 | pup | 23.4 | -121 | 0.0137 | 16.0 | 45.8 | 4.6 | -19.3 | 2.9 | -36 | -52 | -22.2 | 1.0 |
| **B** | 1 | mother | 20.9 | -13 | 0.0154 | 15.4 | 44.3 | 5.4 | -18.8 | 2.9 | 952 | -52 | -22.2 | 1.0 |
| **B** | 2 | mother | 22.3 | -4 | 0.0155 | 13.5 | 45.3 | 5.0 | -19.1 | 3.4 | 952 | -52 | -22.2 | 1.0 |
| **B** | 3 | pup | 21.1 | 121 | 0.0175 | 13.5 | 44.7 | 5.0 | -19.7 | 3.3 | 952 | -52 | -22.2 | 1.0 |
| **B** | 4 | pup | 21.1 | 86 | 0.0169 | 14.2 | 44.3 | 4.6 | -19.1 | 3.1 | 952 | -52 | -22.2 | 1.0 |
| **B** | 5 | pup | 23.3 | 111 | 0.0173 | 13.8 | 44.6 | 5.3 | -19.7 | 3.2 | 952 | -52 | -22.2 | 1.0 |
| **B** | 6 | pup | 23.2 | 105 | 0.0172 | 13.9 | 44.9 | 4.6 | -19.6 | 3.2 | 952 | -52 | -22.2 | 1.0 |
| **B** | 7 | pup | 24.2 | 134 | 0.0177 | 16.1 | 45.2 | 6.2 | -19.1 | 2.8 | 952 | -52 | -22.2 | 1.0 |
| **B** | 8 | pup | 23.5 | 138 | 0.0177 | 14.4 | 44.2 | 4.8 | -19.3 | 3.1 | 952 | -52 | -22.2 | 1.0 |
| **B** | 9 | pup | 22.9 | 135 | 0.0177 | 14.3 | 44.7 | 4.9 | -19.0 | 3.1 | 952 | -52 | -22.2 | 1.0 |
| **B** | 10 | pup | 23.0 | 132 | 0.0176 | 14.3 | 45.0 | 4.6 | -19.3 | 3.1 | 952 | -52 | -22.2 | 1.0 |
| **B** | 11 | pup | 22.3 | 120 | 0.0174 | 14.3 | 44.5 | 5.1 | -19.5 | 3.1 | 952 | -52 | -22.2 | 1.0 |
| **B** | 12 | pup | 22.7 | 111 | 0.0173 | 15.5 | 45.7 | 5.3 | -19.9 | 2.9 | 952 | -52 | -22.2 | 1.0 |
| **C** | 1 | mother | 20.6 | 198 | 0.0187 | 14.2 | 45.2 | 23.0 | -8.3 | 3.2 | -36 | 246 | -19.2 | 22.5 |
| **C** | 2 | mother | 21.0 | 197 | 0.0186 | 14.1 | 44.5 | 20.9 | -9.0 | 3.2 | -36 | 246 | -19.2 | 22.5 |
| **C** | 3 | pup | 19.6 | 357 | 0.0211 | 15.9 | 45.0 | 40.6 | 0.3 | 2.8 | -36 | 246 | -19.2 | 22.5 |
| **C** | 4 | pup | 20.1 | 359 | 0.0212 | 13.8 | 44.8 | 45.9 | 4.7 | 3.3 | -36 | 246 | -19.2 | 22.5 |
| **C** | 5 | pup | 22.9 | 417 | 0.0221 | 14.1 | 45.2 | 52.7 | 9.6 | 3.2 | -36 | 246 | -19.2 | 22.5 |
| **C** | 6 | pup | 21.5 | 386 | 0.0216 | 14.0 | 44.8 | 51.3 | 8.5 | 3.2 | -36 | 246 | -19.2 | 22.5 |
| **C** | 7 | pup | 21.7 | 477 | 0.0230 | 15.7 | 44.7 | 54.7 | 10.2 | 2.9 | -36 | 246 | -19.2 | 22.5 |
| **C** | 8 | pup | 22.5 | 487 | 0.0232 | 14.1 | 43.6 | 41.1 | 2.3 | 3.1 | -36 | 246 | -19.2 | 22.5 |
| **C** | 9 | pup | 22.6 | 400 | 0.0218 | 13.8 | 44.7 | 55.1 | 10.0 | 3.2 | -36 | 246 | -19.2 | 22.5 |
| **C** | 10 | pup | 23.6 | 352 | 0.0211 | 14.7 | 45.0 | 44.0 | 3.8 | 3.1 | -36 | 246 | -19.2 | 22.5 |
| **C** | 11 | pup | 20.2 | 421 | 0.0221 | 15.2 | 44.2 | 51.6 | 7.9 | 2.9 | -36 | 246 | -19.2 | 22.5 |
| **C** | 12 | pup | 23.4 | 438 | 0.0224 | 16.1 | 44.2 | 54.1 | 10.5 | 2.7 | -36 | 246 | -19.2 | 22.5 |
| **D** | 1 | mother | 22.4 | 273 | 0.0198 | 15.6 | 44.7 | 21.7 | -9.5 | 2.9 | 952 | 246 | -19.2 | 22.5 |
| **D** | 2 | mother | 20.2 | 236 | 0.0192 | 14.5 | 44.6 | 24.2 | -7.1 | 3.1 | 952 | 246 | -19.2 | 22.5 |
| **D** | 3 | pup | 21.7 | 680 | 0.0262 | 14.7 | 45.2 | 55.2 | 10.0 | 3.1 | 952 | 246 | -19.2 | 22.5 |
| **D** | 4 | pup | 23.9 | 615 | 0.0252 | 15.3 | 43.8 | 45.5 | 4.3 | 2.9 | 952 | 246 | -19.2 | 22.5 |
| **D** | 5 | pup | 21.5 | 600 | 0.0249 | 14.1 | 44.7 | 45.7 | 3.7 | 3.2 | 952 | 246 | -19.2 | 22.5 |
| **D** | 6 | pup | 22.8 | 671 | 0.0260 | 15.3 | 44.1 | 48.8 | 6.4 | 2.9 | 952 | 246 | -19.2 | 22.5 |
| **D** | 7 | pup | 22.6 | 659 | 0.0258 | 15.7 | 43.2 | 57.5 | 12.1 | 2.8 | 952 | 246 | -19.2 | 22.5 |
| **D** | 8 | pup | 23.0 | 634 | 0.0254 | 15.8 | 44.9 | 39.9 | 0.2 | 2.9 | 952 | 246 | -19.2 | 22.5 |
| **D** | 9 | pup | 20.3 | 746 | 0.0272 | 14.3 | 45.1 | 52.1 | 6.6 | 3.2 | 952 | 246 | -19.2 | 22.5 |
| **D** | 10 | pup | 21.9 | 629 | 0.0254 | 15.5 | 43.5 | 43.7 | 3.6 | 2.8 | 952 | 246 | -19.2 | 22.5 |
| **D** | 11 | pup | 21.2 | 735 | 0.0270 | 15.9 | 44.5 | 48.1 | 6.0 | 2.8 | 952 | 246 | -19.2 | 22.5 |
| **D** | 12 | pup | 21.6 | 696 | 0.0264 | 12.9 | 41.0 | 54.2 | 9.4 | 3.2 | 952 | 246 | -19.2 | 22.5 |

**Table S2:** Description of Purina® 5015 Mouse Diet composition from labdiet.com. Reproduced from [https://www.labdiet.com/cs/groups/lolweb/@labdiet/documents/web\_content/mdrf/mdi4/~edisp/ducm04\_028439.pdf](https://www.labdiet.com/cs/groups/lolweb/%40labdiet/documents/web_content/mdrf/mdi4/~edisp/ducm04_028439.pdf) with permission from *PMI Nutrition International*.

