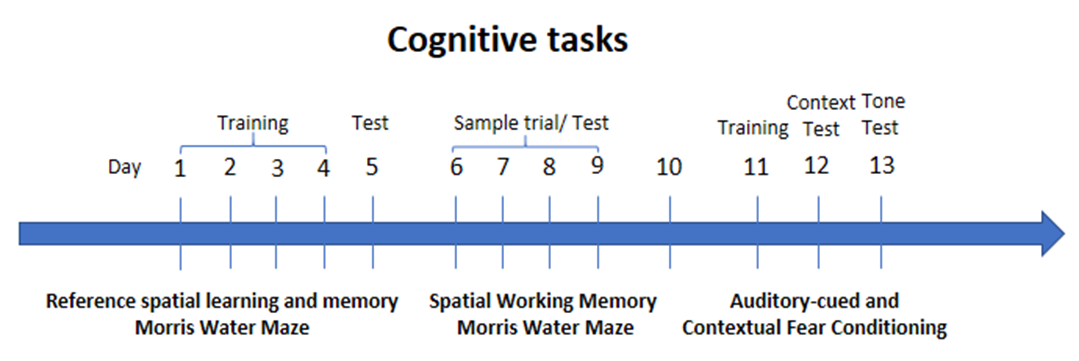
Supplementary **Figure 1**. Representation of cognitive assessment test.



Supplementary **Table 1**. Composition of MFGM concentrate supplement isolated from buttermilk (BMC). **A)** Global composition; **B)** Fatty acid profile; **C)** Lipid classes and polar lipids profile.

****CE, Cholesterol esters; TAG, triacylglycerols; FFA+Chol, free fatty acids + cholesterol; DAG, diacylglycerols; MAG, monoacylglycerols; PL, Polar Lipids; PE, phosphatidylethanolamine; PI, phosphatidyl inositol; PS, phosphatidylserine; PC, phosphatidylcholine; SM, sphingomyelin. Glucer, glucosylceramides; Lacer, lactosylceramides; AA, arachidonic acid; ALA, -linolenic acid; LA, linoleic acid; CLA, Conjugate linoleic acid; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SFA, saturated fatty acids

Supplementary **Table 2.** Fat content (g/100g tissue) of the tissues after control diet and MFGM concentrate supplement (BMC) diets.



a,b Means with different superscript letters within a row are significantly different (*P* < 0.05).

SAT: subcutaneous adipose tissue; VAT: visceral adipose tissue; RBC: Red blood cells or erythrocytes; CB: cerebelum, TC: temporal cortex, OC: occipital cortex

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **SAT** | | | | | | |  | **VAT** | | | | | | |  | **Liver** | | | | | | |  | **Plasma** | | | | | | |  | **Erythrocytes** | | | | | | |
| **Fatty Acid**  **(g/100g fat)** | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C14:0** | 0.66 | ± | 0.09 |  | 0.82 | ± | 0.15 |  | 0.74 | ± | 0.11 |  | 0.89 | ± | 0.14 |  | 0.45 | ± | 0.13 |  | 0.45 | ± | 0.15 |  | 0.46 | ± | 0.25 |  | 0.46 | ± | 0.15 |  | 0.42 | ± | 0.21 |  | 0.50 | ± | 0.15 |
| **C15:0 DMA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.17 | ± | 0.04 |  | 0.18 | ± | 0.07 |
| **C15:0** | 0.23 | ± | 0.02 |  | 0.23 | ± | 0.06 |  | 0.29 | ± | 0.03 |  | 0.32 | ± | 0.05 |  | 0.18 | ± | 0.04 |  | 0.19 | ± | 0.03 |  | 0.19 | ± | 0.05 |  | 0.20 | ± | 0.03 |  | 0.55 | ± | 0.10 |  | 0.58 | ± | 0.10 |
| **C16:0 DMA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2.37 | ± | 0.45 |  | 2.47 | ± | 0.27 |
| **C16:0** | 17.70 | ± | 1.91 |  | 17.03 | ± | 1.58 |  | 21.90 | ± | 1.55 |  | 20.80 | ± | 2.04 |  | 21.50 | ± | 2.59 |  | 19.92 | ± | 1.27 |  | 21.56 | ± | 5.09 |  | 20.19 | ± | 0.76 |  | 54.45 | ± | 4.66 |  | 52.85 | ± | 3.54 |
| **C17:0 *iso*** | 0.41 | ± | 0.08 |  | 0.36 | ± | 0.15 |  | 0.53 | ± | 0.06 |  | 0.51 | ± | 0.07 |  | 0.20 | ± | 0.07 |  | 0.20 | ± | 0.04 |  | 0.09 | ± | 0.10 |  | 0.04 | ± | 0.07 |  |  |  |  |  |  |  |  |
| **C16:1*cis9*** | 4.35 | ± | 1.86 |  | 5.21 | ± | 1.72 |  | 3.22 | ± | 0.75 |  | 3.09 | ± | 1.16 |  | 2.83 | ± | 1.00 |  | 2.63 | ± | 1.16 |  | 2.18 | ± | 1.12 |  | 2.16 | ± | 1.03 |  | 0.77 | ± | 0.31 |  | 0.97 | ± | 0.40 |
| **C17:0** | 0.13 | ± | 0.04 |  | 0.11 | ± | 0.05 |  | 0.20 | ± | 0.02 |  | 0.22 | ± | 0.04 |  | 0.21 | ± | 0.05 |  | 0.24 | ± | 0.04 |  | 0.13 | ± | 0.03 |  | 0.13 | ± | 0.03 |  | 0.64 | ± | 0.09 |  | 0.69 | ± | 0.12 |
| **C18:1DMA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1.81 | ± | 0.36 |  | 1.95 | ± | 0.22 |
| **C18:0 *iso*** |  |  |  |  |  |  |  |  | 0.08 | ± | 0.01 |  | 0.09 | ± | 0.03 |  | 0.12 | ± | 0.04 |  | 0.15 | ± | 0.04 |  |  |  |  |  |  |  |  |  | 0.15 | ± | 0.03 |  | 0.17 | ± | 0.03 |
| **C17:1** | 0.11 | ± | 0.04 |  | 0.10 | ± | 0.07 |  | 0.12 | ± | 0.02 |  | 0.12 | ± | 0.02 |  | 0.05 | ± | 0.03 |  | 0.07 | ± | 0.03 |  |  |  |  |  |  |  |  |  | 0.36 | ± | 0.10 |  | 0.42 | ± | 0.11 |
| **C18:1DMA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.22 | ± | 0.07 |  | 0.23 | ± | 0.07 |
| **C18:0** | 1.40 | ± | 0.45 |  | 1.15 | ± | 0.36 |  | 2.18 | ± | 0.24 |  | 2.15 | ± | 0.44 |  | 7.93 | ± | 1.73 |  | 7.70 | ± | 1.09 |  | 7.77 | ± | 2.03 |  | 6.90 | ± | 1.44 |  | 17.40 | ± | 2.31 |  | 16.52 | ± | 2.02 |
| **C18:1*cis9*** | 25.63 | ± | 1.38 |  | 26.32 | ± | 1.99 |  | 27.53 | ± | 1.68 |  | 27.15 | ± | 1.88 |  | 10.11 | ± | 2.47 |  | 8.99 | ± | 1.16 |  | 8.79 | ± | 2.03 |  | 9.16 | ± | 1.69 |  | 5.80 | ± | 0.78a |  | 6.93 | ± | 2.29b |
| **C18:1*cis11*** | 6.08 | ± | 0.49 |  | 5.72 | ± | 0.69 |  | 6.70 | ± | 0.68 |  | 6.53 | ± | 0.62 |  | 4.81 | ± | 0.70 |  | 4.55 | ± | 0.88 |  | 2.73 | ± | 0.91 |  | 2.78 | ± | 0.68 |  | 4.20 | ± | 0.40 |  | 4.40 | ± | 0.48 |
| **C18:2 n-6 (LA)** | 39.17 | ± | 2.27 |  | 39.19 | ± | 2.32 |  | 34.07 | ± | 2.78 |  | 35.15 | ± | 3.00 |  | 15.78 | ± | 2.68 |  | 16.31 | ± | 3.58 |  | 20.13 | ± | 3.39 |  | 21.46 | ± | 2.83 |  | 4.74 | ± | 1.66 |  | 5.05 | ± | 1.31 |
| **C18:3n-6 (GLA)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.09 | ± | 0.06 |  | 0.11 | ± | 0.05 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C18:3n-3 (ALA)** | 1.58 | ± | 0.43 |  | 1.34 | ± | 0.69 |  | 1.00 | ± | 0.28 |  | 1.14 | ± | 0.43 |  | 0.33 | ± | 0.15 |  | 0.42 | ± | 0.24 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C20:1** | 0.39 | ± | 0.19 |  | 0.27 | ± | 0.20 |  | 0.26 | ± | 0.07 |  | 0.31 | ± | 0.11 |  | 0.12 | ± | 0.05 |  | 0.14 | ± | 0.06 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C20:2 n-6** | 0.26 | ± | 0.10 |  | 0.25 | ± | 0.15 |  | 0.14 | ± | 0.05 |  | 0.17 | ± | 0.07 |  | 0.29 | ± | 0.10 |  | 0.33 | ± | 0.12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C22:0** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.06 | ± | 0.04 |  | 0.08 | ± | 0.04 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C20:3 n-6 (DGLA)** | 0.14 | ± | 0.06 |  | 0.15 | ± | 0.10 |  | 0.09 | ± | 0.03a |  | 0.13 | ± | 0.06b |  | 0.50 | ± | 0.12a |  | 0.62 | ± | 0.14b |  | 0.19 | ± | 0.11 |  | 0.20 | ± | 0.07 |  |  |  |  |  |  |  |  |
| **C20:4 (AA)** | 1.15 | ± | 0.42 |  | 1.09 | ± | 0.42 |  | 0.61 | ± | 0.13 |  | 0.74 | ± | 0.25 |  | 25.25 | ± | 3.71 |  | 27.07 | ± | 2.41 |  | 33.08 | ± | 5.99 |  | 33.20 | ± | 4.29 |  | 5.43 | ± | 2.47 |  | 5.43 | ± | 2.16 |
| **C20:5 n-3 (EPA)** | 0.27 | ± | 0.16 |  | 0.27 | ± | 0.17 |  | 0.15 |  | 0.05 |  | 0.20 |  | 0.09 |  | 0.71 | ± | 0.28 |  | 0.87 | ± | 0.40 |  | 0.26 | ± | 0.12 |  | 0.33 | ± | 0.14 |  | 0.20 | ± | 0.10 |  | 0.24 | ± | 0.08 |
| **C24:0** | 0.05 | ± | 0.05 |  | 0.04 | ± | 0.04 |  | 0.03 | ± | 0.01 |  | 0.04 | ± | 0.02 |  | 0.62 | ± | 0.26 |  | 0.59 | ± | 0.32 |  | 0.16 | ± | 0.10 |  | 0.17 | ± | 0.12 |  | 0.15 | ± | 0.14 |  | 0.19 | ± | 0.14 |
| **C22:5 n-3 (DPA)** | 0.14 | ± | 0.10 |  | 0.16 | ± | 0.13 |  | 0.07 | ± | 0.03 |  | 0.12 | ± | 0.08 |  | 0.96 | ± | 0.35 |  | 1.10 | ± | 0.35 |  | 0.25 | ± | 0.16 |  | 0.29 | ± | 0.15 |  | 0.06 | ± | 0.02 |  | 0.09 | ± | 0.05 |
| **C22:6 n-3 (DHA)** | 0.18 | ± | 0.13 |  | 0.19 | ± | 0.14 |  | 0.09 | ± | 0.04 |  | 0.13 | ± | 0.07 |  | 6.73 | ± | 1.30 |  | 7.03 | ± | 0.92 |  | 2.03 | ± | 0.70 |  | 2.32 | ± | 0.40 |  | 0.11 | ± | 0.05 |  | 0.13 | ± | 0.08 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **ΣDMA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4.57 | ± | 0.81 |  | 4.83 | ± | 0.46 |
| **ΣSFA** | 20.53 | ± | 2.12 |  | 19.72 | ± | 1.87 |  | 25.92 | ± | 1.71 |  | 24.99 | ± | 2.52 |  | 31.28 | ± | 3.43 |  | 29.53 | ± | 1.93 |  | 30.36 | ± | 6.23 |  | 28.08 | ± | 1.48 |  | 73.81 | ± | 4.81 |  | 71.55 | ± | 4.54 |
| **ΣMUFA** | 36.57 | ± | 2.63 |  | 37.63 | ± | 2.51 |  | 37.84 | ± | 2.26 |  | 37.22 | ± | 2.25 |  | 17.92 | ± | 3.49 |  | 16.37 | ± | 2.37 |  | 13.70 | ± | 3.71 |  | 14.11 | ± | 3.18 |  | 11.13 | ± | 1.14 |  | 12.72 | ± | 2.72 |
| **ΣPUFA** | 42.90 | ± | 2.54 |  | 42.65 | ± | 1.85 |  | 36.24 | ± | 3.07 |  | 37.79 | ± | 3.83 |  | 50.63 | ± | 5.59 |  | 53.87 | ± | 3.26 |  | 55.94 | ± | 6.62 |  | 57.81 | ± | 2.28 |  | 10.49 | ± | 3.84 |  | 10.90 | ± | 3.14 |
| **ΣMCFA** | 0.89 | ± | 0.10 |  | 1.06 | ± | 0.20 |  | 1.03 | ± | 0.12 |  | 1.21 | ± | 0.16 |  | 0.63 | ± | 0.16 |  | 0.64 | ± | 0.16 |  | 0.65 | ± | 0.29 |  | 0.66 | ± | 0.16 |  | 0.97 | ± | 0.29 |  | 1.08 | ± | 0.17 |
| **ΣLCFA** | 96.59 | ± | 1.09 |  | 96.55 | ± | 1.40 |  | 97.55 | ± | 0.34 |  | 96.98 | ± | 0.61 |  | 63.97 | ± | 4.87 |  | 61.29 | ± | 2.39 |  | 63.38 | ± | 6.23 |  | 62.82 | ± | 4.02 |  | 88.51 | ± | 2.95 |  | 88.01 | ± | 2.45 |
| **ΣVLCFA** | 2.52 | ± | 1.06 |  | 2.39 | ± | 1.25 |  | 1.42 | ± | 0.33 |  | 1.81 | ± | 0.64 |  | 35.40 | ± | 4.97 |  | 38.07 | ± | 2.42 |  | 35.97 | ± | 6.46 |  | 36.52 | ± | 4.14 |  | 5.95 | ± | 2.50 |  | 6.08 | ± | 2.21 |
| **Σn-6** | 40.7 | ± | 2.2 |  | 40.7 | ± | 2.0 |  | 34.9 | ± | 2.8 |  | 36.2 | ± | 3.3 |  | 26.1 | ± | 3.8 |  | 28.1 | ± | 2.3 |  | 53.40 | ± | 6.04 |  | 54.86 | ± | 2.45 |  | 10.17 | ± | 3.89 |  | 10.49 | ± | 3.14 |
| **Σn-3** | 2.2 | ± | 0.7 |  | 2.0 | ± | 1.1 |  | 1.3 | ± | 0.3 |  | 1.6 | ± | 0.6 |  | 8.7 | ± | 1.8 |  | 9.4 | ± | 1.4 |  | 2.54 | ± | 0.87 |  | 2.95 | ± | 0.58 |  | 0.37 | ± | 0.15 |  | 0.46 | ± | 0.16 |

Supplementary **Table 3.** Fatty acid composition (g/100g fat) of subcutaneous adipose tissue (SAT), visceral adipose tissue (VAT), liver, plasma and erythrocytes from aged rats fed control diet (CD) or MFGM concentrate supplement (BMC). Data expressed as means ± SD from aged rats.

a,b Means with different superscript letters within a row are significantly different (*P*< 0.05).

Supplementary **Table 4.** Lipid classes profile (g/100g fat) of subcutaneous adipose tissue (SAT), visceral adipose tissue (VAT), liver, of plasma and erythrocytes from aged rats fed control diet (CD) or MFGM concentrate supplement (BMC). Data are expressed as means ± SD.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | SAT | | | | | | |  | VAT | | | | | | |  | Liver | | | | | | |  | Plasma | | | | | | |  | Erythrocytes | | | | | | |
|  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |
| **CE** | 0.01 | ± | 0.00 |  | 0.01 | ± | 0.00 |  | 0.01 | ± | 0.01 |  | 0.01 | ± | 0.01 |  | 3.33 | ± | 1.04 |  | 3.86 | ± | 1.84 |  | 31.69a | ± | 4.00 |  | 27.73b | ± | 3.97 |  | 0.65 | ± | 0.72 |  | 0.70 | ± | 0.59 |
| **TAG** | 99.84 | ± | 0.05 |  | 99.82 | ± | 0.10 |  | 99.89 | ± | 0.02 |  | 99.90 | ± | 0.03 |  | 38.69 | ± | 11.82 |  | 38.29 | ± | 11.30 |  | 29.42b | ± | 7.19 |  | 39.54a | ± | 10.07 |  | 0.41 | ± | 0.26 |  | 0.75 | ± | 0.55 |
| **DAG** | 0.12 | ± | 0.04 |  | 0.13 | ± | 0.07 |  | 0.03 | ± | 0.03 |  | 0.02 | ± | 0.03 |  | 6.76 | ± | 4.39 |  | 4.97 | ± | 3.37 |  | 0.40 | ± | 0.25 |  | 0.30 | ± | 0.06 |  | 1.68 | ± | 0.82 |  | 3.86 | ± | 3.37 |
| **FFA+CHOL** | 0.03 | ± | 0.02 |  | 0.03 | ± | 0.04 |  | 0.00 | ± | 0.00 |  | 0.00 | ± | 0.00 |  | 8.31 | ± | 2.08 |  | 7.63 | ± | 3.43 |  | 13.15a | ± | 3.33 |  | 7.73b | ± | 3.64 |  | 29.67a | ± | 1.77 |  | 26.43b | ± | 2.43 |
| **MAG** | 0.01 | ± | 0.00 |  | 0.01 | ± | 0.00 |  | 0.00 | ± | 0.00 |  | 0.00 | ± | 0.00 |  | 0.31 | ± | 0.54 |  | 0.24 | ± | 0.38 |  | 0.04 | ± | 0.03 |  | 0.01 | ± | 0.01 |  | 3.82 | ± | 1.66 |  | 4.03 | ± | 1.08 |
| **∑PL** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 42.60 | ± | 11.48 |  | 45.02 | ± | 8.40 |  | 25.12 | ± | 2.66 |  | 22.94 | ± | 2.72 |  | 63.78 | ± | 2.26 |  | 64.23 | ± | 3.02 |
| g/100g of PL | |
| **PA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.83 | ± | 0.65 |  | 0.86 | ± | 0.35 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **PE** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 21.93 | ± | 4.03 |  | 21.49 | ± | 6.52 |  | 0.20 | ± | 0.06 |  | 0.24 | ± | 0.07 |  | 5.47 | ± | 1.88 |  | 5.65 | ± | 1.92 |
| **PI** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.84 | ± | 0.96 |  | 1.37 | ± | 0.97 |  | 1.48 | ± | 0.96 |  | 1.69 | ± | 0.87 |  |  |  |  |  |  |  |  |
| **PS** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.12 | ± | 0.13 |  | 0.10 | ± | 0.11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **PC** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 74.30 | ± | 3.78 |  | 74.22 | ± | 5.19 |  | 94.06 | ± | 1.13 |  | 94.11 | ± | 0.96 |  | 75.00 | ± | 1.69 |  | 74.36 | ± | 1.95 |
| **SM** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1.99 | ± | 0.63 |  | 1.97 | ± | 1.04 |  | 4.27 | ± | 0.95 |  | 3.97 | ± | 0.84 |  | 19.53 | ± | 1.53 |  | 19.99 | ± | 2.39 |

a,b Means with different superscript letters within a row are significantly different (*P*< 0.05).

CE, Cholesterol esters; TAG, triacylglycerols; FFA+Chol, DAG, diacylglycerols; free fatty acids + cholesterol; MAG, monoacylglycerols; PL, Polar Lipids; PE, phosphatidylethanolamine; PI, phosphatidyl inositol; PS, phosphatidylserine; PC, phosphatidylcholine; SM, sphingomyelin

**Supplementary Table 5.** Fatty acid composition (g/100g fat) of cerebelum (CB), temporal cortex (TC) and occipital cortex (OC) from aged rats fed control (CD) or MFGM concentrate supplement (BMC). Data expressed as means ± SD.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | CB | | | | | | |  | TC | | | | | | |  | OC | | | | | | |
|  |  | CT | | |  | BMC | | |  | CT | | |  | BMC | | |  | CT | | |  | BMC | | |
| **C14:0** |  | 0.07 | ± | 0.01 |  | 0.07 | ± | 0.01 |  | 0.07 | ± | 0.01 |  | 0.07 | ± | 0.01 |  | 0.06 | ± | 0.01 |  | 0.09 | ± | 0.10 |
| **C16:0 DMA** |  | 2.18 | ± | 0.20 |  | 2.14 | ± | 0.20 |  | 1.59 | ± | 0.10 |  | 1.50 | ± | 0.14 |  | 1.88 | ± | 0.19 |  | 1.80 | ± | 0.22 |
| **C16:0** |  | 16.25 | ± | 1.04 |  | 16.20 | ± | 0.90 |  | 17.69 | ± | 0.72 |  | 17.26 | ± | 1.36 |  | 18.84 | ± | 0.87 |  | 18.45 | ± | 1.42 |
| **C16:1cis9** |  | 0.25 | ± | 0.02 |  | 0.24 | ± | 0.03 |  | 0.23 | ± | 0.03 |  | 0.23 | ± | 0.03 |  | 0.20 | ± | 0.02 |  | 0.19 | ± | 0.03 |
| **C17:0** |  | 0.14 | ± | 0.01 |  | 0.15 | ± | 0.01 |  | 0.10 | ± | 0.01 |  | 0.10 | ± | 0.01 |  | 0.09 | ± | 0.01 |  | 0.10 | ± | 0.02 |
| **C18:0 DMA** |  | 3.38 | ± | 0.17 |  | 3.37 | ± | 0.18 |  | 3.55 | ± | 0.12 |  | 3.49 | ± | 0.21 |  | 3.97 | ± | 0.55 |  | 3.69 | ± | 0.36 |
| **C17:1** |  | 1.52 | ± | 0.15 |  | 1.54 | ± | 0.11 |  | 1.27 | ± | 0.09 |  | 1.15 | ± | 0.18 |  | 1.01 | ± | 0.20 |  | 1.01 | ± | 0.30 |
| **C18:1DMA** |  | 2.60 | ± | 0.40 |  | 2.59 | ± | 0.27 |  | 1.60 | ± | 0.11 |  | 1.43 | ± | 0.20 |  | 1.22 | ± | 0.22 |  | 1.23 | ± | 0.53 |
| **C18:0** |  | 13.78 | ± | 1.02 |  | 13.45 | ± | 0.57 |  | 15.84 | ± | 0.45 |  | 15.49 | ± | 0.73 |  | 16.98 | ± | 1.04 |  | 17.07 | ± | 1.40 |
| **C18:1 cis9** |  | 16.35 | ± | 0.80 |  | 16.37 | ± | 0.62 |  | 15.72 | ± | 0.33 |  | 15.04 | ± | 0.62 |  | 13.91 | ± | 0.98 |  | 14.29 | ± | 1.03 |
| **C18:1cis11** |  | 4.36 | ± | 0.51 |  | 4.50 | ± | 0.21 |  | 2.75 | ± | 0.13 |  | 2.64 | ± | 0.13 |  | 2.47 | ± | 0.16 |  | 2.50 | ± | 0.56 |
| **C18:2n-6** |  | 0.49 | ± | 0.10a |  | 0.56 | ± | 0.10b |  | 0.28 | ± | 0.06 |  | 0.32 | ± | 0.09 |  | 0.23 | ± | 0.04 |  | 0.28 | ± | 0.12 |
| **C18:3n-6 (GLA)** |  | 0.19 | ± | 0.05 |  | 0.19 | ± | 0.03 |  | 0.08 | ± | 0.02 |  | 0.08 | ± | 0.02 |  | 0.08 | ± | 0.03 |  | 0.08 | ± | 0.05 |
| **C18:3 n-3(ALA)** |  | 4.90 | ± | 1.24 |  | 4.96 | ± | 0.69 |  | 1.93 | ± | 0.32 |  | 1.78 | ± | 0.44 |  | 1.43 | ± | 0.49 |  | 1.67 | ± | 1.35 |
| **C20:1** |  | 1.04 | ± | 0.27 |  | 1.01 | ± | 0.13 |  | 0.30 | ± | 0.06 |  | 0.28 | ± | 0.09 |  | 0.23 | ± | 0.08 |  | 0.28 | ± | 0.30 |
| **C22:0** |  | 0.38 | ± | 0.09 |  | 0.37 | ± | 0.06 |  | 0.26 | ± | 0.04 |  | 0.26 | ± | 0.07 |  | 0.22 | ± | 0.08 |  | 0.25 | ± | 0.10 |
| **C20:3 n-6** |  | 0.25 | ± | 0.03 |  | 0.26 | ± | 0.02 |  | 0.18 | ± | 0.03 |  | 0.19 | ± | 0.03 |  | 0.19 | ± | 0.02 |  | 0.21 | ± | 0.04 |
| **C20:4 (AA)** |  | 11.30 | ± | 0.85 |  | 11.20 | ± | 0.34 |  | 14.36 | ± | 0.34 |  | 14.56 | ± | 0.60 |  | 14.90 | ± | 1.32 |  | 14.98 | ± | 1.38 |
| **C20:5n-3 (EPA)** |  | 2.97 | ± | 0.38 |  | 2.86 | ± | 0.24 |  | 3.55 | ± | 0.25a |  | 3.80 | ± | 0.29b |  | 4.28 | ± | 0.34 |  | 4.19 | ± | 0.41 |
| **C24:0** |  | 0.31 | ± | 0.09 |  | 0.27 | ± | 0.06 |  | 0.39 | ± | 0.07a |  | 0.48 | ± | 0.08b |  | 0.54 | ± | 0.12 |  | 0.52 | ± | 0.13 |
| **C22:5n-3 (DPA)** |  | 0.16 | ± | 0.02 |  | 0.16 | ± | 0.02 |  | 0.09 | ± | 0.02a |  | 0.13 | ± | 0.02b |  | 0.13 | ± | 0.02a |  | 0.19 | ± | 0.07b |
| **C22:6n-3 (DHA)** |  | 17.14 | ± | 0.88 |  | 17.56 | ± | 1.49 |  | 18.16 | ± | 0.82a |  | 19.72 | ± | 1.56b |  | 17.14 | ± | 1.69 |  | 16.93 | ± | 1.82 |
| **ΣDMA** |  | 8.16 | ± | 0.46 |  | 8.10 | ± | 0.48 |  | 6.75 | ± | 0.17 |  | 6.41 | ± | 0.37 |  | 7.07 | ± | 0.79 |  | 6.72 | ± | 0.87 |
| **ΣSFA** |  | 30.92 | ± | 1.92 |  | 30.50 | ± | 1.21 |  | 37.28 | ± | 0.81a |  | 33.67 | ± | 1.75b |  | 36.74 | ± | 1.45 |  | 36.48 | ± | 2.32 |
| **ΣMUFA** |  | 23.52 | ± | 1.52 |  | 23.65 | ± | 0.92 |  | 20.27 | ± | 0.44a |  | 19.33 | ± | 0.93b |  | 17.82 | ± | 1.34 |  | 18.28 | ± | 1.92 |
| **ΣPUFA** |  | 37.40 | ± | 1.17 |  | 37.75 | ± | 1.67 |  | 38.63 | ± | 1.04a |  | 40.58 | ± | 1.60b |  | 38.38 | ± | 2.37 |  | 38.52 | ± | 2.16 |
| **ΣMCFA** |  | 0.07 | ± | 0.01 |  | 0.07 | ± | 0.01 |  | 0.07 | ± | 0.01 |  | 0.07 | ± | 0.01 |  | 0.06 | ± | 0.01 |  | 0.09 | ± | 0.10 |
| **ΣLCFA** |  | 58.22 | ± | 1.19 |  | 58.15 | ± | 1.47 |  | 55.89 | ± | 0.99a |  | 54.09 | ± | 1.49b |  | 55.24 | ± | 1.83 |  | 55.64 | ± | 2.04 |
| **ΣVLCFA** |  | 33.55 | ± | 1.51 |  | 33.69 | ± | 1.81 |  | 37.29 | ± | 1.00a |  | 39.42 | ± | 1.60b |  | 37.63 | ± | 2.53 |  | 37.54 | ± | 2.67 |
| **Σn-6** |  | 12.23 | ± | 0.76 |  | 12.21 | ± | 0.33 |  | 14.90 | ± | 0.40 |  | 15.15 | ± | 0.67 |  | 15.39 | ± | 1.31 |  | 15.55 | ± | 1.23 |
| **Σn-3** |  | 25.17 | ± | 1.19 |  | 25.54 | ± | 1.44 |  | 23.73 | ± | 0.88a |  | 25.44 | ± | 1.32b |  | 22.99 | ± | 1.70 |  | 22.97 | ± | 1.79 |

a,bMeans with different superscript letters within a row are significantly different (*P*< 0.05).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lipid classes  (%) |  | CB | | | | | | |  | OC | | | | | | |  | TC | | | | | | |
|  |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |  | CD | | |  | BMC | | |
| **DAG** |  | 1.28 | ± | 0.5 |  | 1.55 | ± | 0.61 |  | 1.13 | ± | 0.29 |  | 1.06 | ± | 0.64 |  | 0.88 | ± | 0.95 |  | 0.59 | ± | 0.24 |
| **FFA+CHOL** |  | 38.21 | ± | 4.37 |  | 38.11 | ± | 2.29 |  | 32.27 | ± | 1.62 |  | 28.6 | ± | 8.09 |  | 40.99 | ± | 2.31 |  | 39.37 | ± | 3.23 |
| **MAG** |  | 1.09 | ± | 0.29 |  | 1.26 | ± | 0.32 |  | 0.82 | ± | 0.23 |  | 0.83 | ± | 0.22 |  | 0.67 | ± | 0.14 |  | 0.64 | ± | 0.16 |
| **GluCer** |  | 2.64 | ± | 0.29 |  | 2.76 | ± | 0.55 |  | 1.5 | ± | 0.41 |  | 1.47 | ± | 0.55 |  | 1.72 | ± | 0.36 |  | 1.66 | ± | 0.45 |
| **Gangliosides** |  | 8.81b | ± | 3.09 |  | 9.78a | ± | 2.14 |  | 7.26 | ± | 1.77 |  | 7.64 | ± | 2.01 |  | 9.08 | ± | 1.10a |  | 7.64 | ± | 1.51b |
| **LacCer** |  | 1.31 | ± | 0.42 |  | 1.23 | ± | 0.31 |  | 1.5 | ± | 0.37 |  | 1.66 | ± | 0.58 |  | 1.17 | ± | 0.19 |  | 1.04 | ± | 0.28 |
| **∑PL** |  | 46.66 | ± | 3.23 |  | 45.31 | ± | 2.81 |  | 55.54 | ± | 2.05a |  | 58.74 | ± | 7.9 |  | 45.79 | ± | 1.23a |  | 47.91 | ± | 1.73b |
| g/100g of PL |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **PA** |  | 1.31 | ± | 0.36 |  | 1.5 | ± | 0.86 |  | 1.62 | ± | 0.39 |  | 1.57 | ± | 0.51 |  | 0.88 | ± | 0.11 |  | 0.98 | ± | 0.29 |
| **PE** |  | 45.42 | ± | 1.63 |  | 45.16 | ± | 1.88 |  | 40.64 | ± | 1.51 |  | 40.89 | ± | 1.74 |  | 46.67 | ± | 0.64 |  | 46.49 | ± | 1.44 |
| **PI** |  | 2.35 | ± | 0.42 |  | 2.49 | ± | 0.38 |  | 3.46a | ± | 0.4 |  | 2.88b | ± | 0.65 |  | 1.61 | ± | 0.18 |  | 1.73 | ± | 0.25 |
| **PS** |  | 10.82 | ± | 0.51a |  | 10.18 | ± | 0.64b |  | 12.48 | ± | 0.54 |  | 12.71 | ± | 0.54 |  | 11.64 | ± | 0.52 |  | 11.72 | ± | 0.96 |
| **PC** |  | 37.9 | ± | 1.22 |  | 38.51 | ± | 1.01 |  | 37.64 | ± | 1.23 |  | 38.57 | ± | 1.56 |  | 37.69 | ± | 0.65 |  | 37.69 | ± | 0.71 |
| **SM** |  | 2.29 | ± | 0.54 |  | 2.16 | ± | 0.52 |  | 4.16 | ± | 1.08 |  | 3.38 | ± | 1.25 |  | 1.51 | ± | 0.36 |  | 1.39 | ± | 0.4 |

**Supplementary Table 6.** Lipid classes profile (g/100g fat) of cerebellum (CB) occipital cortex (OC) and temporal cortex (TC) from aged rats fed control diet (CD) or MFGM concentrate supplement (BMC). Data expressed as means ± SD.

a, b Means with different superscript letters within a row and between extraction methods are significantly different (*P* < 0.05).

DAG, diacylglycerols; FFA+Chol, free fatty acids + cholesterol; MAG, monoacylglycerols; PL, GluCer, glucosylceramides; LacCer, lactosylceramides; Polar Lipids; PE, phosphatidylethanolamine; PI, phosphatidyl inositol; PS, phosphatidylserine; PC, phosphatidylcholine; SM, sphingomyelin