

Technical note communication:

Fatty acid composition of commercial rodent diets

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Introduction

There is a considerable variation in the composition of commercial diets for laboratory rodents. This variation concerns differences between diets from different manufacturers and differences between batches of one brand. Examples of diet variation and possible biological effects have been described (Beynen 1987). The degree of variation in dietary fatty acid composition was hitherto not known. Here we report the analysed fatty acid profiles of 10 commercial rodent diets.

Materials and methods

One batch of each of the following pelleted, commercial maintenance rodent diets was used (in alphabetical order): 1320 Rat/Mouse/Maintenance: Altromin-Tier-Labor-Service, Lange Strasse 42, D-4937 Lage/Lippe, FRG; Rat and Mouse Standard Diet: Beekay Feeds, Bantin & Kingman Ltd., The Field Station, Grimston, Aldbrough, Hull, North Humberside HU11 4QE, UK; F2234 Maintenance Rat Diet: Bioserv Inc., P. O. Box 450, Frenchtown NJ 08825, USA; R-34 Ewos-Alab Grower Maintenance Feeds for Rats and Mice: Ewos-Ab, P. O. Box 618, S-15127 Södertälje, Sweden; RMH-TM for test and maintenance: Hope Farms, P. O. Box 85, 3440 AB Woerden, The Netherlands; Maintenance diet GLP for Rats/Mice: Kliba Klingentalmühle AG, CH-4303 Kaiseraugst, Basel, Switzerland; Ratte/Maus

/Hamster Haltungsfutter: Nohrlin, Eggersman Futtermittelwerk, 3260 Rinteln 1, FRG; Rat Chow 5012: Purina Mills Inc., P. O. Box 548, Richmond, Indiana 47375, USA; Rat & Mouse no. 1 Maintenance Diet: Special Diets Services Ltd., P. O. Box 705, Witham, Essex CM8 3AD, UK; Ssniff R10 Alleindiät für Ratten: Ssniff Versuchstier-Diäten GmbH, P. O. Box 488, 4770 Soest, Westfalen, FRG. All diets were composed of natural ingredients, except for the F2234 Maintenance Rat Diet, which consisted of purified ingredients.

Fat was extracted from duplicate diet samples using chloroform/methanol and subsequently weighed (Folch *et al.* 1957). The combined within- and between-run variation was 2.1% (coefficient of variation). Fatty acid methyl esters were prepared according to Metcalfé *et al.* (1966) and separated by gas liquid chromatography as described earlier (Beynen & Katan 1985).

Results and discussion

Diet codes in Arabian numerals in Table 1 refer to the commercial diets in random order and bear no relation to the order that they are listed in the Materials and methods section. The diet codes are identical to those in a previous paper in which the same batches of commercial diets were used (Ritskes-Hoitinga *et al.* 1991). We analysed only one batch per brand and thus within-brand variation of fatty acid composition is not known. Consequently, from the data in Table 1 true between-brand variation cannot be calculated.

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Table 1. Fat concentration and fatty acid composition of commercial rodent diets.

	Diet code									
	1	2	3	4	5	6	7	8	9	10
Dry matter (g/100 g)	90.2	87.5	86.7	89.6	90.9	86.3	90.3	89.8	96.1	88.7
Fat (g/100 g)	4.5	4.4	4.8	2.7	2.8	2.9	4.0	4.4	3.2	4.2
Fatty acids (g fatty acid methylester/100 g methylesters) ¹										
C 14:0	0.4	1.2	0.5	0.4	0.4	1.3	1.3	2.1	0.1	0.4
C 16:0	15.2	18.1	15.5	15.7	16.1	19.6	18.8	14.1	11.1	14.9
C 16:1	0.6	1.3	1.1	0.4	0.4	1.5	1.4	2.5	0.2	0.4
C 18:0	2.3	6.2	4.6	4.6	1.8	5.1	5.4	3.3	2.1	2.6
C 18:1	19.1	29.8	26.2	21.5	17.7	22.0	22.1	19.7	27.3	19.6
C 18:2	53.9	35.5	43.2	49.2	55.0	37.8	36.9	42.5	56.2	53.0
C 18:3 (n-3)	5.5	3.3	3.8	5.2	5.4	4.3	4.1	4.4	0.9	6.1
C 22:1	0.4	0.6	0.3	0.3	0.3	0.3	1.9	0.6	0.1	0.3
C 24:1	0.6	0.5	0.0	0.0	0.6	2.4	1.6	2.9	0.1	0.0
S	17.9	25.9	21.0	21.8	19.0	27.7	25.7	20.5	14.3	18.7
M	21.2	33.1	28.1	23.1	19.7	27.0	28.9	26.3	28.0	20.8
P	59.7	39.2	47.0	54.4	60.7	42.3	41.3	46.9	57.1	59.1
unknown	1.2	1.8	3.9	0.7	0.6	3.0	4.1	6.3	0.6	1.4

¹ Selected fatty acids in shorthand notation: the number before and after the colon represents the number of carbon atoms and of double bonds, respectively. S = saturated fatty acids; M = monounsaturated fatty acids; P = polyunsaturated fatty acids.

The requirement for dietary fat by rats has been arbitrarily set at 5 g/100 g diet with an energy density of 3.8 kcal digestible energy/g of diet (*National Research Council* 1978). Analysed crude fat concentrations of the 10 commercial rodent diets ranged from 2.7 to 4.8 g/100 g diet. The requirement for linoleic acid (C18:2) is 0.6 g/100 g diet (*National Research Council* 1978). Linoleic acid concentrations ranged from 1.3 (diet 4) to 2.3 (diet 1) g/100 g diet; we have assumed that 100 g of fat contains 95 g of fatty acids. Thus, the commercial diets had concentrations of linoleic acid that were abundant.

It is clear that the fatty acid composition of commercial rodent diets can vary markedly between brands. Such variation has also been reported for other dietary components (*Beynen* 1987). This could lead to poorly comparable results from animal experimentation when obtained with animals fed different brands of diets.

References

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