

Dietary fatty acids modify gastric emptying rates in healthy adults

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Dietary fat is a major risk factor in the development of obesity and the metabolic syndrome. Acute exposure to dietary fat is a potent inhibitor of gastric emptying (GE). High fat (HF) feeding leads to desensitisation of this mechanism⁽¹⁾. It is unknown whether adaptation to an HF diet is affected by fat quality, as opposed to quantity of dietary fat exclusively. The current study aimed to assess the association between dietary intake of specific fatty acids and GE of a HF test meal⁽²⁾.

Three-day weighed food records (WFR) were collected from nine healthy adults [three males and six females, age 26.2 (SD 3.0) years, BMI 22.4 (SD 2.5) kg/m²] in this ethically approved study. Energy, macronutrient and fatty acid intake (1- and 3-d) were estimated using UK food tables. On the fourth day, GE of an HF solid test meal (2611 kJ; 46 g fat; 46% of fat derived from linoleic acid (18:2n-6)) was determined using the (¹³C) octanoic acid breath test⁽³⁾.

Mean GE half-time was 226 (SD 31) min. Assessment of WFR indicated that a higher 1- and 3-d intake of palmitoleic acid (16:1), eicosenoic acid (20:1) and n-3 PUFA were associated with shorter GE half-time of the HF meal. Background intake of 18:2n-6, which was high in the test meal, did not show a strong association GE half-time ($P > 0.05$).

	1-d WFR		WFR v. GE	3-d WFR		WFR v. GE
	Mean	SD		Mean	SD	
Energy (kJ)	8312.5	1329.9	-0.51	7959.7	872.0	-0.55
Fat (g)	63.46	12.39	-0.41	70.49	15.07	-0.22
16:1 (g)	0.29	0.17	-0.78*	0.28	0.17	-0.73*
20:1 (g)	0.11	0.12	-0.84**	0.10	0.13	-0.76*
n-3 PUFA (g)	0.48	0.37	-0.72*	0.50	0.36	-0.73*

Mean values were strongly associated with GE half-time by Pearson's Correlation: * $P < 0.05$, ** $P < 0.01$ ($n = 9$).

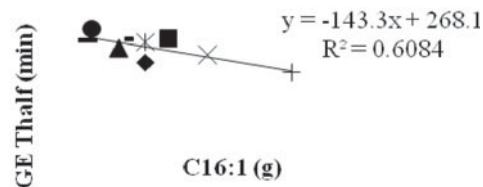


Fig. 1. Association between GE half-time and 1-d intake of palmitoleic acid: $P < 0.01$ ($n = 9$).

Our findings suggest that GE half-time of an HF meal is affected by the fatty-acid composition of the diet, as well as the total amount of dietary fat. These data may also explain the intra-individual variability in gastric emptying measurements.

This research was supported by the Irish Research Council for Science, Engineering & Technology.

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