

LIPID CONTENT AFFECTS THE FATTY ACID COMPOSITION OF AUSTRALIAN FISH

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The most exciting recent development in the area of dietary fatty acids concerns the n-3 series of polyunsaturated fatty acids (PUFAs). n-3 PUFAs, in reducing plasma lipids and platelet aggregation, are thought to have great potential in combatting cardiovascular disease. Because fish (particularly fatty fish) are the major source of these n-3 PUFAs, the National Heart Foundation is recommending that we include more fish in our Western diet.

To date, 92 fatty acid profiles on the flesh of 217 Australian marine finfish, representing about 70 different species, are available in 7 published studies (Pearson 1977, 1978; Gibson 1983; Sinclair et al. 1983; Evans et al. 1986; Fogerty et al. 1986; Nichols et al. 1986). Half the species analysed were collected from north western Australia.

This abstract summarises the trends and relationships which have emerged for the Australian fish data and compares them with Northern Hemisphere data.

Australian fish flesh generally has a lipid content less than 2 g% (range: 0.5-10.7 g%) and on average, is twice as lean as Northern Hemisphere fish. Curvilinear relationships were found. Namely, the fattier the fish the higher the saturated and monounsaturated fatty acid proportion tended to be, and the lower the PUFA proportion and the polyunsaturated to saturated fatty acid (P/S) ratio (Table).

Table. Correlations between lipid content* and fatty acid proportions

Fatty acid class	r**	Line of best fit	n
Saturated	0.626	$y = -0.27x^2 + 4.0x + 28$	73
Monounsaturated	0.522	$y = -0.29x^2 + 4.7x + 16$	73
PUFAs	-0.792	$y = 0.53x^2 - 9.2x + 56$	73
P/S	-0.777	$y = 0.024x^2 - 0.38x + 1.9$	74

*Up to 15 g%. ** All correlations are significant ($p < 0.001$).

As a result of their leanness, Australian fish tended to contain higher proportions, but lower absolute amounts, of n-3 and n-6 PUFAs than Northern Hemisphere fish. The curvilinear relationships (Table) did not translate completely to Northern Hemisphere fish in that increasing lipid content was associated with increasing monoene proportion ($r = 0.699$) and decreasing PUFA proportion ($r = -0.529$), but no correlation was found between lipid content and the proportion of saturated fatty acids.

Lipid content should therefore influence which fish we choose to eat. The more fatty Australian fish such as gemfish (6.4 g% lipid) may be the most appropriate to incorporate in our diet.

EVANS, A.J., FOGERTY, A.C. and SAINSBURY, K.J. (1986). CSIRO Fd Res. Q. **46**: 40.

FOGERTY, A.C., EVANS, A.J., FORD, G.L. and KENNETT, B.H. (1986). Nutr. Rep.

Int. **33**: 777.

GIBSON, R.A. (1983). Lipids **18**: 743.

NICHOLS, P.D., KLUMPP, D.W. and JOHNS, R.B. (1986). Comp. Biochem. Physiol.

83B: 103.

PEARSON, J.A. (1977). CSIRO Fd Res. Q. **37**: 33.

PEARSON, J.A. (1978). CSIRO Fd Res. Q. **38**: 62.

SINCLAIR, A.J., O'DEA, K. and NAUGHTON, J.M. (1983). Lipids **18**: 877.