

Comparison of n-3 polyunsaturated fatty acid contents of wild and cultured Australian abalone

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Omega-3 polyunsaturated fatty acids (n-3 PUFA) from marine sources have been reported to have beneficial effects on human health. Previous studies showed that there was a variation of n-3 PUFA concentration and total lipid content between wild and cultured fish (1,3), and wild adult and juvenile cultured abalone (2). However, there are no data available on the variation of fatty acid concentration between wild and cultured adult abalone in Australia. We have analysed the fatty acid content of wild and cultured blacklip abalone (*Haliotis rubra*), collected from Port Phillip Bay, Victoria, Australia in September. The cultured samples were fed a commercial artificial diet. The total lipid was extracted with methanol-chloroform containing butylated hydroxytoluene. The fatty acid methyl esters were prepared by saponification of about 20 mg lipid plus 2 mg of methyl tricosanoate using KOH followed by transesterification in BF₃ in methanol. The fatty acid methyl esters were separated by capillary GLC.

	Wild (n = 4)	Cultured (n = 4)
20:5n-3(mg/100g)	34 ± 1	10 ± 4**
22:5n-3 (mg/100g)	39 ± 4	8 ± 4**
22:6n-3 (mg/100g)	2 ± 1	2 ± 1
Total n-3 PUFA (mg/100g)	79 ± 6	21 ± 9**
Total n-6 PUFA (mg/100g)	67 ± 2	18 ± 7**
SFA (mg/100g)	146 ± 34	116 ± 53**
MUFA (mg/100g)	92 ± 2	27 ± 8**
Total lipid (g/100g)	0.9 ± 0.1	0.5 ± 0.1*

Values are means ± SD. SFA = saturated fatty acids, MUFA = monounsaturated fatty acids.

Significance of differences: *P < 0.05, **P < 0.01 compared with wild samples.

The concentration of total n-3 PUFA, 20:5n-3 and 22:5n-3 varied significantly between wild and cultured samples (P < 0.01) with the higher levels being recorded in wild samples. A significantly higher concentration of n-6 PUFA was also recorded in wild samples than in cultured samples (P < 0.01). 22:5n-3 was a main n-3 PUFA in wild samples but in cultured samples 20:5n-3 was higher. Interestingly, a higher total lipid content was found in wild than in cultured samples despite the fact that the natural diet of wild abalone contains less lipid than the artificial diet of cultured samples (2). This study indicates that consumption of wild blacklip abalone will provide a good source of long chain n-3 PUFAs and help to achieve the correct dietary recommendations.

References

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