



SHELLFISH PROVIDE STEROLS COMPETING WITH CHOLESTEROL

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Sterol composition of shellfish species commonly consumed in the United States.

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Abstract

BACKGROUND: Shellfish can be a component of a healthy diet due to a low fat and high protein content, but the cholesterol content of some species is often cited as a reason to limit their consumption. Data on levels of non-cholesterol sterols in commonly consumed species are lacking.

OBJECTIVE: Shellfish were sampled and analyzed to update sterol data in the United States Department of Agriculture (USDA) National Nutrient Database for Standard Reference.

DESIGN: Using a nationwide sampling plan, raw shrimp and sea scallops, canned clams, and steamed oysters, blue crab, and lobster were sampled from 12 statistically selected supermarkets across the United States in 2007-08. For each species, four composites were analyzed, each comprised of samples from three locations; shrimp and scallops from six single locations were also analyzed separately. Using validated analytical methodology, 14 sterols were determined in total lipid extracts after saponification and derivatization to trimethylsilyl ethers, using gas chromatography for quantitation and mass spectrometry for confirmation of components.

RESULTS: Crab, lobster, and shrimp contained significant cholesterol (96.2-27 mg/100 g); scallops and clams had the lowest concentrations (23.4-30.1 mg/100 g). Variability in cholesterol among single-location samples of shrimp was low. The major sterols in the mollusks were brassicasterol (12.6-45.6 mg/100 g) and 24-methylenecholesterol (16.7-41.9 mg/100 g), with the highest concentrations in oysters. Total non-cholesterol sterols were 46.5-75.6 mg/100 g in five single-location scallops samples, but 107 mg/100 g in the sixth, with cholesterol also higher in that sample. Other prominent non-cholesterol sterols in mollusks were 22-dehydrocholesterol, isofucosterol, cionasterol, campesterol, and 24-norcholesta-5,22-diene-3 β -ol (4-21 mg/100 g).

CONCLUSIONS: The presence of a wide range of sterols, including isomeric forms, in shellfish makes the analysis and quantitation of sterols in marine species more complex than in animal and plant tissues. The detailed sterol composition reported herein provides data that may be useful in research on the impact of shellfish consumption on dietary risk factors.

KEYWORDS: 22,23-dihydrostigmasterol; 22-dihydrobrassicasterol; 7-dehydrocholesterol; crustaceans; desmosterol; dihydrocholesterol; ocellasterol; phytosterols; poriferasterol; salmon

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