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The relationship between fatty acids and fish: lesser-known aspects and the need for increasingly efficient analytical techniques

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When we associate the word fatty acids with fish, most people identify fish as sources of fatty acids from the omega families. This relationship is always present in the valuation of nutritional quality of fish. However, fatty acids have many other crucial functions in fish. The oldest studies related to fatty acids focused essentially on their role as sources metabolic energy in the form of ATP through β-oxidation. Many studies referred the fatty acid role for migrations, energy production during growth and egg formation, among others. Soon fatty acids quickly began to be studied from the point of view of source of essential nutrients for several physiological processes and integral components of biological membranes. The high content of highly polyunsaturated fatty acids found in fish is related to the fact that they are poikilothermic. In the presence of various temperature scenarios, fish can effectively exploit a wide chemical diversity of membrane fatty acid profiles, to defend their physical properties, such as fluidity. In the last decades, fatty acids have been used as either biomarkers because they are limited to certain *taxa* and they can be transferred conservatively from primary producers to higher trophic level or stock identifiers because the fatty acid composition of phospholipids in some body tissues have a stable genetics basis.

In the last decades multiple techniques have been used for fatty acid analysis. As a rule, before the instrumental analysis, the sample requires 2 previous steps. These comprise extraction of lipids from the matrix and derivatization. The combination of these two stages generates multiple methodologies that are not always standardized. Soon, the analysis of fatty acids tends to reduce and standardize these previous analyses while the instrumental analysis should solve problems related to similar mass spectra of the isomers and coelution between fatty acids.

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