

Anchovies: a healthy food and a good source of vitamins B2 (riboflavin) and B3 (niacin)

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Vitamins are crucial for maintaining good health in humans; lack of a sufficient amount of them can cause serious disease [1]. Essential for the calculation of dietary intake of nutrients from food is the use of reliable, accurate and precise analytical methods for nutrients in the foods. The water-soluble vitamins act mainly as coenzymes, while the fat-soluble ones act in different and more complex ways [2]. In foodstuffs, the vitamins B2 (riboflavin) and B3 (niacin) may be present in free (riboflavin, nicotinamide and nicotinic acid) and binding forms (essentially riboflavin-5'-phosphate (FMN), riboflavin-5'-adenosyldiphosphate (FAD), nicotinamide adenine dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP)). Furthermore, they may be bound tightly but non-covalently to proteins and polysaccharides [3]. Anchovies are a good source of those two vitamins, based on the various nutrition tables available. Thus, the aim of this paper was to evaluate the content of vitamin B2 (riboflavin) and B3 (niacin, i.e. nicotinic acid plus nicotinamide) in anchovies samples provided by "Dimar Sapore di Mare" and to evaluate the possibility to use the health claims related to the above vitamins reported in EU Regulation 432/2012. In order to use the claim, the levels of these two vitamins must be at least 15% of the recommended dose given in the Annex Regulation 2008/100/EC, that is 1.4 mg/100 g for riboflavin and 16 mg/100 g for niacin. In the current study, we tested different extraction procedures such as acidic hydrolysis, acidic hydrolysis plus protein precipitation, acidic plus enzymatic hydrolysis and enzymatic hydrolysis and we choose the best one for the extraction of riboflavin and niacin from anchovies. Additionally, a new analytical method to simultaneously determine these three compounds in anchovies by using HPLC-MS/MS triple quadrupole, has been developed. The analytical procedure is fast (2.5 minutes of chromatography run time), the method is sensitive (LOQ for all compounds is in the range 1-5 µg kg⁻¹), accurate and robust as it is possible to apply the method to both normal and under-oil/canned anchovies. After method validation, the best method was then applied to the analysis of 23 anchovies samples, in order to understand the dietary intake of vitamins.

References

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