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Nutritional assessment and comparative study between two *Clupeiform* species

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The European sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*), from the *Clupeidae* and *Engraulidae* families respectively, are key bony, pelagic fish species in Iberian waters and among the most traded.¹ The World Health Organization (WHO) and Food and Agriculture Organization of the United Nations (FAO), highlight the health benefits of fish consumption due to its rich nutrients, including high-quality protein and essential long-chain fatty acids.² Factors such as season, stage of maturation, sex, diet and migration have the greatest impact on the nutritional composition of fish throughout the year. Assessment of the main components of fish, such as moisture, ash, proteins and lipids, is necessary to guarantee that they provide the requirements of food regulations and commercial guidelines.³ The main goal of this work was to evaluate the *E. encrasicolus* and *S. pilchardus* fillet nutritional composition at the beginning of autumn. Fish were caught by seine in South of Spain in October 2023. For the chemical analyses each sample was prepared in laboratory and made up of different number of specimens of the same fish species (*E. encrasicolus* – 15+16+16; n=3 and *S. pilchardus* – 9+10+10; n=3). The total average weight (g), length (cm), Fulton body condition factor ($K = 100 \times W/L^3$) and yield (%) of each fish species were taken. The moisture (%), ash (%), protein (%) and fat (%) were analyzed for each sample in duplicate and energy (kcal/100g) was calculated. Statistical analysis was conducted using the Student's t-test. *S. pilchardus* (n=29) had higher weight, length and K factor ($p < 0.05$) but lower yield compared to *E. encrasicolus* (n=47). A high Pearson's correlation was found between the weight and the length of both species ($R=0.881$). The anchovy samples had lower ash ($1.5\% \pm 0.02$), protein ($19.7\% \pm 0.36$), fat ($1.0\% \pm 0.12$), and energy content ($89.7 \text{ kcal}/100\text{g} \pm 0.35$) ($p < 0.05$), while moisture was lower in sardine samples ($73.1\% \pm 0.17$) ($p < 0.05$) (Figure 1). Considering the results obtained in this study *S. pilchardus* has a more interesting nutritional composition than *E. encrasicolus*. Future studies will be necessary to analyze the fatty acids profile before and after the reproductive season as well as the vitamin D, Se and Hg contents.

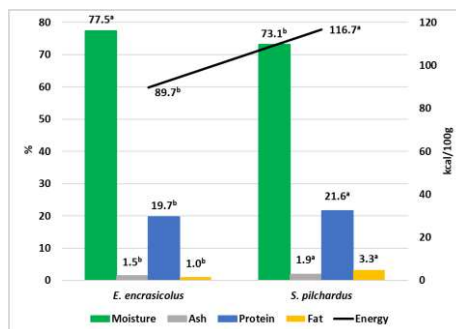


Figure 1: Nutritional composition of *Engraulis encrasicolus* and *Sardina pilchardus*. a, b – Different letters denote significant differences between species ($p < 0.05$).

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