

Effect of heat treatment of sardines and sprats after fattening on cellular integrity

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Currently, studies focus on the effect of individual fatty acids on the integrity of the intestinal barrier. Sardines and sprats are essential sources of fatty acids and are also present in the human diet. However, it is common for these and other fish rich in fatty acids to be cooked. This treatment could also affect intestinal integrity.

Sprats were caught in the Baltic Sea, and sardines in the Mediterranean Sea. After removing inedible parts, fish washed were thermally treated using the following processes: cooking, steaming, baking, or deep frying. Subsequently, the samples were digested using the *in vitro* digestion model INFOGEST. At the end of intestinal digestion, samples were centrifuged, filtered through a 0.22 µl filter, and then frozen at -80 °C until further testing. Intestinal barrier integrity testing was performed on the C2BBe1 (clone of Caco-2) cell line, cultured in 24-well inserts with complete media for 28 days. On the day of testing, the plates were washed with HBSS, and then TEER was measured. Then a sample of the prepared digest was added to the apical side with a final concentration of 1% along with 25 µm Lucifer Yellow (LY). On the basolateral side, only HBSS was included. Subsequently, 50 µl of the sample was collected from the basolateral side at defined time points and measured. Subsequently, the permeability was determined as the ratio between LY on the apical and basolateral sides.

From the results for all heat treatments, permeability increased by an average of 8% after 0.5 h. However, after 1 h, permeability increased by 16% for Cooked Boiled Sardines and 17% for Baked Sardines. After 3 h of incubation, permeability increased by 53% overall for raw Sardines and almost 60% for Cooked Boiled Sardines. On the other hand, the smallest effect on permeability was observed after 3h for Steamed Sprats when the value reached 34%.

The results show that the different treatments influence intestinal permeability as measured by LY, and prolonged exposure to digestion negatively affects cellular integrity.

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