

Seafood in Mediterranean countries: A culinary journey through history

José Lucas Pérez-Lloréns^{a,*}, Yanet Acosta^b, Fernando G. Brun^a

^a Instituto Universitario de Investigación Marina (INMAR), Campus de Excelencia Internacional/Global del Mar (CEI-MAR), Departamento de Biología, Facultad de Ciencias del Mar y Ambientales Universidad de Cádiz, Campus Universitario de Puerto Real, 11510, Puerto Real, Cádiz, Spain

^b Departamento de Ciencias de la Educación y Sociología, Facultad de Ciencias de la Comunicación. Universidad Rey Juan Carlos, Camino del Molino 5, 28942, Fuenlabrada, Madrid, Spain

ARTICLE INFO

Keywords:

Seafood
Mediterranean
Culinary history
Eating habits
Cookbooks
Recipes

ABSTRACT

Olives, wheat and grapes have been the staple foods of the Mediterranean world, with seafood, above meat, as the preferred protein source. Fish and shellfish were used often since ancient times by wealthy classes as a kind of social marker, not only as a gastronomic delight, but also as a way to stay healthier. This paper reviews thoroughly how seafood has been present in the dietary practices of the Mediterranean people since ancient Egyptians up to the gastronomic discourse of some celebrated contemporary chefs. Preferences for particular tastes and flavors, local traditions, myths and religious rites (such Lent, Shabbat and Ramadan that prohibited eating some foods and allowed others) as well as cultural exchanges between countries and civilizations (with the incorporation of new ingredients and culinary techniques), have shaped the Mediterranean culinary customs along the history. Such traditions are reflected in many ancient writings, culinary literature and cookbooks. We will analyze some of these sources with special attention to those excerpts, anecdotes, cookbooks, recipes, cooks and even characters related to seafood. Knowledge and learning from our rich Mediterranean culinary heritage are important aspects to bear in mind. Whereas some contemporary celebrity chefs (and probably many diners) are not fully aware of such culinary legacy, others like Ferran Adrià have recently recognized the importance of studying the past as a driver for creation and gastronomic innovation.

1. Introduction

“In the hands of an able cook, fish can become an inexhaustible source of perpetual delight” (Brillat-Savarin, 1826).

In antique thought the sea was uncertain: bountiful, but also frightening to life; rich in opportunity but capricious and threatening (Wilkins, 2018). The Roman author and natural philosopher Pliny the Elder (23–79 CE) in his book *Historia Naturalis* reported an Iberian myth explaining the origin of the Mediterranean Sea.¹ In the beginning it was empty and isolated from the ‘Outer Ocean’ (i.e., Atlantic Ocean) but the Greek hero Heracles (Hercules) delved an inlet with his sword between Europe and Africa (the rock of Gibraltar and mount Jebel Musa, respectively or ‘the two pillars of Hercules’) allowing the ‘Outer Ocean’ to flow into the Mediterranean basin (García-Castellanos et al., 2020). This quasi-lake (or “liquid continent with solid contours” according to Audisio, 1935) is surrounded currently by more than 20 states along

46.000 km of coastline hosting around 480 million people (a third of whom dwell on the coast)² across three continents: Africa, Asia and Europe (UNEP/MAP-Plan Bleu, 2009). Mediterranean Sea has undergone large anthropical activities since antiquity (Montanari, 2002). Therefore, the history of the Mediterranean is the history of shipping and trade between people from different countries and cultures. Egyptians, Phoenicians, Greeks, Romans and Byzantines were some of the most ancient human civilizations from the neighboring lands with a major influence in the development of the Western civilization including food, eating habits and, of course, culinary traditions (Lopes, 2010).

Gastronomy (in its widest sense) in Mediterranean countries was affected by different cultures not only because of the historical contacts among neighboring states resulted into a melting pot affecting local traditions, cultural aspects and lifestyles (e.g., attachment to the family, sharing and sociability), sea and land produce (traded and blended over time) as well as the preferences for particular tastes and flavors. Also,

* Corresponding author.

E-mail address: joselucas.perez@uca.es (J.L. Pérez-Lloréns).

¹ From *mediterraneus*, in the ‘midst of lands.’ Also known as *mare nostrum* (our sea).

² Socrates, in Plato’s *Phaedo*, referred to Mediterranean inhabitants as: “those that dwell between Phasis and the Pillars of Hercules, on a small strip of land surrounding the sea, like ants or toads around a puddle.”

myths and religious rites or celebrations (e.g., abstinence, fasting and penitence such as Lent, Shabbat and Ramadan) that prohibited eating some foods and allowed others (e.g., seafood instead of meat) were expressed in strong culinary traditions, dishes and cookbooks, at least, up to 18th century (Essid, 2012). Yet, despite such differences, most Mediterranean countries share similar ways of being and lifestyles, especially regarding food and flavors. Therefore, Mediterranean cuisine is one of those cultural elements that have happily helped to preserve the special nature of this region. The meal is not a simple act of nourishment, but a special place for interaction, where people enjoy not only the food but also of many other food-related aspects such as culture, history, etc. (i.e., some of the so-called non-sensory contextual factors). Historical examples could span from Greek symposia to the explanations given by the maître of many avant-garde restaurants to diners as part of the ‘dining experience’ (Mombiela, 2012; Pérez-Lloréns, 2019a).

Mediterranean food habits were historically based on 3 fundamental pillars which were symbols of a simple, frugal and sedentary life: olives (oil), wheat (bread) and grapes (wine). As a sign of the great appreciation and respect they had, they were offered to the gods by ancient Greeks in sacrificial rituals (*psadista*) (Toussaint-Samat, 2009). Together with these ‘basic’ produce, other important foodstuffs were vegetables and fruits (dried and fresh), nuts, milk, cheese, fish and meat which constitute the principal elements of the so-called Mediterranean Diet (listed as Intangible Cultural Heritage of Humanity by UNESCO, in 2010) (Essid, 2012; Reguant-Aleix, 2012). In general, seafood (fish and shellfish prominently, but also some marine mammals) has been strongly preferred above meat as a protein source appearing in a huge variety of recipes and dishes from ancient Egypt up to our current times. Seafood (as well as spices) was often used as a kind of social marker since antiquity. Fresh, rare (exotic) and large fishes and shellfishes, as well as derived products (e.g., *garum*), were at the table of many historic wealthy gourmets and gourmands (such as the Roman Lucius Licinius Lucullus) as a luxury product (Davies, 1971). Still, species like lobster, oysters, or caviar (fish roe), etc. are social markers of a certain upper class. On the contrary, small and odd seafood, salted or dried fishes were staple food mostly for many poor or lower classes (although in contemporary cuisine this food is being valued). But eating went beyond a simple gastronomic delight of upper crust classes. It was also a way to stay healthier depending on the kind of food ingested and the humoral characteristics of the person. This Hippocratic theory (developed later by Galen) influenced also food (and seafood) preferences of many cultures: Greek, Roman, Byzantine, Islamic, and European up to the 18th century (Albala, 2013).

The Mediterranean Sea is considered a biodiversity hot-spot hosting a large number of species, many of them endemic (Coll et al., 2010). It was already noted by Aristotle in his book *History of Animals* that provided accurate information, for example, about the biology of mugilid species (D’Arcy Thompson, 1947). It is not surprising that this ‘Bountiful Sea’ was seen as a natural and endless pantry where all nearby civilizations fished and traded with sea produce since the very early beginning (Trentacoste et al., 2018). In fact, European Mediterranean countries are among the world’s higher consumers of seafood³ after Japan. But decades of overfishing to meet the rising seafood demand (driven by economic expansion and population growth and tourism), combined with illegal fishing, discards, pollution and climate change has led to much of the fish stock (up to 93% of the assessed ones) becoming at risk of depletion and exhaustion (Koutrakis, 2018). Actually, it seems that overfishing of some Mediterranean species was already noted by some ancient authors like the Roman Juvenal (*Saturae* V. 92–98, in Gillis, 2020):

Your lord will have a mullet sent from Corsica or even the cliffs of Tauromonium, since every mullet is gone and now our seas are exhausted while gluttony rages. Due to the incessant nets of the fish market surveying nearby, the Tyrrhenian does not sustain fish which can grow to their full size. Therefore, the provinces provide for our kitchens – fish is taken from there for the sake of legacy-seeking Laenas to buy and Aurelia to sell.

Today, sustainability of Mediterranean fishery stocks is not only one of the main concerns of the EU policy (Koutrakis, 2018), but it is also at the very core in the gastronomic discourse of many seafood restaurants (e.g., 3 Michelin starred Aponiente) as well as into the costumers and consumers attitudes. Among the actions ‘from sea to the plate’ that countries, consumers and restaurants are taking to reverse such damage are: the promotion of policies towards sustainable management of fisheries, try different species, foment the use of fish discards (or fish parts usually ignored in cuisine), traceability of the product, creation of new markets or to promote environmental-friendly aquaculture (i.e., multitrophic aquaculture) (WWF, 2017).

In this review we give a shallow dive into the Mediterranean seafood culinary history. How eating habits and recipes have changed and evolved from ancient Egyptians to contemporary modernist cuisine as consequence of cultural exchanges and incorporation of new cooking techniques and ingredients (e.g., from Far East, New World), including marine plants too (algae and seagrasses) (Mouritsen et al., 2019; Gouldwing, 2021). Special attention is given to some ancient literary sources (e.g., Greek comedies, Roman satires ...), culinary literature (e.g., *Hedypatheia*, *Deipnosophistae* ...), reference cookbooks (e.g., *De Re Coquinaria*; *Llibre de Sent Soví*; *De Honesta Voluptate et Valetudine*; *Opera dell’Arte del Cucinare*; *Arte de Cocina, Pastelería, Vizcochería, y Conservería*; *Le Cuisinier François* ...), cooks (e.g., Mithaecus, Martino, Messisbugo, Scappi, Hernández de Maceras, Martínez Montañón, La Varenne, Massialot, Carême, Escoffier ...), characters (e.g., Archestratus, Athenaeus, Lucullus, Apicius, Platina, Brillat-Savarin ...) including some recipes, excerpts, anecdotes or traditions related to seafood.

Knowledge and learning from our rich Mediterranean culinary heritage are important aspects to bear mind, not only to enjoy the ‘dining experience’, but also as a driver for both culinary innovation and gastronomic discourses (Opazo, 2012; Albala, 2013; Pérez-Lloréns, 2019a). In fact, the importance of knowing and learning lessons from the past has been recently pointed out by Adrià’s project ‘elBulli1846’.⁴ The motto of this interesting project is that “when you understand the history of your profession you will be more efficient creating”. Accordingly, a first successful call to recruit professionals in culinary history was launched in 2020 (and a second one in 2021) with the overall aim “to create from reference cookbooks from the Middle Ages and the Renaissance and the keys to these times by reproducing elaborations from these books”. This philosophy is not new, matching fully with that of Confucius: “study the past if you would define de future”.

2. Ancient age

This period starts with the appearance of the earliest form of writing (5.500 BCE) and ends with the fall of the Roman Empire in the West (476 CE).

2.1. Egyptians

No culinary books are known from Ancient Egypt (3100 BCE-332 CE). Thus, information about foodstuffs and eating practices has mainly relied on wall paintings of tombs, descriptions of reliefs, papyrus and texts from tireless adventurers such as the Greeks Herodotus (484-425 BCE), Diodorus (91 BCE-30 CE) or Plutarch (46–119 CE) (Tallet,

³ Europeans spent around €34.57 billion on seafood, some 63% of the EU total. Spain, Italy and France account for more than half of the EU figure, despite having only around a third of the EU’s population (WWF, 2017).

⁴ <https://elbullifoundation.com/elbulli1846/>.

2015). Such sources reveal that fish was an essential source of protein mostly for workers (as payment for wages) and lower classes⁵ because of its inexpensiveness (but it depended on type and whether gutted or whole) and its abundance in the Nile⁶ (Van Neer et al., 2004). The priests abstained from eating fish for religious motivations in the believe that it was an unnecessary and superfluous fare. Also, most elite Egyptians avoided eating some species considered taboo perhaps because some (particularly *medjet* or elephant fish) defiled the god Osiris by eating his phallus after the god was killed, dismembered and thrown to the Nile by his brother Seth (Osiris' myth), or because other species (e.g., *phagrus* or eel) were considered unwholesome and the best way of preventing eating was to declare them sacred (Wilkinson, 1854). The main fishes consumed were freshwater and anadromous species (mostly tilapia, catfish,⁷ gray mullet⁸ and shad). Mediterranean species rarely figure in the archaeological records, and papyrus hardly mention sea fish, probably because it was easier and safer to fish in the river than in the sea. It is known that some Mediterranean species were traded inland such as meagre, seabream or sea bass (Van Neer et al., 2004).

Fish could be eaten fresh, and the simplest way to cook it was by roasting. It could be done by thrusting a rod through its mouth, and grilling fish over a fire. Boiling in a cauldron together with salt and spices was another usual method (Mehdawy and Hussein, 2010). However, since fish is a very perishable food, Egyptians did have elaborated ways of preparing and preserving it such as drying, salting or smoking. It would also allow to keep fish edible for longer (Gosse, 1847). A relief from the 'Tomb of the Two Brothers' (2500 BCE) show gutted fish, opened up, dried, and probably also salted (Brewer and Friedman, 1989). The extraction and salting of gonads (roe and milt) are depicted in some walls of the tombs of the Old Mad Middle Kingdoms (Keimer, 1939). Salted fish was a main meal for the 'Feast of the Harvest', a tradition that has lasted until today. Fish was also drenched in oil and honey wax and then fried; or baked in a casserole or cooked with crushed wheat (Mehdawy and Hussein, 2010).

2.2. Sumerians

The first written reference to seafood is probably that found in the culinary Babylonian clay tables (or Yale Tablets) (1730 BCE) from Ancient Mesopotamia considered the oldest culinary recipes (Bottéro, 1987). Some recipes are long and elaborated and it seems especially directed for wealthy and refined diners with an appreciation of *haute cuisine* (Lion, 2015). Although no seafood recipes seem to be included, indications about how to preserve fish are given, especially for desiccation (body split open, gutted, sliced and exposed to the sun). It is also believed that smoking and salting methods (as did the Egyptians) were also used, as well as fermentation in brine to obtain a sauce called *siqqu*.⁹

⁵ Israelites (slaves) remembered with regret in their exodus: "the fish which (they) did eat in Egypt freely" (Numbers XI, 5).

⁶ According to Diodorus: "Nile contains every variety of fish for it supplies to natives not only with abundant subsistence from the fresh fish caught, but also yields an unending multitude for salting" (Alcock, 2005).

⁷ It was believed to guide the solar boat through the dark river of the underworld. It was the custom to remove catfish heads, dry them, and store them to be eaten elsewhere (Alcock, 2005).

⁸ A desirable and expensive fish. It was exported to Syria and traded for cedar. Ramses II is said to have donated some 474,000 specimens in honor to the god Amun at Thebes (Alcock, 2005).

⁹ *Siqqu* was apparently a pickling agent, made from soaked fish, shellfish or grasshoppers and salt in liquid, and letting them decompose (Salonen, 1970). It could be considered the precursor of Greek *garos*, Roman *garum* or *liquamen*, and Arabic *murrī*. Its culinary descendants are still in use around the Mediterranean today, including the *colatura di alici* (Cetera, Italy) and the *mêlet* (Provence, France) and are ubiquitous in contemporary East Asian cooking (Plouvier, 2010). Curiously there is a renowned interest in 'insects *garum*' (Mouritsen et al., 2017; Redzepi and Zilber, 2018).

a household staple made also from grasshoppers or locust (Bottéro, 2004; Reynolds, 2007). *Siqqu* was blended with many wild herbs: cumin, coriander, dill, dodder, 'fragrant wood' (liquorice?), mint, nigella (or 'black cumin'), resin (cedar), rue and sesame (Plouvier, 2010).

Four of the Yale recipes used *siqqu*, especially in a recipe of how to prepare a pastry dough to be used as a plate where meal must be served on top (Bottéro, 1987):

After cleaning the flour, you should soften it milk and, once it is puffy, you should knead it, adding *siqqu*, and including *samidû* [Persian shallot?], leeks and garlic ...

2.3. Greeks

The long and winding coastline of the continental Greece and its many islands facilitated people easy access to the marine resources of the Mediterranean. According to Homer (8th century BCE) fish was a food unworthy of a hero, only acceptable when nothing better was available: "after several days without wind and once supplies were exhausted, Ulysses' companions were forced to catch fishes only because hunger gnawed at their entrails" (García-Soler, 2011). However, although Homer, and many Greek authors long after him, considered seafood as the fare of poor people (and religious-philosophical groups like the Pythagoreans objected ingesting certain types), there is no doubt that seafood contributed decisively to the diet of most Greeks during both, Classical (490 BCE-330 BCE) and Hellenistic periods (323 BCE-31 BCE) (Lovano, 2019). It is then easy to understand the commonness of fish in iconography, especially on decorated pottery, such as fish-plates or bowls (Wilkins, 2000).

People (most) that could not afford to buy fresh fish ate it salted, dried (*tarichos*) or pickled. There were markets (*tarichopōleia*) fully dedicated to the sale of such fish, which indicates how abundant and consumed it was (Lovano, 2019). Preserved fish could be shipped in large amounts and kept longer helping people to subsist tough years in stock raising or farming (Rostovtzeff, 1941; Lovano, 2019). Athens imported salted fish from places as far as Sicily and Hispania in the west and Byzantium in the east (Curtis, 1991). Small fry as well as anchovies and sardines (*aphuê*) were cheap and readily available in many coastal settlements and probably the only fresh fish that humble people could afford. Its supply often exceeded demand being common to find rotting three-day-old fry at the market (Lytle, 2018). In contrast, since only prosperous and sophisticated members of the elite could choose and buy from a large variety of fresh seafood species for their banquets (*deipnon* and *symposia*) this produce became social markers for the rich and those with aspirations (Batten, 2017; Wilkins, 2018) (Table 1). It was especially true during the Hellenistic period, much more luxurious, extravagant and even opulent than the Classical one (more austere). It was because the expansion of Alexander the Great's empire allowed wealthy Greeks the access to costly spices and other lavish produce from China or India through Persia that only they could afford them (Albala, 2013).

The unaffordability that a major part of the population had to fresh seafood (particularly the larger, scarcer and rarer species) is frequently cited in classical texts especially in comedies (Donaldson, 1860). For example, the poet Hiponnax (541-487 BCE) wrote, in a mocking style, of a young man who eat his inheritance "in the form of female tuna and *myttotós*¹⁰". Playwrights such as Aristophanes (444-385 BCE) or Antiphanes (408-334 BCE) deal with fish feasting, both by the honest poor and the voracious rich (Wilkins, 2000, 2005, 2018). Aspects such as fish condition at the market, seafood varieties, price, cooking methods or recipes are frequently addressed in these comedies. For example, Amphis (4th century BCE) says in *Leucas*: "Any man who goes to market

¹⁰ Popular Greek sauce based on garlic, cheese and other ingredients (honey, vinegar, leek, eggs, etc.).

Table 1

Ancient Age. Culinary and medicinal uses, and comments on the main seafood species used by ancients Greeks and Romans. (1): Yonge (1854); (2): Adams (1844); (3): Soyer (1853); (4) Vehling (1936); (5): Alcock (2005); (6) Grainger (2018); (7): Mair (1928); (8): Bostock and Riley (1857).

Seafood	Commentaries
Fishes	
Conger	Greeks ate the whole even the intestines, but epicureans appreciated only its head (1) The Greek physician Galen affirmed that nothing was more hard or indigestible (2) There was a belief of bestowing immortality on those who were lucky of tasting it, and the dead would revive (3) It was eaten fried or broiled with a sauce similar to that given for the moray eel (see below) (4)
Eel-pout	The liver was very much appreciated by the Roman gourmets. It was garnished with fine chopped leeks and onions and served with a sauce composed of vinegar, grated cheese and garlic (4)
Gray mullet	Very much appreciated by Greeks, preferring those sold by the fishermen of Scyathus. The Greek poet Antiphanes said that it was best split down the center, then flattened and sprinkled with salt, vinegar, and crushed stalk of silphium (1) Apicius' sauce recipe: "pepper, lovage, cumin, onion, mint, rue, sage, date wine, honey, vinegar, mustard and oil" (4)
Mackerel	Very much esteemed in Greece. Intestines were used for preparing <i>allec</i> . It could be salted for consumption in winter (1) The best ones were from Gades (Cádiz), being exported to Greece, Italy and North Africa (5) For the Greek physician Diphilus of Siphnos the Spanish ones were rather purgative and pungent with poor flavour, but filling; and for Xenocrates they were unpalatable and flatulent (2) <i>Garum sociorum</i> was used by the Romans Martial and Seneca to designate a sauce derived from mackerel and its blood (6)
Moray eel	Appreciated by Greeks, and called 'Queen of Luxury' by Archestratus, were especially popular in Sybaris where the fishers and fishmongers were exempt of all taxes (3). It was held in much esteem before spawning (2). However, Hippocrates disliked it, banning it to his patients with pulmonary affections (2) The Roman Vedius Pollio fed them with rebellious slaves he threw into the fish pond in the common belief that human flesh greatly improved the fish quality. He enjoyed the liver of the fish that previously had eaten some body parts of his victim (4) Many Roman emperors were exceedingly fond of it. The gluttonous Vitellius, being tired of this dish, only ate the soft roes, sending numerous vessels to get them for him. Also, eccentric Heliogabalus ordered that the peasants of the Mediterranean should be stuffed with soft roes. This folly amused him, and only cost several millions. That was none when compared with the blood which almost always flowed to satisfy his caprices (3) The Roman orator Lucius Licinius Crassus put on mourning clothes for the death of a moray eel he raised (2) Apicius gives several recipes to dress it broiled: "pepper, lovage, saffron, onion, stoned Damascus prunes, wine, mead, vinegar, reduced must and oil" (4)
Ray	The Greeks appreciated its back that had a flavour quite pleasant (1) Apicius sauce for a boiled ray: "pepper, lovage, parsley, mint, egg yolks, honey, broth, raisin wine and oil. If you wish, add mustard and vinegar, or, if desired richer, add raisins." (4)
Red mullet	Very much appreciated by Greeks, considered the most exquisite dish of its delicate cookery. They were most appreciated in spring, grilled over a brazier (4) "The unbridled and cruel luxury of ancient Rome required that this fish should be cooked by a slow fire, on the table and under a glass, that the guests might gloat on its sufferings before they satiated their appetites with its flesh it is true this barbarous gratification was very expensive, and it was necessary to be very rich to indulge in it—consequently it was decidedly very fashionable, quite natural, and in the very best taste." (3) "The liver of this fish appeared to the Roman Emperor Heliogabalus too paltry; he took it into his head to be served with large dishes completely filled with the gills" (3) Apicius prepared scalded salt mullet placed in a pan with oil. When done added a dash of honey wine (or raisin wine) sprinkled with pepper (4) The Romans fattened it in ponds to get a good weight (5)
Scarus	Very much appreciated by epicurean Greeks and Romans, because of the delicacy of its flesh and the exquisite flavour of its intestines (1)
Sea bass	It should be cooked whole without being gutted or scaled, and the head was regarded as a great delicacy (5)
Small fishes (Sprat, anchovy, sardines)	The Greeks called this small fishes <i>aphue</i> . Consumed fried altogether, mostly for humble people. Archestratus recommended to add sea-anemone tentacles (1) The Romans used them to elaborate <i>garum</i> and <i>allec</i> (8) Sardine was given the first rank among salt fish by the Romans, which stuffed them. Following Apicius: "the sardine is boned and filled with crushed flea-bane, several grains of pepper, mint, nuts, diluted with honey, tied or sewed, wrapped in parchment and placed in a flat dish above the steam rising from the stove; season with oil, reduced must and oregano" (4)
Sole	It was much sought by Greeks because of the delicacy of its nourishing and light flesh. It was specially prescribed for the sick, being easily digestible, especially when simply cooked (2) A recipe from Apicius: "Skin the soles, place in a sauce pan, add broth, oil, white wine, a bunch of leeks and coriander seed, place on fire, grind a little pepper, oregano, moisten with the fish liquor, take 10 raw eggs, beat them and mix with the remaining liquor; put it all back over the fish, and on a slow fire allow to heat without boiling and thicken to the right consistency; sprinkle with pepper" (4)
Sturgeon	It was considered the king of the Greek and Roman banquets. After its death received honours from the epicurious Greeks, and its flesh was compared to the ambrosia of the gods (1) Antiphanes wrote "If anyone should wish for caviar from mighty sturgeon, fresh from Cádiz Sea" (1) The Roman poet Martial praised pompously this fish and judged it worthy of being placed on the luxurious tables of the Palatine Mount, the most ancient of the seven hills of Rome (3) Apparently, it was not noticed by the dietetical writers (2)
Swordfish	The Greeks were fond of it and often dressed it with a sauce prepared by mixing yolks, leeks, garlic cheese and olive oil (1) The Greek physician Xenocrates recommended eating its tail with mustard (1) The Romans ate very little of this fish, and prayed Neptune to send it far from their fishing nets (3)
Tuna	The wealthy Greeks and Romans eat only the jowl and belly part and never touched the remainder. Tuna hearts, packed in jars from Cádiz were shipped to Rome for the banquets. According to Greek physician Diocles of Carystus young specimens were the best among all lean varieties of salt fish, but the mature ones were the best of all fat fish (1) The migratory patterns were predictable, and fishermen were prepared to make huge catches at specified times (7) The Romans sold it at a very good price during the autumn and winter; but it fetched less in summer because it was thought to be unwholesome during that season (3) According to the Greek physician Galen the best ones were from Byzantium and the second-best ones from Spain (1) Intestines were used for <i>garum</i> and <i>allec</i> (8) Apicius give several recipes for seasoning boiled tuna: "pepper, cumin, onion, mint, sage, and dates, to which was added a mixture of honey, vinegar, oil, and mustard (4)
Turbot	Very much appreciated in Rome for its size and delicious flesh. It was compared to the pheasant (as soles were likened to partridges, lampreys to quails, and sturgeons to peacocks) (4)

(continued on next page)

Table 1 (continued)

Seafood	Commentaries
Fishes	
	Galen manifested that its size might be a problem for the cook to fry and recommended baking it. About its size, the poet Juvenal wrote: "In the reign of Domitian a monstrous rhombus fish [turbot] was taken; such a one had never been seen in the imperial kitchens. The emperor convoked the senate, and deferred to them to decide in what dish it should be cooked, in order that it might be served whole. The deliberation was long and stormy; all Rome was in a state of expectancy; and the august assembly strove to prove itself worthy of the high confidence reposed in it by Caesar. At length the illustrious old men were tolerably unanimous in their idea that the best way would be to make a dish expressly for the fish-since there was none large enough ready-made-and also that a stove should be constructed vast enough to allow the dish to be placed commodiously upon it" (3)
Whiting	The Greeks were not very much fond of it and said that it was only good for those who could not obtain more delicate fish. Cooks sprinkled it with grated cheese, moistened with vinegar; then they threw over it a pinch of salt and a few drops of oil (1) Galen recommended it to people with delicate stomachs because of its light flesh (2) Very much appreciated by the Romans. Pliny the Elder wrote: "This fish, like the sturgeon, was surrounded with the ridiculous honours of an almost divine pomp by Romans. It was served interwoven with garlands, and trumpeters accompanied the slaves who, with uncovered heads and foreheads crowned with flowers, brought to the guests this dish, the merit of which was, perhaps, exaggerated by capricious fancies" (8) A recipe from Apicius: "put with the fish, in a stewpan, some <i>liquamen</i> , chopped leeks, cumin, savory, and a sufficient quantity of cooked wine, and some wine slightly diluted; cook it on a slow fire" (4)
Wolfish	Much esteemed by Greeks that preferred its head (1). Arcestratus called it "a child of the gods" (3) The Romans loved its tender and white meat up to the extent that it eclipsed the great sturgeon (4)
Crustaceans	
Crab, lobster, prawns	Crab meat was considered heavy and hard to digest (1) In Roma they could be served whole (boiled with a sauce with pepper, cumin, rue, <i>liquamen</i> , honey oil and vinegar); stuffed (with a mixture of cumin, mint, rue, pine nuts and pepper, <i>liquamen</i> , honey, vinegar and wine) or in sausages (boiled crabs reduced to a pulp and mixed with spikenard, <i>liquamen</i> , pepper and eggs; this shaped as a sausage and placed on the stove or gridiron) (4) Apicius once sailed all the way to Libya in search of particularly large prawns. Not finding any to his satisfaction among those that were brought out to his ship, he then returned to Campania without even going ashore (1)
Molluscs	
Limpet	According to Hicesius "limpets are most easily digested shellfish, with little juice not very pungent, of good flavour and easily digested; when boiled, too, they are tolerably well-flavored" (1)
Mussels	The Greeks and the Romans have granted uncommon praise to mussels, and partook of them at their most sumptuous feasts (1) At the wedding banquet of the beautiful Hebe, Jupiter wished the inhabitants of Olympus to interchange mussels by their celestial ambrosia (3) Diocles of Carystus considered mussels (as well as oysters and cockles) moderately nourishing and the best shellfish for digestion and for the kidneys (1)
Octopus	In Rome they were reputed be aphrodisiacs, but for most Romans they were an indigestible delicacy (3) Cooks boiled them with nitro with which they took on a beautiful red colour (3)
Oysters	The Greeks and Romans were extremely fond of it, eating them at the beginning of the banquets. Athenian epicures called oysters 'the gastronomic prelude to the dinner' (1). Oysters were often served raw, and were then "dexterously opened by a slave on the table in presence of the guests, whose experienced eyes greedily sought the light purple net which, according to them, surrounds the fattest and best" (3). Oysters were also eaten fried, stewed, or nicely dressed with marsh-mallows, dock-leaves, and with some kind of fish (1) Diphilus wrote: "Those which are found on beaches or rocks and are untouched by slime or fresh water are small, tough, and biting to the tongue. The spring shell-fish, and those which come at the beginning of summer, are superior, being plump and having a sea flavour mixed with sweetness; they are wholesome and digestible. Cooked with mallow or sorrel or fish, or even alone, they are nourishing and good for the bowels" (1) The wealthy Roman Fulvius Hirpinus ordered to build a fishpond to grow and fatten oysters with paste and cooked wine worked into the consistence of honey. He got rich (more) by selling them (8) At Rome, oysters were served with a seasoning of pepper lovage, yolks, vinegar, <i>liquamen</i> , oil, wine, and honey (4)
Periwinkles	The Greek physician Hicesius said: "The 'necks' are wholesome, but contain less nutriment than mussels and the 'livers' ('poppies,' so-called) are tender at the base and digestible. Hence, they are fit for those who suffer from abdominal weakness" (1)
Razor-shell	It was a sweet shellfish, very pleasant for Greeks that "many widowed women eagerly desire" (1) Dilphus wrote: "the male razor-shells are striated and not of one colour; they are good for patients who suffer from stone or a stricture of any kind. But the females are of one colour and are sweeter. They are eaten boiled or fried, but those that are baked on coals until the shells open are better" (1)
Squid and cuttle-fish	The Greeks fried the smallest ones together with the <i>aphuê</i> (1) Cuttle-fish passed at Rome as an estimable dish (1) There are several recipes in Apicius' book, one of them stuffed with cooked brains raw eggs and a mixture of species, wild herbs, hone, wine and <i>liquamen</i> . There is also a recipe to make croquettes (4)
Others	
Dolphin	Apicius gives a recipe for balls in wine sauce with a mixture of ingredients similar that used for the tortoise (4)
Sea urchins	The Greeks thought them delicious when caught at the full moon and prepared with vinegar, sweet cooked wine, parsley, and mint. Oxymel often replaced vinegar (1) The Greek grammarian Demetrius of Scepsis wrote that a Spartan was once invited to a symposium where sea-urchins were served; he took one, but not knowing how to deal with it, and not even observing how the guests disposed of it, he put it whole (including spines) into his mouth and tried to crack it with his teeth. He had serious troubles with the bite and he shouted: "You rascally morsel, I won't be soft and let you go now, nor will I ever again take another" (1) The Romans esteemed highly this dish, which was recommended to sluggish appetites (3) Apicius gave several recipes, one of them prepared with pepper, a little costmary, dry mint, mead, broth, Indian spikenard, and bay or nard leaves (4)
Tortoise	It was very much esteemed as food by the Greeks from the Peloponnesus (3) Apicius prepared it "cutting into pieces of a middling size, and placing in a saucepan with pepper, rue, and scallions, crushed in the same mortar; over this was poured honey, <i>liquamen</i> , raisin wine, common wine, and a small quantity of good oil. At the moment of ebullition, the whole was thickened with flour" (4)

to get some delicacy and prefers to buy radishes when he may enjoy real fish must be crazy"; or Aristophanes in *The Masters of the Frying Pan* (Olson, 2011):

A: So, then, as for the *glaukidion* [small owl], I'm ordering you to stew it in brine, like the other times. B: What about the little seabass? A: Roast it whole. B: The dogfish? A: Stew it in a sauce. B: The eel? A: Salt, marjoram and water. B: The conger eel? A: Ditto. B: The skate? A: Green herbs. B: There's also a tuna steak. A: Roast it.

Another beautiful example is the passage of the comedian Alexis of Thuri (375-275 BCE) in his play *Crateias* [The Apothecary] (Yonge, 1854):

First, then, I spied oysters, wrapped in seaweed, in the shop of an Old Man of the Sea, and sea-urchins too. I grabbed them; for they are the prelude to a daintily ordered dinner. Next, I came upon some little fish, all trembling for fear of what was to happen to them. But I bade them have no fears so far as I was concerned, promising that I wouldn't harm a single one, and bought a large grayfish. Then I took an electric ray-fish, being mindful that when a lady lays tender fingers upon it, she must not suffer any hurt from its thorny touch. For the frying-pan I got some wrasse, sole, shrimp, jack hake, gudgeon, perch, and sea-bream, and made the dish gayer than a peacock. [...]. Rather, I shall myself act as steward, so cleverly, so smoothly, and elegantly (yes, I shall make the dish myself), that I shall cause the feasters now and then to push their teeth into the plates for very joy. The preparation and composition of all these foods I am ready to disclose, proclaim, and teach for nothing if anybody wishes to learn.

It is important to keep in mind in order to understand food habits that the culinary use of seafood in antiquity went beyond a gastronomic delight (taste, flavour, texture) of upper crust classes. It was also a way to stay healthier. The physician Hippocrates (460-370 BCE) considered foods and cooking very much related to medicine in his 'Theory of the Four Humours', where the best fish would produce good blood and prove to be very beneficial for health (Wilkins, 2018). The Hippocratic Regimen II has a substantial section on fish (48 species) dividing them according to its name, environment, distance swum, and texture: dryness (*xerotatoi*) and lightness (*kouphoi*, mostly typical from fishes occurring in rocky coasts) and heaviness (*barus*, largely fish from rivers, marshes and sandy shores). Also, the physician Diocles of Carystus (4th century BCE) was very much interested in dryness, softness and toughness of fish flesh (Wilkins, 2005) (Table 1). Quite a bit later, the Hippocratic writer and physician Galen (129-216 CE) developed further the theory of humoral physiology that influenced many cultures: Byzantine, Islamic, and European up to the 18th century, also in seafood preferences (Albala, 2013).

Greek cooks used different cooking methods depending upon the seafood type. Fresh shellfish (molluscs and crustaceans) and eels were mostly steamed or boiled (Table 1). Fish preparation techniques were more diverse. Besides boiling fish to make soups or broths, pan frying was mostly used for the *aphuê*. However, the most was grilled or roasted (i.e., charred mullet or tuna steaks or its intestines), sometimes drizzled with *óxos* (vinegar) or seasoned in strong garlic sauce (i.e., tuna). Some fishes, after being baked in a clay vessel enclosed in hot ashes, were stuffed with wild herbs such as the highly valued silphium.¹¹ The Greeks removed the bones from larger fish, but usually left them in with smaller ones (e.g., *aphuê*) (Lovano, 2019). The following fragment from *Deipnosophistae* [The Banquet of the Learned] (early 3rd century CE) by the writer Athenaeus of Naucratis (170-223 CE) reproduces the words that a

¹¹ A fennel-like plant, it was used both, in cooking and in medicine (contractive). According to Pliny it was "one of the most precious gifts of Nature to man". It was so abundant in Cyrene (now Libya) and so important to its economy that most of their coins bore its picture. But, by the time of Nero, the plant had become extinct, probably because of overharvesting (Blümmner, 1893).

mageiros (cook) addresses to a diner (Benton, 1894):

Here are choice fish from the sea, ready scaled, side by side; Help here! the sauces now mix by receipts I have tried. Put me this pan on the coals, and but spill on the fire just— there! — the slightest wee drop of fine oil; see how higher flames up the coal, and your fish are just done to a turn; Once more a toss— now beware lest they brown to a burn. Chop up some herbs. That apprentice must see to each dish that it is daintily it for the guest's slightest wish. Garnish it neatly, and sprinkle the sauce to his taste. Epicures only should taste it, else 'tis but a waste.

Preserved seafood used to be desalted or rehydrated before cooking. Its taste and texture were completely different to the fresh ones (Theodoropoulou, 2018). Again, Athenaeus included many passages from different authors about salt fish. In one of them, Alexis of Thuri commented he had a cook who gave him specially prepared salt fish. Apart from silphium, it could be a simple method appealing to any contemporary cook (Yonge, 1854):

I must wash it well. Then I will sprinkle seasoning in a casserole, place the slice in it, pour over a little white wine, stir it in oil and stew it until it is soft as marrow, covering it generously with a garnish of silphium.

A common way to serve seafood was probably as *opson*, a sort of side dish that complemented the staple part of the meal (barley or wheat). Probably from this practice of mixing small pieces of seafood with other nibbles arose in the 5th century BCE, the luxurious fish sauce, *garos*, made from fermented fish in brine and developed and manufactured further by Romans as *garum liquamen* and *allec* (see next section) (Table 1) (Donahue, 2014). That *garos* was used primarily as seasoning is manifest in the Philoxenus' banquet (see below) where he visited other people's homes with oil, *garos*, wine and vinegar so that he could rectify the seasoning of the domestic cook (Yonge, 1854).

Cooks in the early ancient world were not trained, but at the end of the Classical period and the onset of the Hellenistic one, cooks who were freedmen had set themselves up as freelancers being hired out for dinner parties (*symposia* and *deipnon*). There was often a tense challenge between them and household slave cooks, as frequently reported by Greek (and Roman) playwrights as those above cited (Benton, 1894; Alcock, 2005). Sicon, a typical name for a cook in Greek comedies, brought the study of astrology to the aid of accurate cookery. He also mastered physics for the same purpose, showing already in that time the importance of science in cooking. Therefore, for ancient Greeks, cookery was an important matter. Reputed cooks could command his own price. There were cooking schools, and some scattered sources reveal about cooks who wore a papyrus cap about 490-330 BCE (Donaldson, 1860), long time before it was brought about by the renowned French chef Antonie Carême in the 19th century.

Athenaeus in his book *Deipnosophistae* gave the names of the most famous Greek cooks ("The Seven Sages of the Philosophy of Cooking") that influenced very much future generations of cooks (also in Rome). Several of these 'Magnificent Seven' were skilled in seafood recipes. Thus, Agis of Rhodes was the only one who could bake fish *à merveille*; Nereus of Chios was versed in the mystery of serving conger eels, and Ariston cooked gilthead fish for clubs (Benton, 1894). Another genuine cook was Mithaecus of Syracuse¹² (5th century BCE), who was mentioned by Plato in his *Gorgias*: "Mithaecus, the author of the book on Sicilian cookery and minister of the body by providing tasty dishes". His talent as a cook was very much appreciated elsewhere in Greece (Hill and Wilkins, 1996; Chowanick, 2020).

The Greeks were the very first in Europe to write cookery books (5th

¹² The sophist Maximus of Tyre, said that he was from Syracuse and he was great in cookery as Pheidias was in sculpture (Alcock, 2005).

century BCE). Greeks (also Romans, but to a lesser extent) produced texts which focused particularly on eating and drinking such as the *Deipnosophistae* by Athenaeus. Cookbooks and culinary literature (comedy and satire are probably the best examples) were mostly written by elite writers for a wealthy audience since the most luxury products were only available for upper crust, who used these books as a demonstration of the great concern for maintaining social hierarchy (Donaldson, 1860; Wilkins, 2000; Villegas, 2019). It seems that the first cookbook (until the discovery of the Yale tablets) was written by the cook Mithaecus. The only three surviving fragments (collected in the *Deipnosophistae*) indicate that he described fish recipes using *alphestes* (wrasse) and ribbon-fish (Hill and Wilkins, 1996):

Cut the head off the ribbonfish. Wash it and cut into slices. Pour cheese and oil over it and cook

What may be the world's first gourmet travel book, *Hedypatheia* [also called *Gastronomia*, *Opsologia* or *The Life of Luxury*], is a mock epic poem, written in hexametric verse, by the writer and philosopher Archestratus of Gela (?-330 BCE) probably for recitation aloud in symposia (Olson and Sens, 2000). He revels in fish-eating, desire and pleasure contrasting with the previous fears of Plato about the dangers of luxury. He traveled along the Mediterranean coast recording the cuisine of many Greek and Italian cities. He knew where to find the best fish and, when the proper season were as well as the best way to cook it (Wilkins, 2018). His cooking style was simple and elegant: seafood boiled, roasted or grilled and seasoned lightly to keep natural flavors and textures. His cuisine was based on knowledge, judgement and the quality of the raw material, presumably trying to offset what must have been before him (a cuisine based on lavishness, assortment and very expensive), but directed to the elite (Albala, 2013) (modern *nouvelle cuisine*, with its emphasis on fish which is barely cooked, has rediscovered his concepts). Only strong flavours (e.g., silphium, *garos*) should be used to season lesser quality fish.

I urge you again to eat a steak of peak-season tuna; for it is very good and soft [...]. The tuna, in autumn when the Pleiades set, you can prepare in any way you please [...]. But here is the very best way for you to deal with this fish. You need fig leaves and oregano (not very much), no cheese, no nonsense. Just wrap it up nicely in fig leaves fastened with string, then hide it under hot ashes and keep a watch on the time: don't overcook it. Get it from Byzantium, if you want it to be good (Yonge, 1854).

The book *Deipnosophistae* [The Banquet of the Learned] by Athenaeus of Naucratis (early 3rd century CE) provides extensive information about fish cookery. Chapters follow the order of the meal, and the guests debate with each other over the correct way to approach their material. Chapter three is largely devoted to seafood, but numerous references about fish are scattered throughout the book (Baldwin, 1976; Wilkins, 2005). In writing his encyclopedia, Athenaeus drew on some 1250 different authors and cited the titles of more than a thousand plays, placing itself in the trend of broad scholarly interests that characterizes the time in which he lived. Athenaeus was interested by rare and little-known writings, which have not reached us by handwritten tradition. Therefore, the work of Athenaeus constitutes an indirect way of huge importance for the knowledge of a large number of writers, cooks, historians, physicians and naturalists such as Heracleides (author of the Art of Cookery), Epaenetus (author of a treatise On Fishes), and the above cited Mithaecus and Archestratus, constituting a real gastronomic encyclopedia (García-Soler, 2011).

The following fragment of the Marriage of Hebe¹³ by the playwright Epicharmus (550-460 BCE) in relation to seafood is referred in

Deipnosophistae (Yonge, 1854):

He brings all sorts of shell-fish such as limpets, lobsters, crabs, owl-fish, whelks, barnacles, purple-shells, oysters tight-closed (to open them is no easy matter, but to eat them is easy enough), mussels, snails, periwinkles, and suckers (which are sweet to eat forthwith, but too acrid when preserved), and the long, round razor-fish; also the blackshell, to gather which brings fair profit to children; and on the other side are land-snails and sand-snails, which are held in poor esteem and are cheap, and which all mortals call androphycitides ('man-shy'), but we gods call *whites*.

Also, the most complete Greek banquet, a satire of the Sicilian court narrated by the poet Philoxenus of Cythera (435-380 BCE) in *Deipnon* [Dinner] has been preserved thanks to the Athenaeus's work. This fragment refers mostly to the seafood dishes (Yonge, 1854):

Filled the rich board, eels, and the well-stuffed conger, a dish fit for the gods. Then came a platter of equal size, with dainty swordfish fraught, and then fat cuttle-fish, and the savoury tribes of the long hairy polypus. After this another orb appeared upon the table, rival of that just brought from off the fire, fragrant with spicy odour. And on that again, were famous cuttle-fish [...]. And when we all had reached satiety of food and wine, the slaves bore off the still full tables; and some others brought us warm water for to wash our hands!

2.4. Romans

As in ancient Greece, the eating habits of the Romans changed over time, albeit in a more radical way. During the early Republican period (509-27 BCE), the Romans were mostly warlike persons with no major distinctions in diet among the different social strata. Food was not very much enjoyed, it was just energy (Albala, 2013). For example, molluscs, as well as other gastronomic delights (exotic birds and dormice), were recorded in the *Lex Aemilia*, a Republican sumptuary law (around 115 BCE) that prohibited certain luxury foods from feasts (Bostock and Riley, 1857). As in the Classical Greek period, preserved fish (dried and salted or *salsamenta*) and some (small) fresh fish were the most consumed seafood produce among humble people including common legionaries or even quarry workers as indicated by abundant literary sources (Davies, 1971; Van der Veen, 1998; Marzano, 2013, 2018a) as well as ichthyoarchaeological evidences (Theodoropoulou, 2018). By mid-Republican period, and particularly later on, during the Imperial one (27 BCE-476 CE) as Rome spread dominating Greece and much of the eastern Mediterranean and beyond, the austere romans met and traded with more ancient, sophisticated and richer cultures allowing them to access to exotic and very expensive produce (e.g., spices, fruits, fish, etc.) that only the richest people could afford them (Albala, 2013). Exotic spices, fruits and other new ingredients were very much used in recipes to prepare luxurious meals, many of them based on fresh seafood (Vehling, 1936). In fact, fresh seafood became a marker of the social status since its demand by wealthy citizens exceeded availability pushing up prices in the *Forum Piscatorium*, the most important fish market in Rome (around 210 BCE) (Déry, 1998). The bigger, the fresher, the scarcer, the rarer and the further away the fish was caught, the more priced it was (Marzano, 2018a; Nicholson et al., 2018). Roman mosaics of stunning seascapes decorated the villas of the elite and provided a complementary artistic backdrop for the abundant and extravagant banquets at which such expensive seafood was served (Ayodeji, 2009) (Fig. 1).

As in Greek comedies, the value (social and monetary) of seafood, was often mentioned in plays and the satires as well as by notable citizens such as Cato the Censor (234-149 BCE):

¹³ The goddess of youth and the cupbearer for the gods and goddesses of Mount Olympus, serving their nectar and ambrosia until she married Heracles.



Fig. 1. Detail of a seascape mosaic with marine animals (tuna, sea bream, swordfish, scallops, sea snails) believed to belong to a large and well-appointed Roman house (about 300 CE). Photo by Carole Raddato, CC-BY-SA 2.0, <http://www.flickr.com/photos/caroleimage/13541561383/>, via Flickr.

A fish sells for more at Rome than a cow, and they sell a cask of smoked fish for a price that a hundred sheep plus one ox in the lead wouldn't bring, cut in pieces (Marzano, 2018b).

In the play *Pseudulus* by Plautus (254-184 BCE), the arrogant procurer Ballio said:

Go you in-doors, and get these things ready quickly, that there may be no delay when the cook comes. I'm going to market, that I may make purchase of whatever fish is there (Morris, 1895).

Cooking and seafood are also a major theme in some Horace's *Satires* (65-8 BCE). In the *Dinner of Nasidienus*, the host, an innovator in seafood cuisine, wishes to impress his invitee serving plenty of dishes, especially turbot as well as many delicatessens and imported produce, all selected punctiliously for their flavor: molluscs harvested under a crescent moon, oysters from Circei, scallops from Tarentum and sea urchins from Misenum (Berg, 1996). The following recipe is from that banquet:

A Mediterranean moray eel was brought on a plate, having been spread long between fishes. And so, 'this creature,' says the master, 'was captured whilst pregnant, since the meat would be worse after giving birth. The juice of the eel is mixed as thus: with oil, which is from the best storeroom of Venafrò; with garum from the juice of the Iberian fish; with five-year-old wine, yet that which is from this side of the sea, while it is cooking – combine it thus with cooked Chian, as no other wine is better; with white pepper, not without vinegar, which will have been removed from the Methymaeam vine due to error. I first boiled down bitter elecampanes then green cabbage; Curtillus cooked the unwashed sea-urchins, as the brine it gives off is better than sea shell-fish.

The poet Martial (40–104 CE) wrote about the dissimilar types of food eaten at a banquet to emphasize the social differences between host and guest: whereas a turbot and oysters were served for the former, the socially-inferior guest had to settle on cheaper molluscs and a brill (Marzano, 2018) Also, the poet Juvenal (60–125 CE) in one of his epigrams referred how expensive some fish were (Piros, 2019):

You, Calliodorus, sold a slave for 1300 sesterces yesterday
So that you may try eating well for once.
Nevertheless, you did not eat well: a four-pound mullet has been bought
For you as the main course of dinner.
It pleases me to exclaim: 'This is not it – it is not a fish: it is a man,
Calliodorus, a companion of men which you wrongfully ate'.

In the late Republican period fish-farming practices were developed by constructing artificial ponds in coastal villas close to the sea, where fishes were raised and fattened (such as moray eel, turbot, red mullet,¹⁴ gray mullet, sea-bass, etc.). Such pools allowed wealthy people to enjoy watching fishes as well as eating fresh fish regularly. The politician and one of the Rome's most renowned epicureans, Lucius Licinius Lucullus (117-566 BCE), in his villa near Naples had large ponds connected by channels to the sea where he bred many fish (Toussaint-Samat, 2009). It seems that moray eel was the first fish grown in ponds by the Tribune Gaius Lucilius C. Hirrus that in 53 BCE who practically ruined himself, since the profits from the sale of fish did not compensate for the maintenance costs as Pliny the Elder wrote (Bostock and Riley, 1857):

C. Hirrus was the first who formed preserves for the moray eel; and it was he who lent six thousand of these fishes for the triumphal banquets of Cæsar the Dictator; on which occasion he had them duly weighed, as he declined to receive the value of them in money or any other commodity. His villa, which was of a very humble character in the interior, sold for four million of sesterces, in consequence of the valuable nature of the stock-ponds there.

In addition to fresh fish, fermented fish sauces (*garum* and *liquamen*) were also present as luxury condiments at the banquets of wealthy Romans. Pliny the Elder called *garum* the 'exquisite liquor' and 'no liquid, except unguents, fetched a higher price' (Bostock and Riley, 1857). Besides controversies in composition of such fish sauces, their prime constituents were somewhat different. Whereas *garum* (also known as black *garum*) was made with fresh fish entrails, blood and salt (if the fish was the Spanish mackerel, still breathing, it was known as *garum sociorum*), the *liquamen* (much more similar to the Greek *garos*) was elaborated from whole (small) fishes and salt. The different composition conferred them a characteristic flavour and appearance that also affected to their culinary uses. *Garum* was black glossy, darker, stronger, and more pungent than *liquamen*. It was poured directly onto food at the table just before eating it. On the other hand, *liquamen*, with a lighter flavour, seems to have been used mostly during the cooking process. It functioned both as a general salt seasoning in cooking and as an ingredient in the different *garum*-derived sauces (*oenogarum*, *garum piperatum*, *oleogarum*, *oxygarum* or *hydrogarum*) that were served as dips and also poured over cooked meat, fish and prepared dishes (Grainger, 2014, 2018). Currently there is a renewed scientific interest in reproducing such umami-rich seafood sauces in laboratory (from ichthyoarchaeological evidences) (García-Vargas et al., 2014) as well as its sensory evaluation to be used in contemporary gastronomy (Mouritsen et al., 2017).

Other two products associated to fish sauce and salt fish were *allec* and *muria*. *Allec* was the residue after obtaining the *garum* and it had a pasty consistency. At first, it was considered a low-quality product being used, for example, by the Elder Cato to feed his slaves. Later on, however, gourmet varieties of *allec* became available so that it was not always a low-grade produce such as those popularized by the epicurean Apicius (see below) when he prepared *allec* from the liver of red mullet, oysters, sea-urchins and sea-anemones. *Muria* was the briny liquid used for packing salted fish products during transportation (mostly the Hispanian and Sicilian salted tuna traded), though it could also be used to pickle olives and preserve meat and cheese. It is even found as a component in sauces, where it clearly served as a cheaper substitute to *garum* or *liquamen*, conferring a salty savor to a dish (Déry, 1998).

¹⁴ Red mullet was a very expensive fish. Apart from food it was also used by Romans in the traditional punishment, *rhaphanidosis*, originated in Ancient Greece. It was used to penalize male adulterers publicly shoving a radish (*Rhaphanum*) up his rectum. Romans took this punishment one step further by also inserting a mullet into the adulterer's anus. The mullet served to transform the man's anus into a vagina with the addition of a fishy smell that was typically associated with woman's vaginas (O'Bryhim, 2017).

Literary sources give much information on seafood served at the abundant banquets of the elite (Déry, 1998; Peurière, 2003). The paradigm is the most famous cookbook of the classical antiquity *De re Coquinaria* [The Art of Cooking]. It is a compilation of recipes from several sources (from the 1st to 5th century CE), sometimes credited to a famous Roman merchant and epicure Marcus Gavius Apicius (1st century CE), although the real authorship has been a matter of speculation for centuries. The two earliest manuscripts, one held in the Vatican and the other in the New York Academy of Medicine, both date to the 9th century CE (Alcock, 2005). In the book, recipes are intended to amaze diners with lavishness and sophistication. Most of them are a juxtaposition of contrasting flavours and textures using costly spices and ingredients imported from all around of the Roman Empire and beyond (e. g., parsley, mint, cilantro, rue,¹⁵ lovage, silphium, pepper, coriander, oregano, saffron, dill, thyme, ginger, dates, wine, *liquamen* ...). The text is organized in ten books. Two of them (*Thalassa* and *Aelius*) are dedicated exclusively to seafood, attesting to its popularity as a banquet food, and providing a good example of the kind of dishes enjoyed by wealthy Romans. *Thalassa* has 12 chapters dedicated each one to different seafood types: shellfish, ray, calamary, cuttlefish, polypus, oysters, bivalves, sea urchins, mussels, sardines, fish sauces and seafood stews. Seafood is prepared in all the usual ways: grilled, baked, steamed, fried, or boiled, either prepared whole, or as fillets, or cut into pieces (see Table 1 for some recipes). As a curiosity, Apicius provided one of the earliest surviving recipes for fish *en papillote*. *Aelius* book is mostly dedicated to different sauces (especially several varieties of *Alejandro*) for seasoning fishes, especially conger and moray eel, which are technically difficult fish for a cook (Vehling, 1936).

3. Middle age

This period is usually dated from the fall of the Western Roman Empire (476 CE) to the beginning of the Renaissance (15th century). It is characterized mostly by theocentrism which affected also to diet and culinary traditions by imposing fasting periods and forbidding some type of foods. In the Mediterranean Christian countries, there were no common fasting periods until the 4th century CE (Albala, 2013). Christians were not allowed to consume meat during Lent, on Wednesdays, Fridays, Saturdays, and on the day before of main feast days, therefore many of them, specially the richest, chose seafood as an alternative (Adamson, 2004). Another important feature to bear in mind is the large influence of the physicians in recommending certain foods according to the humoral theory initiated by Hippocrates and followed later on by Galen that lasted until 18th century. It contributed to maintain the social discrimination by claiming that the dietary requirements of proletarians and those of the wealthy class were completely different (Albala, 1998, 2013). As in ancient cookbooks, the medieval ones were copied and compiled by members of the refined elites, such as priesthood, aristocracy and wealthy bourgeoisie. Therefore, there is more available information about banquets, custom and manners of the higher social classes than that for less privileged ones which constituted the vast majority of medieval society (Civitello, 2008).

3.1. Byzantium

One of the most important civilizations, also culinarily, was the Byzantine Empire that lasted almost ten centuries. It was the direct successor of the Greco-Roman civilization that became very much enriched by Islamic and Persian cultures resulting in the most important

¹⁵ Plant little used by Greeks, but very much by Romans. Very pungent. Apicius recommended caution in using it as a condiment, being often employed as a *bouquet garni* during the cooking, a sprig sometimes being used merely to stir a sauce, after which it was discarded (Andrews, 1948).

hub in the trade routes between Far East and Europe. It enabled easy access to luxury produce such as spices that were very much appreciated, not only in the Byzantine cuisine, but also in most European countries as a marker of social status, as already occurred in Ancient Rome (Sephard, 2009). Mediterranean and Black Sea fisheries were very important. Catches were transported to markets all over the empire with more than 1600 vessels unloading freshly caught seafood at the docks every day (Civitello, 2008; Ragia, 2018). Fish markets were meticulously supervised by government inspectors who fixed daily prices depending on the volume of the catch. Wealthy citizens had access to fresh fish (tuna, gray mullet, sea bass, red mullet, monkfish, sturgeon, skate, mackerel, etc.), shellfish (crab, octopus, squid, cuttlefish, oyster, mussel, scallop, cockle, wrinkle, etc.) as well as delicacies such as *ootarikhon* (salted gray mullet roe) or *kabiari* (caviar, the new fish delicacy from the Black Sea) (Dalby, 2003). Small fishes and those caught and sold in large quantities would be salted and stored for more humble citizens. In taverns, fish was served fried or cooked, and it could also be purchased cooked from street vendors and in market stalls (Ragia, 2018). The Spanish writer and traveller Pedro Tafur (1410–1487 CE) was amazed by the enormous amounts of shellfish in the market close to the church of St Sophia concluding that it was related with the religious calendar:

In certain times of fasting during the year they do not merely confine themselves to fish, but to fish without blood, that is, shellfish (Tafur, 1874).

Unlike the Greeks and Romans, Byzantine cookbooks were *rara avis*. Only short mentions to cuisine can be found into diplomatic reports and memoirs of the Imperial family such as that the Empress Lupicina (5th century CE) was a cook, or that the Emperor Justinian's wife (482–565 CE), Theodora, hired cooks from Greece, Persia, Syria or India to serve at her court (Haussig, 1971). Also, some texts such as *Geoponica* (10th century CE), a compilation on farming manual, provided the most detailed description of *garum* (Grainger, 2018). This sauce was also mentioned by the Lombard Bishop Liutprand of Cremona (920–972 CE), who expressed humorously his disgust at being sent a meal "proudly stuffed with garlic, onions, leeks, swimming in fish sauce" (Dalby, 2003). However, the richest source on food and culinary habits are, doubtless, the writings of the Byzantine poet Prodhromos (12th century CE). Some of his poems express the variety of seafood dishes available at the monasteries and how social differences affected the monks' eating rights. In one of them, a humble monk mocks the hedonistic luxuries that abbots and bishops generously enjoy themselves (Dalby, 2003):

On Wednesdays and Fridays, they keep a strict fast: they don't even eat any fish on those days, my lord, but only a bit of bread, and lobsters and nice crabs and stewed crayfish, pan-fried prawns and a few greens and lentils with their oysters and mussels, and clams and razor-shells [...] olives and caviar, and botargo in season to keep them from starvation. [...]. Of course, they complete their fast-day meal with sweet Cretan wine, and Samian, to throw off the evil humours with a drink of sweet wine.

In another poem, Prodhromos refers to the contrasting diet between the abbots and the modest monks (Dalby, 2003):

They [abbots] munch angler-fish, we have our Lent Soup. They drink their Chian wine till they can take no more, we have Varna wine cut with water. [...]. They have white bread; we have bran bread. They have a mousse after their sesame sweetmeat; we have wheat gruel with the wheat filtered out. They have spoon sweets; we get castor oil seeds. They have the sea bass and the shining gray mullet; we have the smoky-smelling Lent Soup. They have the bluefish, the catfish, the brill; we have another go at our What do you call it?

There is also a seafood stew recipe (*monokythron*) in one of the ptochoprodromic poems that makes the author dream in its aromatic

smell (Dalby, 2003):

After all these dishes have been served comes in a nice *monokythron*, slightly blackened on the top, preceded by its aroma. If you like I'll tell you all about this *monokythron*. Four hearts of cabbage, crisp and snowy white; a salted neck of swordfish; a middle cut of carp; about twenty *glaukoi* [unidentified small fish]; a slice of salt sturgeon; fourteen eggs and some Cretan cheese and a bit of Vlach cheese and a pint of olive oil, a handful of pepper, twelve little heads of garlic and

fifteen chub mackerels, and a splash of sweet wine over the top, and roll up your sleeves and get to work - just watch the mouthfuls go.

3.2. Europe

In addition to the above cited influence of Church and physicians in the Christian culinary traditions, the conquest of southern Iberian Peninsula (711 CE up to 1492), southern Italy and Sicily by the Arabs of

Table 2

Middle Age. Some seafood recipes in medieval manuscripts. For detailed information see given references. (1): Granja-Santamaría (1960); (2): Martinelli (2012); (3): Vogelzang (2008); (4): Scully (1988); (5): Möhren (2016); (6): Greco and Rose (2014); (7): Lambert (1997); (8): Scully (2010); (9): Kosta-Théfaine (2014); (10): Scully (1998); (11): Martinelli (2003).

Book	Author/year	Seafood recipes
<i>The Delicacies of the Table and the Finest of Foods</i>	Ibn Razin al Tugibi 13th	Tuna <i>murri</i> ; Yamali's recipe for baked fish ^a (1)
<i>Cooking from the Maghreb/Al-Andalus</i>	Anonymous 13th	<i>Tharīda</i> ^b ; stuffed fish; <i>tafāyā</i> ^c (green or white); <i>tajīne</i> ^d with fennel; pilchard (fried and marinated with vinegar and <i>murri</i>); fish <i>Jimly</i> ^e style; <i>munashshā</i> ^f ; <i>murawwaj</i> ^f ; <i>mashi</i> ^f ; fishballs and <i>ahrash</i> (patties); <i>burānyya</i> ^f ; fish roe; fish pie (also with tortoise) (2)
<i>Libre de Sent Soví</i>	Anonymous 1324	<i>Escabete</i> (pickled fish); fish sauce; eel/conger (sauce); lamprey (pie); octopus/squid/cuttlefish (stuffed); fresh and salted tuna sauces; fish gelatine (3)
<i>Libre d'Aperellar de Menjar Le Viandier</i>	Anonymous 14th Taillevent 1380	Sour grape juice with summer fried fish; fish pies (3) Jelly of slimy fish; lamprey (with hot sauce, in gelatine, roasted); comminee ^k of fish; eel (bright green soup, <i>soringue</i> ^l , in Saracen ^m broth); seabream (roasted with green sauce); porpoise stew; fresh mackerel/gray mullet/garfish (roasted and in pie); fresh cod stew (in garlic and wine); dogfish/ray/plaice/sole/turbot/conger (in pottage, in wine or in green sauce); fresh cod/hake (in wine or in mustard sauce); sauce for keeping saltwater fish (4)
<i>Libro Della Cucina</i>	Anonymous ~1380	Fish aspic; fish broth; Saracen broth; fish croquettes, sausages and <i>tortelli</i> ⁿ ; gratinea ^o of fish; blanchmange; eel pastry; roasted lampreys in sauce; boiled octopus with cumin; roasted cuttlefish; bread soup with fish innards; mullet for invalids (boiled with parsley and saffron) (5)
<i>Le Menagier de Paris</i>	Anonymous 1393	Fish comminee; eel (with mustard sauce, green stew, or in Saracen broth); lobster soup; broth with fish strips; mullet (in green or bitter orange sauce); porpoise stew; fish rissoles (6)
<i>Modus viaticorum Du Fait de Cuisine</i>	Anonymous 14th Chiquart Amiczo 1420	Tuna; hake; <i>scabeg</i> (pickled fish), eel confit (7) Lamprey (in sauce with tripes of large fish, in sauce or roasted); fish broth (camlina ^p); tarts (with different sauces depending on fish type); seabream (stew, salted and cooked in wine and served with rice); fish gratin; fish jelly (8)
<i>Arte Cisoria</i>	Enrique de Villena 1423	Not contains recipes. It describes how to carve 47 different fish and shellfish including whales and dolphins
<i>Le Recueil de Riom</i>	Anonymous 14th -15th	Fish broths (camlina, black, yellow); lamprey (in hot sauce); small fish (roasted); flatfish (in sauce); eels (roasted) (9)
<i>Cuoco Napolitano</i>	Anonymous ~1480	Anchovies with eggplants; fish tarts; stuffing for a fish; fish jelly in various colours; fake ricotta (for Lent); Lent white dish; fritters shaped like ravioli using fish milt and liver; Papal torte (with sturgeon); fish-eggs/caviar omelette; sardines (fried and garnished with bitter orange juice); seabream/shad (roasted or boiled); corb (boiled with garlic or in mustard sauce); squid/saddled bream/moray eel (fried); gilthead/gray mullet/mackerel (boiled or fried); boiled turbot; roasted red mullet; salpa (roasted with orange juice); black fish (killer whale) fried with orange juice and pepper (10)
<i>Libro per Cuoco</i>	Anonymous ~1430	Fish jelly; tart of beaten fish; <i>schibeze</i> (pickled fish); fish broth; stuffed lamprey; fried fish; fried-cooked eels in wine; <i>sapeto</i> (tasty fish sauce) (11)
<i>Liber de Arte Coquinaria</i>	Martino da Como 1465	Eel (stew or in torte with dates, almonds, fish fat and liver); fish entrails and milt torte; whole-fish pies; fish fritters; fish-shaped fritters; sturgeon/dentex (cooked in wine sauce); sea bass/corb (fried with vinegar and herbs dressing); gilthead/turbot/dogfish (boiled); sole (fried and topped with orange juice and parsley); bonito/tuna/goby/cod/mussels/mantis shrimps/bay shrimps (boiled); red mullet (roasted); salpa/dolphin/oysters (fried); scorpion fish (boiled or fried); red/white seabream (fried or roasted); moray eel (fried with garlic sauce); gray mullet (roasted or boiled) (Ballerini, 2005)
<i>De Honestate Voluptate et Valetudine</i>	Bartolomeo Sacchi 1470	Fish recipes are borrowed from Martino's manuscript

^a Large fish salted overnight with a weight on top. Thereafter boiled, seasoned with mix of spices, oil and baked.

^b Dish of bread moistened with meat or fish juices.

^c Stew of meat or fish cooked on water, oil, onion and coriander. It was white or green depending if the coriander was dry or fresh.

^d Dish consisting of meat/fish, fruit, vegetables and spices that are cooked together very slowly in an earthenware pot.

^e A cereal-based fermented salty sauce used as a condiment. Also made with fish (a kind of *garum*).

^f Boiled and baked fish with spices, herbs, vinegar, *murri* and meatballs.

^g Pounded fish made into a shape of a pilchard and fried and dressed with vinegar and spices.

^h Fish prepared in tajine, but fried at the end.

ⁱ Small fishes deep fried and dressed with crumbs, spices and *murri*.

^j Boiled and fried fish with fried eggplant.

^k Cumin and almonds grinded and tempered with clear water and sieved and put in with the fish.

^l Skinned and boiled eel pieces are simmered in a thick sauce made from roasted breadcrumbs, diluted with verjuice; with the addition of fried onion rings and chopped parsley. At the end, wine, verjuice and vinegar are added.

^m Skinned eel cut in little chunks, then sprinkled with ground salt and fried in oil; grind ginger, cinnamon, clove, grain, galingale, long pepper and saffron to give color, and verjuice, and boil all together with the eels which will make the liaison.

ⁿ Dish with boiled fish, where liver is mixed with starch, spices and egg yolks diluted with broth and starch to thicken. Once well cooked, finely ground sugar is added on top before presenting it at the table.

^o Sauce composed by white bread, red wine, vinegar, cinnamon, ginger, cloves, sugar, saffron and salt.

North Africa was highly influential on the cuisines of the occupied territories. The new ingredients such as spices and herbs (cinnamon, mastic,¹⁶ caraway, sesame, mint, etc.), vegetables and fruits (eggplants, asparagus, artichoke, lemon, oranges, pomegranate, raisins, etc.), nuts (almonds, pine nuts, pistachios, etc.), food colorings (saffron), new cooking techniques (use of grounded almonds or rice as thickeners; the addition of tangy liquids like verjuice,¹⁷ tamarind or bitter oranges to produce a distinctly sweet-sour taste; *escabeche*; stews shimmered for hours over a low flame, etc.) and new gastronomic habits, reflected the highly refined and sophisticated cuisine influenced by Arab courts in the Middle East (Civitello, 2008; Nabhan, 2020). Al-Andalus became quickly the gateway through which Arab (and also Jewish, see below) and the surviving Greek and Roman cultures reached medieval Europe (via Catalonia and Italy), affecting also their culinary preferences. European cuisine was rather artificial. Europeans loved colours,¹⁸ sharp contrasts of tastes (sweet-and-sour or bitter-and-sweet) and disguised food (Albala, 2013). Two manuscripts, with seafood recipes, have survived from the early Medieval age from Al-Andalus (Muslim kingdom in the Iberian Peninsula). *Fuḍālat-al-Hiwan Fi Tayyibat al-Ta'am Wa-l-Alwan* [The Delicacies of the Table and the Finest of Foods and Dishes] by the Murcian scholar, poet, jurist and epicurean Ibn Razin al Tugibi (1227–1293 CE) contains 432 recipes divided into 12 sections. Section five is dedicated completely to fish (and eggs) with 30 recipes including several *escabeche* recipes, and section 11 to lobsters/shrimps with 3 recipes (Table 2) (Granja-Santamaría, 1960). The other manuscript is *Kitāb al-tabīj fi l-Magrib wa-l-Andalus fi 'asr al-muwahhidin li-mu'allif mayhul* [Treatise on Cooking from the Maghreb and Al-Andalus during Almohad Period] by an anonymous author written in 13th century. It contains over 500 recipes collected from a variety of authors. The text outlines the court cuisine of Baghdad during the great period of the caliphs with dishes and cooking styles typical of the Muslim, Roman and Visigoth, upper-class cuisine, becoming a paradigm of 'culinary fusion'. One chapter (out of 22) is dedicated exclusively to seafood including many different recipes: stuffed, breaded and baked, jugged, fried, in meatballs, battered and fried, fish roe, fish pies, etc. (Table 2) (Perry 1998; Martinelli, 2012).

The Sephardic Jews (those that populated Al-Andalus), developed their cuisine in close contact with Christians and Arabs contributing even more to this culinary melting pot that Al-Andalus was. Fish was a staple food in the Jewish cuisine. According to the kashrut,¹⁹ fish was considered *parveh*²⁰ but only were allowed (*kosher*) those possessing both fins and scales. Thus, species like eel, conger, dogfish, molluscs and shellfish (very much appreciated in Europe) were forbidden. Fresh sardines, tuna, mackerel, hake and sea bream were among the most consumed species. Fish could be prepared fried (usually cod, traditionally served in Sabbath dinner); in *cazuela* (stew) with eggs, seasonal vegetables, pulse, garlic, onions and spices; grilled (specially, those with strong flavour like tuna, sardines or mackerel) and garnished with bitter vegetables (chicory, artichoke), plums, and Mediterranean herbs (dill, fennel, oregano, thyme); in meatballs (poached in vegetable broth) frequently served with *agristada*.²¹ Fish was also basic ingredient on the Friday dinner and Sabbath lunch (mostly as appetizer). Most of these

recipes were cold dishes, prepared the day before, because of the prohibition of lighting fire and cooking in Sabbath. They used smoked fish, in brine, marinated in lemon or vinegar (*escabeche*), in oil, or in pies (*empanada*) (Cantera, 2003; Macías, 2003).

Al-Andalus cuisine left its mark on many European culinary manuscripts by integrating some of its flavours, ingredients and cooking methods (bitter oranges, rose water, almonds, *escabeche*, etc.). The best examples are the anonymous texts *Llibre de Sent Soví* [Book of Sent Soví] (1324) (considered the oldest European culinary manuscript) and *Llibre d'Aperellar de Menjar* [The Food Pairing Book] (mid-14th century), both written in Catalan. Curiously, none of them mention shellfish, which must have been one of the major food sources in the Catalan coastal regions. New Mediterranean herbs (marjoram, sage, basil, and oregano) as well as parsley, as substitute of coriander, are listed in many recipes (Vogelzang, 2008). Another example is the French (Occitan) *Modus Viaticorum Preparandum et Salsarum* that contains recipes for fish in *escabeche*, fresh tuna, Mediterranean hake or confit of eel, which appear nowhere else but in Occitanie (Lambert, 1997). The latter manuscript contrasts with many of the French 'bestsellers' (e.g., *Le Viandier*, that influenced later scripts (plagiarism?) such as *Le Menagier de Paris* or *Du Fait de Cuisine*) whose recipes, although with some Arab ingredients, are closer to northern European cuisines than to Mediterranean ones (Table 2) (Civitello, 2008). In Medieval manuscripts, recipes often did not detail the kind of fish to be used, or they list different species as appropriate for a given dish. The most common fishes were eel, lamprey, but also red mullet, mackerel, seabream sturgeon and cod, among others. Fishes were cooked in a variety of ways: roasted, fried, boiled, baked, in a pie, or in jelly, etc. (Table 2). Seafood was often heavily processed and pressed in molds, or stuffed back into the raw skin of the fish. Also, a sort of multiple cooking/dressing was used in dishes served in-between courses at medieval banquets across Europe. Keeping the fish whole, front part was fried (accompanied with cameline sauce), the middle part roasted (with bitter orange juice) and the tail was boiled (with green sauce) (Adamson, 2004). Most of the Italian Middle Age cookbooks also contain similar recipes of this 'international elite cuisine' led by France. However, there are recipes that reveal strong Mediterranean character with an important Muslim influence such as the anonymous Venetian manuscript *Libro per Cuoco* [Book for Cook] (1430) or the Neapolitan *Cuoco Napoletano* [Neapolitan Cook] (~1480). From both manuscripts can be traced not only the everyday Italian culinary practice but also the very refined taste brought by the Catalan royal family when they ruled Naples, such as the recipe for Papal torte, a Lent dish, whose ingredients were: seafood, sturgeon, bones, nuts, pine nuts, rice, milk, sugar, ginger, cinnamon, salt, saffron and eggs (Table 2).

One of the greatest Medieval cooks was Martino da Como (1430-?) who worked for Cardinal Ludovico Trevisan. His manuscript *Liber de Arte Coquinaria* [Book on the Art of Cooking] (1465) was a milestone in cuisine, marking the transition from Middle and Modern Ages. It is extremely technical and more methodological compared to previous texts, since it was not only a list of recipes, but ingredients, amounts, techniques, utensils and cooking times²² are fully specified. Martino was an innovative chef, with a subtle ability to combine old and new ingredients (many of them brought by the Arabs). He used whole ingredients rather than pounded²³ and disguised (as typical in the Middle Age cuisine), preferred the regional products ('synonym of quality'), paid particular attention to the colours in food preparation, combined wisely ingredients to achieve more flavor, as well as he considered that species should be chosen according to its self-nature. Condiments,

¹⁶ A small Mediterranean tree (*Pistacia lentiscus*) and its resin.

¹⁷ Juice from unripe grapes, sorrel, unripe apples or whatever fruit as long as it is sour.

¹⁸ Spices like saffron and turmeric turned food a beautiful golden color. It was the favorite color in the believe that gold guaranteed eternal life, thus saffron was very expensive "one pound of saffron cost as much as a horse" (Willan, 2000).

¹⁹ Jewish dietary laws that ban eating of certain foods and require other foods being prepared in a specified way.

²⁰ Those foods that may be eaten indiscriminately, with either meat dishes or dairy products.

²¹ A typical Sephardi sauce made with vegetable stock, beaten egg, flour and lemon juice.

²² He measured cooking times against parts of hours rather than against prayers [such miserere or paternoster]. This way, he started to see cooking from a 'secular' perspective and to take into account the esthetical aspects of eating (Ceron, 2017).

²³ One reason for so much chopped meat was the poor state of European teeth, which were not up to chewing larger cuts.

saucers and flavorings should be seen as extensions of what is being cooked. Martino puts heavy emphasis on vegetables (especially artichokes and asparagus) and mushrooms which he treats as dishes in their own right (Ballerini, 2005; Albala, 2013). He attaches great importance to the seafood to which he devotes an entire chapter (Table 2). His recipes vary from humble ones (e.g., octopus, “It is a vile fish of little worth; cook it however you wish”) to *mirabilia gulae*²⁴ such as “how to make aspic in a carafe with a live fish inside”²⁵ (Ballerini, 2005). The following recipe for turbot is an example of his culinary style:

This fish should be boiled, but, because it is very delicate and breaks easily, it should be cooked in a basket, or tied to a cutting board so that it can be removed whole when it is done; and it should be simmered very slowly. Note that in general every type of fish should be simmered slowly, but it is necessary to be able to discern and know the quality of all fish because there are those that are firmer and harder than others; likewise, there are those that are more tender and softer; thus, they should be cooked for longer or shorter periods of time, as necessary, but they all should be simmered softly, gently, and slowly, until cooked through.

Martino’s recipes were included in the book *De Honestâ Voluptate et Valetudine*²⁶ [On Honest Indulgence and Good Health] (1470) by Bartolomeo Sacchi (1421–1481) (alias Platina), with very little changes. It was Platina himself who revealed that he learned the art of cooking from the ‘prince of cooks’ (as Martino was known) (D’Elia, 2008). Platina’s book was the first printed cookbook written in Latin. It enabled a wide dissemination of Martino’s work because “it would not remain confined to a few obscure manuscripts penned in the vernacular but on the contrary would be disseminated throughout Renaissance Europe” (Ballerini, 2005). Platina was not a professional cook like Martino, but a member of the College of Abbreviators.²⁷ After being imprisoned by Popes Pius II and Paul II, he was rehabilitated by Pope Sixtus IV by appointing him prefect of the Vatican Library. It allowed him to come in contact not only with the Vatican curia, but also with a number of texts he used to write his treatise (D’Elia, 2008). His book is not a kitchen manual; it is a 10-volume piece (like Apicius’ *Re Coquinaria*) about natural history (Pliny’s Natural History is the main source of the first part of the book) and dietary medicine (inherited from the Hippocratic tradition), combined with many anecdotes on the eating habits and tastes of his friends of the upper crust of society and Vatican curia (Albala, 2013; Ceron, 2017). Platina suggested how to eat well and defended that pleasure of eating had nothing to do with gluttony, recommending moderation and self-control. The following eel recipe is from the book X dedicated partly to fish (a slight variation from the same Martino’s recipe) although he was in favour, as other authors of this period, that all fishes were difficult to digest because of their viscosity and coldness they produce rheum and cold blood (Albala, 1998):

When an eel is captured, skinned, and gutted, cut it up into large enough pieces and cook well on a spit near the hearth, with bay leaves and sage placed between the pieces, always moistening the meat with the brine they call salimola. When it is nearly cooked, add some meal or ground bread, sprinkling with cinnamon and salt, encrusting it all around. If you want it boiled, cook thoroughly with parsley, sage, and a few bay leaves and cover with verjuice and pepper (Ballerini, 2005).

²⁴ Surprise and decorative dishes typical of Ancient and Medieval banquets such as live birds, live fish, elaborate decorations, or even stuffed peacocks spitting flames.

²⁵ Little fish were made to slide through a pitcher with a spout. Inside the pitcher a chamber of water was created with gelatin above and below.

²⁶ It seems that Leonardo da Vinci owned a copy of this book (Varriano, 2008).

²⁷ A body of writers whose task was to draft bulls and briefs for Pope Pius II.

4. Modern age

It starts at the end of 15th century and spans until the French Revolution (1789). The introduction by Arabs and Jews of new cooking methods, the use of novel ingredients from the Orient through Arab voyages and conquests, and the arrival to the New World with the gradual incorporation of its ingredients and cookery into the Old World, affected deeply the food habits of Mediterranean (and European) countries that developed a very refined cuisine. In cookbooks, many foods received increased prominence than in any medieval cuisine. It was particularly true for seafood that was prepared in many different ways with countless sauces because it was the main food for fast days and Lent that were very much kept by Christians (Albala, 2013). In fact, during Lent fish was present in each of the four courses of the morning meal: the starters served usually included salads, nuts, dried fruits, and two or three fish dishes; the boiled course included more fish and some soups; the fried course offered even more fish and some vegetables. The slighter evening meal had only one course, usually a salad, vegetables, fish and sweets brought out together (Adamson, 2004).

4.1. Catalonia

A late medieval-early modern age cookbook that influenced some of the most important Italian Renaissance culinary texts was the *Llibre de Coch* by Robert de Nola.²⁸ It was published in a printed edition first in Catalan (1520) and later in Castilian (1525), although it was probably written before 1490. It included the Catalan medieval text of *Llibre de Sent Sovi* (see Middle Age section). This text is considered a truly Mediterranean cookbook that combines Catalan, Italian, French, and Arab recipes. As many of the previous culinary books it was written for the upper crust of society. It also contains useful information beyond a list of recipes (as the most important Italian Renaissance books such as those by Messisbugo and Scappi will do): advices for carving meat, setting the table and attending properly, as well instructions on the serving and cooking staff (Adamson, 2004). The third part of the book deals with a large variety of fish and shellfish with almost a quarter out of c. a. 200 recipes; many of them are modifications of meat dishes appropriate for eating on fast days and Lent. Lamprey, conger, moray eel, tuna, bonito, swordfish, sturgeon, gray mullet, scorpionfish, seabream, sardines, mackerel and anchovy are prepared *en graellas* (grilled), *bullit* (boiled), *en cassola* (cooked in stews and casseroles) or *en empa* (made into pies). There are also recipes for cuttlefish, squid and octopus in pottage (*potatge*), fried fish (flounder, dolphinfish), hake in sauce, dried conger, salted tuna belly (*tonyina de sorra*), fish in *escabeche* and casserole of clams. Spices (saffron, pepper, nutmeg, ginger, salt), herbs (parsley, mint, marjoram, and at times dried coriander), nuts (pine nuts, almonds) and bitter orange (juice or in slices) are added frequently in almost all these dishes, as usual in many culinary elaborations in this period (Chabrera and Nola, 2014):

To make a casserole of clams: Put the clams inside a casserole with cold water and leave them for a while so that they open to expel the earth that they have in the heart. Then stir them well and put them into a small pot that you will place on the embers. Then put the sauce and let it cook slowly and do not add salt but a little oil and all the chopped herbs. If you want to eat the clams with almond milk, sauté them a little with these herbs and then boil this milk and add it to the clams that will be sautéed with pepper.

²⁸ He called himself cook of don Ferrando (probably Ferrante I, who ruled Naples from 1458 to 1494).

4.2. Italy

During the early 16th century (Renaissance) Italy led many cultural aspects, also in cuisine. The courts of Ferrara, Florence, Rome and Venice were birth places of fine Italian cooking. Two cookbooks stand out in this period: *Banchetti Composizioni di Vivande e Apparuccio Generale* [Banquets, Food and General Compositions] (1549) and *Opera dell'Arte del Cucinare* [On the Art of Cooking] (1570). The first one, by Cristoforo di Messisbugo, gave a complete description of the menus as well as a list of recipes, logistics, decoration, and cooking tools of the princely banquets at the court of Duke Ercole d'Este in Ferrara, where Messisbugo served as the master of ceremonies and cook, earning the title of Count Palatine too (Snodgrass, 2004). As an example of lavish meal was the eighteen-course, 7-h wedding banquet to impress the French princess Renée in her marriage with the duke of Ferrara. Sturgeon, lamprey, sardines, large lobsters, squid and caviar²⁹ were among the local seafood served. Even, some recipes contained very expensive (and bizarre) ingredients such as powdered coral or pearls, believed to be healing (Willan and Cherniavsky, 2012; Albala, 2013). Fried fishes were seasoned with bitter orange slices sprinkled with sugar, spices (cinnamon and pepper) and orange juice, a widespread fashion just after the publication of Platina's book that became a fixture in the Italian Renaissance cuisine (Varriano, 2008). Messisbugo was one of the first cooks keen of raw vegetables, using equally meat and fish in his recipes. The book also contains less luxurious recipes and menus based on salted fish (anchovies, sardines, herring, *bottarghe*³⁰) especially for Lent and fast days. Marinated fishes were not noticeable in contrast to the Scappi's recipes (see later). However, his book is one of the few Italian ones that mention the salted fish as a condiment (e.g., the use of finely cut-up botargo in a dish with artichokes) (Peterson, 1994). Among fish and shellfish dishes stands out: *gelatia di pesci* (fish jelly), *pottacio di pesce* (fish pottage, several recipes), *pesce in sale* (salted fish), *orate in aceto* (vinegar-marinated sea bream), eel (or other fish/shellfish), *polpette di sturione* (sturgeon fish balls), *fraccasera sopra pesce* (fricassee), *peuerata da pesce* (Florentine-style sausage), *sapore sopra pesce fritto*,³¹ *torta/pastello di pesce* (eel, prawns, and other fishes pie), *tomaselle di pesce*³², *lamprede arrosto et in sapore* (grilled lamprey in sauce) and *pesce in cassonata* (with sugarcane) (Messisbugo, 1549).

This is the recipe for *gambari*³³ *pastello*:

If you want to prepare a *pastello* with shrimps, take the shrimps and make them simmer in water. Then, take the tails and pound a half of the shrimps with the marjoram. Stir-fry the other half. With the pound ones, add shelled pine nuts and fresh almonds, if you find them, and grind all together, adding fine spices and a little quantity of well-ground saffron. Place in the cake pan all these things in a single crust, because the *pastello* would become too dry with two crusts, adding the stir-fried shrimps, whole and shelled pine nuts, whole, fresh, and shelled almonds if you have them; if not, cut walnuts in three parts with a knife. This *pastello* has to be thin, and in this way, it is good.

The cookbook that more stands out in the Renaissance was *Opera dell'Arte del Cucinare* (1570) by Bartolomeo Scappi. He was a professional cook that ruled the prominent kitchens of two cardinals and two popes, Pius IV (a Lombard renowned for loving puddings and pies) and Pius V (who called him 'Michelangelo of cookery' and aimed him to

write the book) catering the most important banquets (Wells, 1988). At this time the papal court was a hub of the humanism and the Scappi's culinary talent prospered in this extraordinary atmosphere (Willan and Cherniavsky, 2012). *Opera*, considered the very first modern cookbook, is the utmost achievement of Italian culinary literature of all times, going far beyond an ordinary cookbook, becoming into an encyclopedia. It is a six-volume work that contains not only very accurate, easy-to-follow and novel recipes, but also how, where and when to choose the best ingredients, complete cooking guidelines, description of the hierarchy of cooks, design and procedures of the kitchen. It is also the first fully and lavishly illustrated cookbook as none before (Allen and Albala, 2003) (Fig. 2). The recipes use ingredients from all over the country, giving especial importance both, to the quality of local produce and humble ingredients like vegetables, but also open to external influences (Arab, Catalan, French or Hungarian). It is a mingle of traditional medieval cookery (spices and sweet-and-sour sauces) with some novelties such as the use of sugar, dairy products, offal, flaky pastry or the noteworthy rise in the variety of fish and shellfish dishes (Table 3) (Willan and Cherniavsky, 2012; Albala, 2013).

Book I starts with important advices about chef training (*Delle circostanze necessarie al maestro cuoco*). Regarding to fish, several are the requirements that master cook should meet: "(1) To tell how good pickled tuna back and salted tuna belly are; (2) To tell how good salted eel is; (3) To tell how good caviar is; (4) To tell how good *moronella*³⁴ is; (5) To tell how good *bottarghe* is; (6) To tell how good a sturgeon back is; (7) To tell how good smoke-dried herring are; (8) To tell how good the fish are that have been soured and kept in leaves; (9) To tell how good a marinated fish is, and that is jellied" (Scully, 2011). Book III is dedicated specially to recipes that are appropriate for lean days and Lent. Preparations for fish (more than 60 different species) are rather simple including poaching, broiling, grilling, or frying after being marinated (Table 3). Precise consideration is given to type, location and season in which fish should be caught. For example, Scappi points out that sea fish are of higher quality than freshwater ones; that those caught in rocky bottoms are tastier than those from soft bottoms; that all marine creatures that come into freshwater to feed are finer when they are gutted; and more than anything else, any fish must be very fresh (except for the large sturgeons that should be left awhile before cooking them). Similarly, every fish used for frying or grilling should be of a moderate size rather than too big. And those used for making jelly, for preserving in vinegar and for salting must be alive. As told before, ingredients are not so rare or costly as in middle age cookery, what amazes in Scappi's is his technical skills even for elaborating a humble sardine dish or tuna head (Scully, 2011):

To fry, souse and marinate sardines:

Get fresh sardines, scale and wash them, set them on a table mixed with a little white salt, then flour them and fry them in olive oil because it will always be better than rendered fat or butter. When they have fried, serve them garnished with orange juice or sliced limes or fried parsley. And after they have fried, they can be kept in bay leaves or myrtle leaves. If, after they have been fried, you want to marinate them, put them into vinegar with sugar or must syrup in it along with saffron, and keep them in that marinade until you want to serve them. In summer instead of vinegar you can use verjuice thickened with egg yolks or breadcrumb. And also, after they have been fried, they are dressed with green sauce.

To cook a tuna head:

Get the head of a tuna and cut it the way it is done in Rome with a hand width of the body, in particular it must be fresh because otherwise it will not be enjoyable, having the most horrible odour of any fish's head. It goes bad very readily; for that reason, it has to be

²⁹ The first known reference to the preparation of Beluga sturgeon caviar in Italy is from Messisbugo.

³⁰ A delicacy of salted, cured fish roe, typically of the gray mullet or the bluefin tuna.

³¹ Sauce over fried fish whose most common ingredients were cinnamon, sugar, pepper and bitter orange.

³² Traditional Genoese meat or fish rolls stuffed with herbs.

³³ It is a generic term for several crustaceans (shrimp, crayfish, and prawn).

³⁴ Salted sturgeon's belly.



Fig. 2. An example of the beautiful illustrations from Scappi's cookbook *Opera* (1570).

Table 3

Modern Age. Some seafood species, recipes and cooking tips from Scappi's book *Opera dell'Arte del Cucinare* [On the Art of Cooking] (1570).

Species	Recipe/cooking method
Bonito	The big ones can be cooked like tuna; in soup like sturgeon
Cod	The medium and small ones, better fried and grilled and served with bitter orange juice and pepper
Croaker	Fritters; with parsnips
Dogfish	Pottage; head boiled (and served with green sauce)
Garfish	Pottage; fried
Goby	Grilled; floured and fried
Gray mullet	Cooked on coals; pottage; marinated; fried
Gurnard/mackerel	Grilled; spit-roasted; fried; marinated; pottage; entrails fried to make a pottage with them; roe (cooked, several ways)
Hake/scorpion fish	Pottage; floured and fried; small ones fried whole
Lamprey/moray eel/conger eel	The big ones in pottage; floured and fried
Leer fish	The small ones fried whole
Ray/monkfish/green wrasse	Boiled and in sauce; pottage; grilled; fried; in pastry; spit-roasted
Red mullet	The small ones, better marinated
Sardines/anchovies	Cooked in the same ways as the sturgeon, excepting caviar and roe
Seabass/meagre/corb/gilthead/sea bream	Boiled in salt water and served with garlic sauce; pottage; floured and fried
Shad	Grilled; fried; thick soups
Smelt	Grilled; floured and fried; pickled; fish balls
Squid/cuttlefish/octopus	The big ones like sturgeon; pottage; stew; meatballs; in jelly
Sturgeon	The small ones, better fried and grilled; marinated; pickled
Tuna/swordfish	Pickled; braised
Turbot/flounder/sole/St. Peter's fish	Fried and served in green sauce
	The big ones in pottage; stuffed in pottage
	The small ones fried whole
	Stew (white wine, vinegar and verjuice); pottage (various ways); thick soup (various types); marinated; grilled; braised (and shaped into a little-like pears); saveloy (sausage); fish balls; fried; filleted, cooked and braised; spit-roasted; intestines (with orange juice and pepper after being boiled, floured and sautéed in oil); milt and liver (in pottage or fried and dressed); caviar; omelette with roe
	Filleted cooked and braised; in fingers stuffed and cooked on a spit; meat balls; cooked in the same ways as the sturgeon, excepting caviar and roe; head boiled (in wine, vinegar, salt, water and crushed spices) and served cold with strong mustard
	Pottage; grilled; fried; in jelly (except St. Peter's fish because it has little flesh)

cooked in wine, vinegar, salt, water and crushed spices. It has to be served cold rather than hot. For a sauce it needs a strong mustard. You can cook the rest of the tuna's body the same way when it is cut up into several pieces.

4.3. Spain

In the early 17th century, the culinary leadership shifted from Italy to Spain. The first major early modern cookbook published in Spanish was *Libro del Arte de Cozina* [Book on the Art of Cooking] (1599) by Diego Granado the official cook at Philip III court in Madrid. The book is scarcely original, just a compilation of recipes and advices (plagiarism?) from earlier books such as those by Ruperto de Nola's (*Libre de Coch*) and Scappi's (*Opera*) (Moreno, 2017). Among the fish recipes, the book gives some original tips for elaborating tuna and hake sausages (Pérez-Lloréns, 2019b).

Seafood is also present in the cookbook *Libro del Arte de Cozina* [Book on the Art of Cooking] (1607) by Domingo Hernández de Maceras. In contrast to previous cooks, he did not work for the elites. He was a cook at the canteen of the University of Salamanca trying to feed the students as good as possible, using basic ingredients and reusing the leftovers (zero waste), under a severe food shortage. Consequently, his cuisine reflects more ordinary eating habits. Some seafood recipes are *abondaguillas de pescado cecial* (fish balls of desalted hake or cod) or *empanada inglesa de pescado cecial* (English pie of desalted hake or cod) elaborated with onion, pine nuts, parsley and peppermint, some spices, beaten eggs and sugar (Moreno, 2017).

Another influential cookbook was *Arte de Cocina, Pastelería, Vizcochería, y Conservería* [Art of Cooking, Making Pastry, Biscuits, and Conserves] (1611) by Francisco Martínez Montañó, that worked as a professional cook at the court of the Kings Philip III and Philip IV. The book, reedited many times (until the 19th century), has been called 'the summa teologica' of Baroque cooking. The book outline is similar to the great cookbooks from Italian Renaissance, but with simpler recipes (he declares he is not fond of 'fantastic dishes'), with fewer ingredients and less sophistication (but not always) (Albala, 2013; (Moreno, 2017)). Several kinds of fish and shellfish are prepared in different ways especially for fast days and Lent: sturgeon, lamprey, tuna and swordfish (grilled, fish balls, pie, puff pastry pie, marinated, salad or casserole); cuttlefish, squid and octopus (in casserole); seabream and sardines (in *escabeche*); lobster and big crabs boiled and grilled seasoned with spices and bitter orange; Portuguese oysters (grilled or in pie) or fish blanc-mange. Interesting recipes are: *capón relleno de ostiones* (stuffed capon with Portuguese oysters), *sardinas rellenas en escabeche* (stuffed sardines in *escabeche*), *empanadillas de sardinas* (sardine pastries), *cazuela de acenorias y pescado cecial* (salted hake or cod and carrot casserole) or *berenjenas y calabazas rellenas de pescado* (fish stuffed egg-plants and pumpkins) (Martínez-Montañó, 1778).

Antonio Salsete authored *El cocinero religioso* [The Religious Cook] (end 17th century) a cookbook containing many conventual seafood recipes that included salted fishes (cod, tuna, sturgeon), but also eel, cephalopods, molluscs and turtle. He mentions *camarones* (small shrimps) which are brought to the table in small tortillas (*tortillitas de camarones*), and anemones (Serrano-Larráyo, 2008):

It is a seafood that has no fish shape, but a set of threads or beards. These must be thoroughly washed with vinegar and salt. The best way to cook them in to fry them, because they have the texture and the taste of brains.

Another example of poor and austere conventual cooking is *Nuevo Arte de Cocina* [New Art of Cooking] (1745) by Juan Altamiras, a Franciscan monk and cook. His cooking style is seasonal and keeping food waste at minimum. He himself wrote in the prologue: "It is no my intention to write about exquisite ways to cook, since there are already many books given to light by the cooks of the monarch, but the

execution is costly, as if dictated by a silver tongue; rather, in this one the golden tongue of the charity can be heard" (Moreno, 2017). There are some Arabic influences in his cuisine (cinnamon, saffron, oranges or lemon), but also uses produce from the New World (tomatoes, chocolate or potatoes), a somewhat novel ingredients in Spain at that time. For example, in his recipe *perdices asadas con sardinas* (roasted partridges with sardines):

After cleaning the partridges well, put two sardines inside the body of each one, in a manner that they don't come out, roast with good pork lard, and if you do not have any, fry bacon and throw it on the partridges, with some tomatoes without skin; to remove it, throw them into the coals. If you do not have tomatoes, add some lemon juice, or orange, with a bit of pepper, salt, a little parsley; and when they are roasted, take out the sardines: serve the partridges, which will always keep the taste of the sardines.

4.4. France

In the mid 17th century Spain passed the culinary leadership to France whose cooks innovated by creating new recipes and techniques, setting the bases of a new culinary model, the so-called modern French classical or *haute cuisine*, that will become a model to be imitated across Europe and influencing strongly its culinary lifestyle until the first half of the Contemporary Age (Trubeck, 2000).

The first French recipe compendium that broke with many previous culinary habits was *Le Cuisinier François* [The French Cook] (1651) by François-Pierre de La Varenne, the first cookbook writer to achieve an international reputation. He was the most imitated and renowned chef during the reign of Louis XIV and beyond. The cookbook details rules and principles of cooking promoting the natural flavours of the ingredients by using fresh herbs and aromatics (mostly onions and mushrooms) rather than sugar, spices, and vinegar (Beaugé, 2012). The book also has traces of cookery from Italian Renaissance introduced by Catherine de Médicis³⁵ (for example, fostering the importance of vegetables like cauliflower and artichoke) as well as using foodstuffs from the New World (Snodgrass, 2004; Albala, 2013). The cookbook includes many fish dishes specially thought for meatless meal days authorized by the church. Such recipes include a wide variety of seafood and preparations revealing that marine produce transportation from Mediterranean and Atlantic coasts to Paris was very much improved,³⁶ safer and reliable (Pinkard, 2010). Seafood is cooked in ragout (oysters, lamprey, eel, fresh cod, ray fish, smelt, porpoise), roasted (oysters, flounder, plaice, shad, eel, mackerel, sardine, fresh cod), fritters/fried (oysters, mussels, flounder, eel, ray fish, tripe of cod, cuttlefish, desalted hake, sole, ray fish), roasted and farced (sturgeon, sole); in casserole (dab, flounder, plaice, turbot), stewed (shad, eel), with short broth (shad, lobster, prawns, fresh cod, dab, sturgeon, porpoise, shad), in sweet sauce³⁷ (lamprey), in white sauce³⁸ (lobster, prawns); pickled (tuna); salted (mackerel); in pie (eel, fresh cod, flounders), in pottage (smelt, mussels, flounders); or in jelly. A recipe for roasted and farced sole:

Dress them as they come out of the water and butter them, then put them on the gridiron, with a little farce, or with some salt, and a twinge of sage, or fine herbs. For to make your farce take sorrel,

³⁵ French professional cookery was brought to its height by Catherine de Médicis and Louis XIV.

³⁶ But not for Vattel, cook and master of ceremonies that killed himself with a sword it because the fish didn't arrive on time for a banquet celebrating the visit of King Louis XIV.

³⁷ Sauce elaborated with vinegar, sugar, two or three cloves, a little butter, and little salt.

³⁸ Sauce elaborated with butter, minced parsley, and a drop of verjuice; which being done, take three or four yolks of eggs with a little of nutmeg.

parsley, and raw yolks of eggs, mince and season all together with a twinge of thyme, then put it into your soles, and make a sauce with fresh butter, salt, vinegar, pepper, chive, and parsley, all passed in the pan, and the sauce very short, serve with a little nutmeg upon it.

Another important cookbook was *Le Cuisinier* [The Cook] (1655) by Pierre de Lune, chef of the Duc d'Orléans and friend of La Varenne. His recipes reveal the finest ingredients that could be purchased, which now meant elegance and sophistication rather abundance, or exoticness. He invented the *bouquet garni*, an aromatic vegetable and herb cluster wrapped in a gauze or confined in a porous container consisting of bay leaf, parsley, and thyme, but depending on the dish it could contain additional herbs (Snodgrass, 2004). The book is also rich in seafood recipes for Lent and fast days, most of them very similar to La Varenne's ones. Among the original ones are, for example, *andoüillettes*³⁹ *de poisson en potage*, *congres marinez* (marinated conger), or *mulets frits à l'anchois* (fried mullet with anchovies). For the latter:

Scale the mullets, fry them in refined butter, then put them in a dish with anchovies, capers, orange juice, nutmeg and a little of the same butter where they will have cooked, and rub the dish with a shallot. The mullets are a very delicate fish from the Mediterranean Sea.

François Massialot was the author of *Le Cuisinier Royal et Bourgeois* [The Royal and Middle-Class Cook] (1691), the most popular cookbook in the latter 17th century. He was the first cook in making a distinction between household cookery and *haute cuisine* (Trubeck, 2000). His cooking style stands out by concentrating flavours and reducing them to its own essence. However, there are also recipes elaborated with humble ingredients and simple cuts treated respectfully and cooked in ways that are straightforward (Albala, 2013). Again, some seafood recipes are quite similar to those by La Varenne, but there are interesting innovations especially with sole and turbot, that are used rather indistinctly: *au vin de Champagne*, *au coulis roux* (with red coulis), *aux concombres* (with cucumbers), *en Fricandeaux*, *farciés aux ecrevices* (stuffed with crayfish), *farciés à la sauce à l'anchois* (stuffed with anchovy sauce), *au fenouill* (with fennel), *aux fines herbes* (to the fine herbs), *aux coeurs de laitüès* (with lettuce hearts) or in *terrine*. Innovations in cooking also include adding a glass of white wine to fish stock. Oysters are also widely used in very different recipes (Massialot, 1693).

5. Contemporary age

5.1. France

This period starts with the French Revolution in 1789. At this time the European cuisine was (and up to first half of 20th century) led by French *haute cuisine*. Many professional chefs employed by wealthy aristocrats lost their jobs because his employers fled France or had their heads removed with a guillotine. These 'unemployed' chefs contributed definitively to the increase of new restaurants, an institution born in 1763 that became into an effective tool for the diffusion of culinary themes from the top to the bottom of society (i.e., democratizing the cuisine) (Beaugé, 2012; Del Moral, 2020).

The most important French chef ('celebrity') was Marie Antonin Carême (1783–1833), known as the 'cook of kings and king of cooks'⁴⁰. He was the founder of *La Grande Cuisine Française*, having established the supremacy of French cooking in Europe for the next 200 years. He was responsible for the evolution from the private kitchen of the wealthy before the Revolution to the modern public Parisian restoration (Rao

et al., 2003), from cookery art to science, and from the cooks' meritorious learning to a professional restaurateur career (Ferguson, 2003). In reference to fish, he never presented fish and meat on the same plate, and he used use fish to garnish fish. In his book *L'Art de la Cuisine Française* [Art of French Cooking] (1833) appears the fish recipe ('Lady Morgan English fish soup') created in honour of Lady Morgan (Baron the Rothschild's wife) the first time they meet, and whose main ingredients were: fish (turbot,⁴¹ sole, eel, anchovies, whitening, oysters and shrimps), vegetables (onion, carrot, celery, leek), lemon, spices (bay leaf, nutmeg, cayenne pepper, cloves, salt), mushrooms, truffles and champagne (Carême, 1833). But not always he seemed to be in favour of using too much spices and herbs in cooking fish (Segnit, 2010):

I have also removed from my cooking of fish those quantities of aromatics and spices that our forebears were wont to use for seasoning, for it is a strange delusion to believe that fish should taste of thyme, bay, mace, clove or pepper, whereas we have irrefutable evidence every day that fish cooked in salt water alone is excellent.

Another influential character in French gastronomy (and worldwide) was Jean Anthelme Brillat-Savarin (1755–1826). Lawyer, politician, *bon vivant*, gastronome and author of a celebrated work, *Physiologie du Goût* [The Physiology of Taste] (1825) the first book that philosophize and theorize about the value of food. In some aspects the book resembles lightly to *Deipnosophistae* by Athenaeus of Naucratis (see Ancient Age section). Together with Grimod de la Reynière⁴² (1758–1838), put in place the triangular system that is the basis of contemporary gastronomy; which brings together the chef, the critic (in the grand sense) and the eater through two mediators: the restaurant and the gastronomic discourse (Beaugé, 2012). Brillat-Savarin considered gastronomy not only as one of the fine arts but also a science supported by physics, chemistry, medicine and anatomy. Of course, quotes, anecdotes and meditation about seafood are also mentioned in his book such as (Brillat-Savarin, 1826):

Its [turbot] beauty has earned it the nickname the 'pheasant of the seas', while its majestic size and delicious flesh has earned it the title of the 'King of Lent'.

Another French celebrity chef was Auguste Escoffier (1846–1935) who made his fame in the restaurants of the finest luxury hotels in Europe, professionalized the kitchens adopting a 'Taylorist' approach (i. e., dividing tasks, specialization, pyramidal organization) as well as simplifying the menus (few ingredients and balanced, flavour against lavish decoration) (Beaugé, 2012). He wrote the authoritative book, *Le Guide Culinaire* [A Guide to Modern Cookery] (1903), that codified French cuisine and is still in use by chefs today. There are nearly 100 pages (out of 790) dedicated to an almost endless number of fish (freshwater and marine) and shellfish recipes (consommé, veloutés, soups, canapés, croquettes, *quenelle*,⁴³ soufflés, timbal, sauces, court-bouillon ...) grouped according to fish/shellfish type. For example, there are 104 recipes just for sole. Apart from recipes, Escoffier discusses the seven ways of cooking fish: boiling, frying, cooking in butter, poaching, braising, grilling and cooking au gratin. Each procedure is outlined in detail (Escoffier, 1903). For example, in the chapter 'The Theory of Fish Frying':

The ideal frying for fish (especially for small ones) is oil which reaches 290° without burning, while that of ordinary frying cannot exceed 180°. [...] Fish intended to be fried should first be soaked in

⁴¹ He called it 'Prince of the seas'.

⁴² One of the world's first food reviewers and restaurant critics. His monthly publication *L'Almanach des gourmands* in the early 1800's was a precursor of the Michelin Guide.

⁴³ Tender dumpling filled with ground meat, poultry, fish, or vegetables, seasoned and combined with breadcrumbs, eggs, fat, flour, or cream.

³⁹ A coarse-grained little sausage containing pepper, wine, onions and seasonings.

⁴⁰ He served as chef to Prime Minister Talleyrand, Baron Rothschild, Emperor Alexander of Russia, and King George IV.

salted milk, then rolled in flour. It results into a crispy and golden envelope which traps the aromatic vapors formed during the cooking of the fish. [...]. The temperature of the frying must always be in proportion to the size of the fish [...]. The amount of frying is subordinate to the quantity or volume of the fish. In any case, it must be abundant enough for the fish to float freely on oil. The care of decanting and frying after each service should not be neglected, because the flour which detaches from the fish, forms a residue which would cause the oil to burn and render it unusable. [...]. Fried fish are always accompanied by fried parsley and fluted lemons. They must be sponged and salted when removing the frying, then drained up on a napkin or absorbent paper.

Prosper Montagné (1865–1948) chef of *The Grand Hotel* (Montecarlo) is considered, along Carême and Escoffier one of the pillars of the French Contemporary gastronomy. He was also a tireless speaker and fruitful writer, author of the first edition of the *Larousse Gastronomique* (1938) that covers from humble to haute cuisine including more than 500 fish and seafood dishes.

A breaking point in French cooking style, with great repercussion on Western cuisines too, was the rising of the *nouvelle cuisine*. It was born in mid 1970's led by chefs like Paul Bocuse, Alain Chapel, Jean and Pierre Troisgros and Michel Guérard, although the idea was already conceived and defended earlier by chefs like Ferdinand Point⁴⁴ (1897–1955) and influential gastronomic critics such as Curnonsky⁴⁵ (1872–1956) who was very much in favour of the simplicity in cooking (“make food simple and things taste of what they are”). Therefore, *nouvelle cuisine* was basically aimed to encourage a simpler and more natural presentation of food taking into account aspects related with medicine and dietetics (Byrd and Dunn, 2020). Some of the ten commandments of this cuisine designed by the restaurant critics Gault and Millau (Willan, 1979) were not so new (e. g., seafood must be fresh, in season and not overcooked) since they remind a lot to the Archestratus' ‘gastronomic discourse’ many centuries ago in Ancient Greece (see Ancient Age). *Nouvelle cuisine* use innovative technics and approaches. For example, new cuts⁴⁶ (i.e., carpaccio or *gigots*) for fish and seafood are used instead of traditional transversal slices; shallow fried fish is not passed through flour prior to cooking; it is common to use low priced fish (‘to be innovative’); fish and fish sauces are never cooked until required; or dishes with antagonist ingredients like land and sea (meat and fish) are usual (Del Moral, 2020). In addition, traditional Mediterranean and eastern recipes (risotto, tajin, sashimi, etc.) are incorporated into *nouvelle cuisine*, as well as the introduction of fusion cuisine for the first time in history (Poulain, 2005).

5.2. Italy

Italian (and Spanish) cuisines, from 18th to mid 20th century, were nowhere near the level of France. Ippolito Cavalcanti (1787–1859), Duke of Buonvicino, was a premier food author who wrote *La Cucina Teorico-Pratica* [The Theoretical and Practical Kitchen] (1837). The book is a compendium of traditional Neapolitan cuisine with some French-inspired recipes, where the use of fish and shellfish is prominent (Snodgrass, 2004). He presents 25 menus all containing seafood, eggs and vegetables. Among the fish dishes are broths, soups, pasta with fish and shellfish, fish balls, fried codfish, etc. (Cavalcanti, 1837). Another prominent Italian culinary writer (and business man) was Pellegrino Artusi (1820–1911), considered the father of the Italian contemporary cuisine (Capatti and

Massimo, 2002). His book *La Scienza in Cucina e L'Arte di Mangiar Bene* [The Science of Cookery and the Art of Eating Well] (1891) included recipes from all over Italy, enhancing the national culinary tradition and placing emphasis on home cooking. Many of the 790 recipes uses unexpensive seafood such as *baccala in gratella* (grilled salt cod), *acciuغه alla marinara* (anchovies marinara, dressed only with garlic, parsley, salt, pepper and oil) or *sarde ripiene* (stuffed sardines with breadcrumbs, eggs, oregano and garlic), *spaghetti col sugo di sepie* (in cuttlefish sauce), *spaghetti colle telline* (with clams), *rotelle di palombo in salsa* (dogfish rounds in sauce), *cacciucco* (fish stew) and many more (Artusi, 2017).

5.3. Spain

The most important Spanish cookbook of this period was probably *El Practicón* (1894) by the writer and epicurean Ángel Muro (1839–1897). This 1000-pages book was a ‘bestseller’ with 34 editions between 1894 and 1928 and reedited again in the 1980's. Recipes are thought for a household cuisine, with unexpensive ingredients (but not always), taking into account seasonality of the produces and trying to reuse the kitchen leftovers as much as possible (Muro, 1894):

Many fish have their season, like fruit. Herring, sardine and whiting are not acceptable at the opulent tables during the time when they are plentifully. They are despised for their cheapness, and in my judgment, with damage, because that is precisely when they have the best quality.

The book contains nearly 100 recipes for 29 different marine fish (fried, stewed, boiled ...) such as the interesting Valencian-style *mero con alcaparras y almendras* (dusky grouper in capper and almond sauce), or *bacalao con miel o azúcar* (cod with honey or sugar) or *hígado de raya* (ray fish liver). Beside fish, there are many recipes on shellfish (crabs, prawns, shrimps, spiny lobster,⁴⁷ clams, limpets, scallops, date shells, periwinkles, purple dye murex, oysters, squid and sea urchins). The book contains many advices about how to deal with the ingredients as well as how to eat them (Muro, 1894):

The prawns in vinaigrette are very good, but the good eater peels the tail, sprinkle it with salt and pepper, eat it, then suck and squash the shells with his teeth.

Traditional seafood recipes are also given in *La Cocina Española Moderna* [Modern Spanish Cooking] (1917) by Emilia Pardo Bazán (1851–1921), a cookbook that became very popular in household kitchen. In the chapter dedicated to seafood she writes (Pardo, 1917):

The wealth of the Spanish coasts would make this section endless, and it is necessary to limit it, also leaving it to the intelligence of those who read to understand that most of the stews of a white fish are applicable to another white fish, and that most they are cooked, fried and roasted in the same way. I just want to remember that seafood has to be very fresh, and that hackneyed fish cannot be presented to anyone.

The 21st century opens with a new world gastronomic revolution starring the elBulli restaurant and which will be known as avant-garde cuisine, techno-emotional cuisine or molecular cuisine. This new movement was enshrined on the cover of NYT Magazine in 2003 with the headline “The new *nouvelle cuisine*. How Spain became the new France” and illustrated with a photo of Ferran Adrià (Lubow, 2003). This movement will prioritize fish over other proteins and will have a great influence on Mediterranean species, especially in sardines and mackerel (with iconic dishes like *teriyaki de ventresca de caballa* or mackerel's belly teriyaki). Adrià himself read the 23-point manifesto of this movement at the IV Madrid Fusión Congress in 2006. In point 4, the use of seafood

⁴⁴ He trained many master chefs such as Bocuse, Chapel and Troisgros.

⁴⁵ Known as the ‘Prince of the gastronomes’.

⁴⁶ Some chefs like Bocuse traveled to Japan because they were influenced by the way fish was filleted and cooked there. Small portions and minimalist presentations inspired by Japanese cuisine also become central features of *nouvelle cuisine* (Byrd and Dunn, 2020).

⁴⁷ One of the recipes is lobster with dark chocolate in sherry wine sauce.



Fig. 3. Sardine (and cephalopods) skewers (*espetos de sardinas y calamares*) are one of the most demanded culinary specialties in beach bars (*chiringuitos*) and restaurants along the coast of Málaga (Southern Spain). They are a sign of cultural identity and have been declared by UNESCO as Intangible Cultural Heritage of Humanity in 2020. Photo by José Lucas Pérez-Lloréns.

was highlighted (Villegas, 2014). This bet had already been included in the manifesto of the previous Spanish movement, called New Basque Cuisine, read by Pedro Subijana in 1976 and among whose demands was the search for new culinary ingredients such as seaweeds (García, 2017).

5.4. Eating out in the 21st century

Seafood can be enjoyed, apart from home, in many places along the Mediterranean: from humble *chiringuitos*⁴⁸ on the beach (Fig. 3) to the finest-dining restaurants. Table 4 lists some of the most traditional/popular dishes (besides the fried or grilled fish that are the most common forms of consumption) in the main Mediterranean cuisines. Most of them share similar origins: dishes prepared by fishermen and/or humble people using no commercial fishes or scraps and easily available and unexpensive ingredients. Whereas some dishes are much typical of certain cuisines revealing ancestral (and little unchanged) culinary habits, others are somewhat similar from place to place, because the historic cultural exchanges ('culinary fusion') among different Mediterranean peoples and the gradual incorporation of what were new ingredients brought from far away (e.g., tomatoes, potatoes, pepper, etc.) (Essid, 2012).

High-end restaurants, run by celebrated chefs, are at the opposite end of the gastronomic spectrum. In many of them seafood becomes an important part of the menu. That is the case, for example, of Vague d'Or (St Tropez, FR), Le Petit Nice (Marseille, FR), Auberge des Vieux Puits (Toulouse, FR), La Madia (Licata, IT), Madonna del Pescatore (Ancona, IT), Spondi (Athens, EL), Funky Gourmet (Athens, EL), Varoulko Seaside (Athens, EL), Nur⁴⁹ (Fez, MA), Miramar (Llançà, ES), Quique Dacosta Restaurant (Denia, ES) or Aponiente (Cádiz, ES). The latter restaurant is owned by Ángel León (alias the Chef of the Sea), currently acclaimed as one the most revolutionary and innovative Spanish chefs. He can be considered as a locavore chef since his creations are based 100% on marine produce from the nearby waters characterized by their huge biodiversity. His culinary and radical concept is

⁴⁸ Temporary open-air bar and snack bar, typical from Costa del Sol (Andalusia, Spain), usually found on the beach in the holiday season. They use to serve mostly fresh seafood caught just few hours ago.

⁴⁹ Owned by a woman chef Najat Kaanache, it is considered the best African restaurant.

Table 4
Some typical/popular seafood dishes in the main Mediterranean cuisines.

Cuisine	Dish	Ingredients
Balkans	Na buzaru-style shellfish (Croatia)	Prawns, clams or mussels steamed in olive oil, white wine and garlic sauce, thickened with bread crumbs and flavored with parsley
Egyptian	<i>Sayadeya</i>	Yellow rice, spices, onions, tomato sauce, and white fish. The combination is then baked in traditional earthenware pots. It is recommended to serve it with a tahini-based sauce
	<i>Smak mashwi</i>	Whole baked fish generously garnished with parsley, lemon slices, mayonnaise, pickles, and sliced olives. It is typically seasoned with salt and olive oil
	<i>Feshik</i>	Dried, fermented and salted gray mullet. It is served with chopped onions, lemon wedges, and bread
French	Bouillabaisse (Marseille)	Fish soup (scorpionfish, red mullet, skate, eel, John Dory, lobster, etc.) with potatoes, tomatoes, garlic, onions, olive oil, spices (cloves, saffron, Cayenne pepper) and <i>bouquet garni</i> (fresh herbs including fennel). The soup is then strained and served with rouille, a classic Provençal spicy sauce which is spread on thick slices of country bread and floated on the bouillabaisse when served
	<i>Salade niçoise</i>	Lettuce, fresh tomatoes, boiled eggs, tuna, green beans, Cailletier olives, and anchovies
	<i>Octopus stew with eggplants, potatoes, onions, red wine, olive oil and spices (bay leaves, pepper)</i>	
Greek	<i>Htapodi me melitzanes</i>	Sea squirts marinated in seawater with olive oil. Typically served on barley rusks drizzled with lemon
	<i>Spinialo</i>	Sautéed shrimps deglazed with the anise-flavored ouzo, then doused in a rich tomato sauce, and finally topped with crumbled feta cheese
	<i>Garides saganaki</i>	Pasta, clams, garlic, parsley and olive oil
Italian	<i>Spagetti vongole</i> (Napples)	Fish stew consisting in five different seafood types, tomatoes, garlic, white wine, chili peppers, and fresh herbs. It's always ladled on top of a toasted slice of garlic-rubbed bread
	<i>Cacciucco</i> (Tuscany)	Stuffed squid with garlic, breadcrumbs, capers, pine nuts, parsley, and onions. They are often paired with tomato sauce, sometimes with the addition of anchovies, and the whole concoction is then baked in an oven until tender
	<i>Calamari ripieni</i>	Minced fish with coriander, dried peppers, onion, black pepper, and salt. It is usually shaped into patties, balls or cigar-like shapes and cooked in a tomato stew with chickpeas or white beans
Levantine	<i>Fish kofta</i>	Fish (haddock or cod) and rice seasoned with a mixture of spices (caraway, cinnamon, cumin and coriander). It is garnished with slivered almonds and toasted pine nuts
	<i>Sayadieh</i> (Lebanon)	Fish cooked in tomato sauce spiced with caraway and hot paprika. Typical meal of North-African Jews served at Shabbat, Passover and Rosh Hashanah
	<i>H'raime</i> (Israel)	Shrimps baked in a stew (in a clay-pot) with olive oil, garlic, hot peppers, and tomatoes
Maghrebi	<i>Zibdieh</i> (Palestina)	Slow cooked fish stew with potatoes, tomatoes and pepper in an earthenware pot (<i>tagine</i>). <i>Chermoulas</i> ⁵ are often used as seasoning
	<i>Tagine</i> (Morocco)	Rice cooked in a broth made from fish heads, roasted coriander seeds, onions, tomatoes, celery and seasonings (parsley, chile peppers, garlic, ginger, cumin, paprika, and black pepper). It is served with grilled, baked, or fried white fish fillets which were previously
	<i>Ruz hoot bil kusbur</i> (Libya)	

(continued on next page)

Table 4 (continued)

Cuisine	Dish	Ingredients
Ottoman	<i>Buğulama</i> (Turkey)	marinated in a combination of garlic, cumin, hot peppers, and lemon juice Fish with lemon and parsley, covered while cooking to be done with the steam
	<i>Pazıda Levrek</i> (Turkey)	Sea bass cooked in chard leaves
	<i>Stiffado</i> (Cyprus)	Octopus/squid/cuttlefish stew with red wine, carrots, tomatoes, and onions
Spanish	<i>Suquet de peix</i> (Catalonia)	Seafood stew with potatoes, white wine, and fish stock, flavored with paprika and saffron. <i>Picada</i> ^b is usually added and served with garlic-rubbed bread on the side
	<i>All i pebre</i> (Valencia)	It means garlic and pepper referring to the sauce, a key component of the stew that also contains eels and potatoes (or bread crumbs)
	<i>Fideuá</i> (Valencia)	Similar to paella, but instead of rice it combines seafood (e.g., cuttlefish, monkfish, and shrimps) with a thin, short and hollow pasta called <i>fideo</i> . Smashed garlic and parsley are also added. Some people prefer to pair it with an aromatic aioli sauce
	<i>Arròs negre</i> (Valencia)	It is a kind of black rice paella with seafood (squid, cuttlefish, tuna, prawns, etc.) and cuttlefish ink (which adds the color)
	<i>Espeto</i> (Andalusia)	Sardines (or also squids) placed on a skewer, seasoned with sea salt, and grilled over the open flames of an olive wood fire. Once the sardines are fully cooked and become golden on the outside, they are drizzled with olive oil and lemon juice
	<i>Adobo</i> (Andalusia)	Firm fresh fish (conger, moray eel, dogfish) marinated in a mixture of lemon juice, bay leaves, oregano, hot and sweet paprika, salt and pepper. Once marinated, fish is strained, coated with chickpea flour and fried until golden

^a Maghrebi marinade that combines fresh herbs (cilantro and parsley), spices (sweet paprika, cumin, garlic, and sometimes turmeric), lemon juice (or vinegar) and olive oil.

^b A classic Catalan sauce traditionally made with a mortar and pestle – prepared with a combination of garlic, chili powder, roasted nuts (almonds, hazelnuts), and fried bread.

‘to cook the sea’, transforming marine species, mostly fish discards or fish parts (ignored by other cooks, such as fat, scales, skin, bones, blood or vitreous humour) and ingredients that no one considers food (e.g., plankton), into culinary masterpieces full of flavour and textures such as stuffed marine charcuterie (*embutido*), marine cheeses, fish skin, or scales, etc. It is not really a completely new ‘cooking approach’, since from Ancient Greece unwanted fish catches, unexpensive fishes and discards were staple and unexpensive foods for humble people, but it is currently rather unknown by many diners (even by some gastronomic critics and journalists) (Pérez-Lloréns, 2019a; Gouldwing, 2021). Besides its huge gastronomic potential, his cuisine is a way to avoid food waste (the same concerns that, for example, Modern Age cooks like Hernández Maceras or Juan Altamiras had) in an effort to help foster more sustainable seafood exploitation, in agreement with the movement initiated previously by the American author Paul Greenberg in his book *Four Fish* (Greenberg, 2010) and the American chef Dan Barber in *The Third Plate* (Barber, 2014). Of course, the Aponiente’s gastronomic discourse has been largely possible because of the fruitful collaboration between cuisine and science, especially with the contributions of the nearby University of Cádiz (Pérez-Lloréns, 2019a; Agrafojo, 2021).

5.5. Novel ingredients in Mediterranean seafood cuisine

Seafood is not only restricted to ‘animal’ ingredients (i.e., fish and shellfish). Seafood refers also to any form of sea life regarded as food by humans, including mammals (see Medieval and Modern Ages section)

and sea plants like seaweeds, microalgae and seagrasses. In contrast to most Asian countries, ‘sea vegs’ have not been part of the Western culinary habits until recently, especially in the Mediterranean (Mouritsen et al., 2018, 2019; Pérez-Lloréns et al., 2018; Pérez-Lloréns, 2020). It could be probably because of the influence of the Graeco-Roman socio-cultural attitudes that did not consider seaweeds edible, certainly not by civilized peoples (O’Connor, 2013). Seaweeds were trash forms of marine life having little value: *et genus et virtus, nisi cum re, vilior algâ est* (high birth and meritorious deeds, if not linked to wealth, are as useless as seaweed) (Satires II, v8 by Horace, 65 BCE) or *refunditur algâ* (the sea detests seaweeds and casts them ashore) (anonymous) (Pérez-Lloréns et al., 2018). Fortunately, this situation rapidly changed since mid 2000’s, partly because some Western chefs were becoming increasingly interested in novel uses of marine foodstuff, often in collaboration with culinary scientists, and partly because of the globally growing locavore movement focused on the use of local food ingredients (Mouritsen, 2013). In Mediterranean Europe the use of fresh seaweeds as an ingredient (the so called phycogastronomy) was mostly introduced by the celebrity chef Ferran Adrià (in his iconic dish ‘razorshell with the seaweed pepper dulce’) and embraced quickly for many other younger Michelin starred chefs such as Ángel León (Aponiente) (Mouritsen et al., 2019). Fortunately, phycogastronomy in the Mediterranean is permeating little by little from high end restaurants to other casual or mid-range restaurants and also to home cuisine (Mouritsen et al., 2019; Palmieri and Forleo, 2020; Figueroa et al., 2021; Moreira Leite et al., 2021).

The magazine Time published, in an 11-page report, the ultimate marine ingredient brought by chef Ángel León to the fine dining culinary universe: the ‘sea rice’ (Gouldwing, 2021). It is, in fact, the seed of the seagrass *Zostera marina* (eelgrass). Although it was already used by Seri Indians⁵⁰ from the Gulf of California to obtain flour to make a kind of gruel (*atole*) or bread since ancestral times (Felger and Moser 1973), it seems that the use of the whole grain (as a ‘rice’) would be pioneering (Fig. 4). In his quest for new sea ingredients, Ángel León contacted researchers of the University of Cádiz (another example of collaborative work between cooks and scientists, that sometimes is not properly acknowledged) who achieved the successful domestication of eelgrass in nearby earthponds. Currently, although there is no seed production in plants grown at Cádiz Bay to meet culinary demand, it will undoubtedly be a featured ingredient to be considered in the future (Agrafojo, 2021; Vera, 2021).

In conclusion, Mediterranean Sea has been a natural and almost unlimited pantry where all nearby civilizations fished and traded with sea produce since the very early beginning. Although fish and selfish has been part of dietary habits of both, humble and wealthy people, certain species and their way of consumption has been used as a social marker of upper classes since the antiquity. Myths, religious rites and cultural exchanges between peoples and civilizations have shaped the Mediterranean culinary traditions along the history. These are recorded in many sources: from Yale tables, through Greek comedies, to the most contemporary culinary literature texts or cookbooks. Moreover, beyond fish and shellfish, seaweeds (and microalgae) are increasingly on the rise in the Mediterranean cuisine as a ‘new’ marine produce. Awareness of such amazing and rich culinary heritage should be key for contemporary chefs, especially as a driver for creation and gastronomic innovation.

Implications for gastronomy

This paper gives an in-depth perspective of seafood in the eating habitats of the Mediterranean people both, wealthy a humble from ancient civilizations to the contemporary avant-garde restaurants.

⁵⁰ The seed is known by Seri people as *xnoois* (sea wheat). In the Seri calendar, the month of April is called *xnoois ihaat iizax*, which means ‘moon, when the sea wheat matures’ (Felger and Moser 1973).

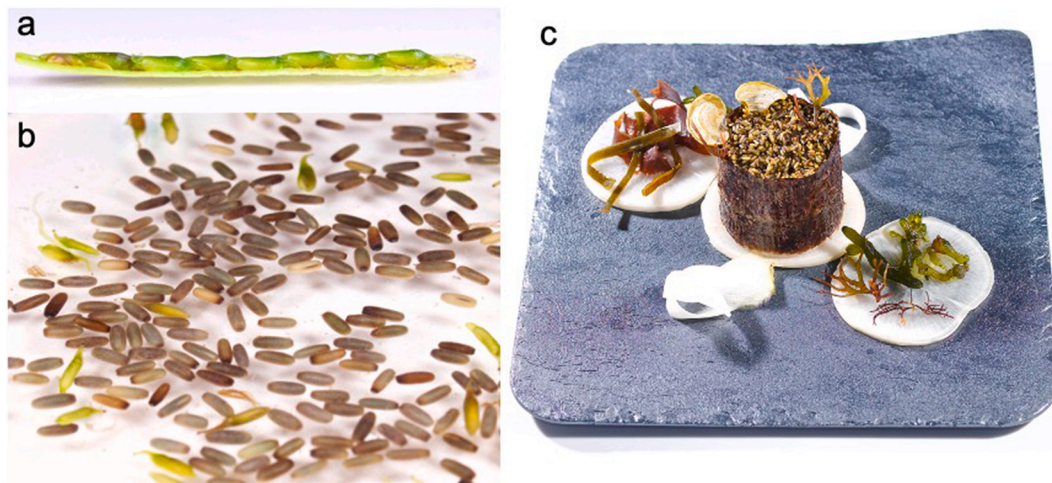


Fig. 4. ‘Sea rice’ (seeds of the seagrass *Zostera marina* or eelgrass). (a) detail of the spike showing unmaturing seeds; (b) mature seeds; (c) Kaiseki-style inspired salad dish, with a makizushi elaborated with eelgrass seeds (instead of japonica rice), garnished with an assortment of pickled seaweeds on daikon disks (dish by José Lucas Pérez-Lloréns). Photo by Fernando G. Brun.

Seafood recipes and anecdotes of the main literary sources and cookbooks are reviewed. Part of this information is almost unknown by many contemporary chefs, students and costumers. Therefore, it is important to be aware of our rich Mediterranean culinary legacy since as Ferran Adrià’s states in his interesting project ‘elBulli1846’: “when you understand the history of your profession you will be more efficient creating”. Knowing the history behind a dish is a non-sensory contextual factor that clearly enrich the gastronomic experience.

Author contributions

José Lucas Pérez-Lloréns: Conceptualisation, bibliographic investigation, writing and editing. Yanet Acosta: bibliographic investigation, writing, raueviewing. Fernando G. Brun: bibliographic investigation, reviewing, graphical work.

Declaration of competing interest

None.

References

- Adams, F., 1844. *Aegineta, P. The seven books of Paulus Aegineta*. trans, I. Sydenham Society, London.
- Adamson, M.W., 2004. *Food in Medieval Times*. Greenwood Press, London.
- Agrafojo, N., 2021. La ciencia y la Universidad al servicio de la gastronomía. https://www.lavozdigital.es/cadiz/lvdi-ciencia-y-universidad-servicio-gastronomia-202102110714_noticia.html/. (Accessed 22 April 2021). accessed.
- Albala, K., 1998. Fish in Renaissance dietary theory. In: Walker, H. (Ed.), *Fish: Food from the Waters*. Prospect Books, Devon, pp. 9–19.
- Albala, K., 2013. *Food: A Cultural Culinary History*. Published by The Great Courses, Virginia.
- Alcock, J.P., 2005. *Food in the Ancient World*. Greenwood Press, London.
- Allen, R.W., Albala, K., 2003. *Food in Early Modern Europe*. Greenwood Publishing Group, Connecticut.
- Andrews, A.C., 1948. The use of rue as a spice by the Greek and Romans. *Classical J.* 43, 371–373.
- Artusi, P., 2017. *La scienza in cucina e l’arte di mangiar bene*. Giunti Editore, Firenze.
- Audisio, G., 1935. *Jeunesse de la Méditerranée*. Gallimard, Paris.
- Ayodeji, K., 2009. Maritime identities. In: Boys-Stones, G., Graziosi, B., Vasunia, P. (Eds.), *The Oxford Handbook of Hellenic Studies*. Oxford University Press, New York, pp. 340–351.
- Baldwin, B., 1976. Athenaeus and his work. *Acta Class.* 19, 21–42.
- Martino (1465) Ballerini, L., 2005. In: *The Art of Cooking: the First Modern Cookery Book*. University of California Press, California.
- Barber, D., 2014. *The Third Plate: Field Notes on the Future of Food*. Penguin PR, Derby.
- Batten, A.J., 2017. Fish tales. *Biblic. Theol. Bull.* 47, 5–14. <https://doi.org/10.1177/0146107916682196>.
- Beaugé, B., 2012. On the idea of novelty in cuisine. A brief historical insight. *International journal of Gastronomy and Food Science* 1, 5–14. <https://doi.org/10.1016/j.ijgfs.2011.11.007>.
- Benton, A.A., 1894. *The classical cook*. *Sewanee Rev.* 2, 413–424.
- Berg, D., 1996. The mystery gourmet of Horace’s “Satyres 2”. *Classical J.* 91, 141–151.
- Blümner, H., 1893. *The Home Life of the Ancient Greeks*. Cassell Co. Ltd., London.
- Brewer, D.J., Friedman, R.F., 1989. *Fish and Fishing in Ancient Egypt*. American University in Cairo Press, Cairo.
- Bostock, J., Riley, H.T., 1857. *Pliny the Elder. Natural History. Books 8–1*. Bohn, H.G. Publisher, London (trans.).
- Bottéro, J., 1987. The culinary tables at Yale. *J. Am. Orient. Soc.* 107, 11–19. <https://doi.org/10.2307/602948>.
- Bottéro, J., 2004. *The oldest cuisine in the world. Cooking in Mesopotamia*. The University of Chicago Press, Chicago.
- Brillat-Savarin, J.A., 1826. *Physiologie du Goût. A Sautelet*, Paris.
- Byrd, M., Dunn, J.P., 2020. *Cooking through History: A Worldwide Encyclopedia of Food with Menus and Recipes*. ABC-CLIO, California.
- Cantera, E., 2003. La carne y el pescado en el sistema alimentario judío en la España medieval. *Espacio, Tiempo y Forma, Serie III, H- Medieval*, 16: 13–51. <https://doi.org/10.5944/etfiii.16.2003.3689>.
- Capatti, A., Massimo, M., 2002. *La Cuisine italienne/Histoire D’une Culture*. Seuil, Paris.
- Carême, M.A., 1833. *L’Art de la Cuisine Française*. Adamant Media Corporation, Massachusetts.
- Cavalcanti, I., 1837. *La Cucina Teorico-Pratica*. Luigi Marotta, Naples.
- Ceron, A., 2017. A humanist in the kitchen. *Platina’s De Honesta Voluptate et Valetudine*. *Doctor Virtualis* 13. <https://doi.org/10.13130/2035-7362/6835>.
- P. Chabrera. 2014(trans.). Nola, R. (1520 *Libre del Coch*. Edicions de la Convivència, Vila-real.
- Chowanek, R., 2020. Are you eating all this, mister Marcus? Towards a study of ancient Sicilian food products and diet. In: Jakubiak, K., Lajtar, A. (Eds.), *Ex Oriente Lux Studies in Honour of Jolanta Mlynarczyk*. Warsaw University, pp. 401–410.
- Civitello, L., 2008. *Cuisine and Culture. A History of Food and People*. Wiley, New Jersey.
- Coll, M., Piroddi, C., Steenbeek, J., et al., 2010. The biodiversity of the Mediterranean Sea: estimates, patterns and threats. *PLoS One* 5 (8), e11842. <https://doi.org/10.1371/journal.pone.0011842>.
- Curtis, R.I., 1991. *Garum and Salsamenta: Production and Commerce in Materia Medica*. Brill, Leiden.
- Dalby, A., 2003. *The Tastes of Byzantium*. Tauris, I.B., London.
- D’Arcy Thompson, W., 1947. *A Glossary of Greek Fishes*. Oxford University Press, Oxford.
- Davies, R.W., 1971. The Roman military diet. *Britannia* 2, 122–142.
- D’Elia, A.F., 2008. *Platina, B. Lives of the Popes*. Harvard University Press, Harvard (trans.).
- Del Moral, R.G., 2020. Gastronomic paradigms in contemporary western cuisine: from French haute cuisine to mass media gastronomy. *Frontiers in Nutrition* 6, 00192. <https://doi.org/10.3389/fnut.2019.00192>.
- Déry, C.A., 1998. Fish as food and symbol in ancient Rome. In: Walker, H. (Ed.), *Fish: Food from the Waters*. Prospect Books, Devon, pp. 94–115.
- Donahue, F.J., 2014. *Food and Drink in Antiquity*. Bloomsbury Publishing, London.
- Donaldson, J.W., 1860. *The Theatre of the Greeks: A Treatise on the History and Exhibition of the Greek Drama*. Longman, London.
- Escoffier, A., 1903. *A Guide to Modern Cookery*. Groupe Flammarion, Paris.
- Essid, M.Y., CIHEAM, 2012. History of the mediterranean food. In: *MediTERRA 2012. The Mediterranean Diet for Sustainable Regional Development*. Presses de Sciences Po, Paris, pp. 51–69.

- Felger, R., Moser, M.B., 1973. Eelgrass (*Zostera marina* L.) in the Gulf of California: discovery of its nutritional value by the Seri Indians. *Science* 181, 355–356.
- Ferguson, P.P., 2003. Writing out of the kitchen: Carême and the invention of French Cuisine. *Gastronomia* 3, 40–51. <https://doi.org/10.1525/gfc.2003.3.3.40>.
- Figueroa, V., Farfán, M., Aguilera, J.M., 2021. Seaweeds as novel foods and source of culinary flavours. *Food Rev. Int.*, 1892749 <https://doi.org/10.1080/87559129.2021.1892749>.
- García, P., 2017. Los Grandes Pioneros. <https://www.degustalarloja.com/noticias/201705/20/grandes-pioneros-20170520012204-v.html?ref=https%3A%2F%2Fwww.google.com>. (Accessed 25 May 2021). accessed.
- García-Castellanos, D., Micallef, A., Estrada, F., Camerlenghi, A., Ercilla, E., Perriñez, R., Abril, J.M., 2020. The Zanclean megaflood of the Mediterranean-Searching for independent evidence. *Earth Sci. Rev.* 201 <https://doi.org/10.1016/j.earscirev.2019.103061>.
- García-Soler, M.J., 2011. La gastronomía en la antigua Grecia a través de su literatura. In: Ibeas, J.M. (Ed.), *El Imaginario de la Alimentación en Europa*. Gastronomía y Literatura. Universidad del País Vasco, pp. 105–132.
- García Vargas, E., Bernal Casasola, D., Palacios Macías, V., Roldán Gómez, A.M., Rodríguez Alcántara, A., Sánchez García, J., 2014. *Confectio Gari Pompeiani*. Procedimiento experimental para la elaboración de salsas de pescado romanas. *SPAL - Revista de Prehistoria y Arqueología* 23, 65–82.
- Gillis, F., 2020. Ancient Foodies: Modern Misconceptions, Alternative Uses, and Recipes for Food in Ancient Rome. *Classics Honors Projects*, vol. 26. https://digitalcommons.maclester.edu/classics_honors/26. (Accessed 15 March 2021). accessed.
- Gosse, P.H., 1847. The Monuments of Ancient Egypt, and Their Relation to the Word of God. The society for promoting Christian knowledge, London.
- Grainger, S., 2014. *Garum, liquamen and muria: a new approach to the problem of definition*. In: Botte, E., Leitch, V. (Eds.), *Fish and Ships: Production et Commerce de salsamenta Durant l'Antiquité*. Publications du Centre Camille Jullian, Aix-en-Provence, pp. 37–45.
- Grainger, S., 2018. *Garum and liquamen*, what's in a name? *J. Marit. Archaeol.* 13, 247–261. <https://doi.org/10.1007/s11457-018-9211-5>.
- Granja Santamaría, F., 1960. *La cocina Arábigoandaluza según un manuscrito inédito*. PhD Tesis, Madrid.
- Greco, G.L., Rose, C.M., 2014. (trans.). *Anonymous. The Good Wife's Guide (Le Ménager de Paris)*. Cornell University Press, New York.
- Greenberg, P., 2010. *Four Fish: the Future of the Last Wild Food*. Penguin PR, Derby.
- Goulding, M., 2021. Seeding the Ocean: inside a Michelin-Starred Chef's Revolutionary Quest to Harvest Rice from the Sea. <https://time.com/5926780/chef-angel-leon-sea-rice/>. (Accessed 12 February 2021). accessed.
- Haussig, H.W., 1971. *A History of Byzantine Civilization*. Praeger, New York.
- Hill, S., Wilkins, J., 1996. Mithaikos and other Greek cooks. In: Walker, H. (Ed.), *Cooks & Other People*. Proceedings of the Oxford Symposium on Food and Cookery 1995, pp. 144–148. Devon.
- Keimer, L., 1939. *La Boutargue Dans L'Égypte Ancienne*. Cairo Imprimerie de l'Institut Français, Cairo.
- Kosta-Théfaïne, J.-F., 2014. *Anonymous. Le Recueil de Riom*. Editions Paléo. trans.. Clermont-Ferrand.
- Koutrakis, E.T., 2018. Post-script: Throug the eyes of a biologist or how the past can guide us to the future - thoughts on the management of fisheries in the Mediterranean. *J. Marit. Archaeol.* 13, 491–497. <https://doi.org/10.1007/s11457-018-9206-2>.
- Lambert, C., 1997. *La cuisine occitane à partir d'un réceptaire culinaire languedocien et de sources annexes*. Archeol. Midi Mediev. 15–16, 295–305.
- Lion, B., 2015. Mesopotamia. In: Wilkins, J.A., Nadeau, R. (Eds.), *A Companion to Food in the Ancient World*. Wiley Blackwell, Oxford, pp. 309–318.
- Lopes, M.H.T., 2010. *The Mediterranean Sea: the language of history*. Cah. Méditerranée 80, 11–16.
- Lovano, M., 2019. *The World of Ancient Greece*. ABC-Clío, California.
- Lubow, A., 2003. *A Laboratory of Taste*. <https://www.nytimes.com/2003/08/10/magazine/a-laboratory-of-taste.html>. (Accessed 30 May 2021). accessed.
- Lytle, E., 2018. The economics of saltfish production in the Aegean during the Classical and Hellenistic periods. *J. Marit. Archaeol.* 13, 407–418. <https://doi.org/10.1007/s11457-018-9207-1>.
- Macías, U., 2003. *La Cocina Judía: Leyes, Costumbres Y Algunas Recetas Sefardíes*. Red de Juderías de España, Córdoba.
- Mair, A.W., 1928. *Oppian. Halieutica*. Heinemann. trans. W. Publisher, London.
- Martinelli, C., 2003. *Libro Per Cuoco*. https://italophiles.com/ancient_cookbooks.htm. (Accessed 18 February 2021). accessed.
- Martinelli, C., 2012. *The Anonymous Andalusian Cookbook*. CreateSpace Independent Publishing Platform, California.
- Martínez-Montaña, F., 1778. *Arte de Cocina, Pastelería, Vizcochería, y Conservería*, 13 Ed. Imprenta de Pantaleón Aznar, Madrid.
- Marzano, A., 2013. *Harvesting the Sea: the Exploitation of Marine Resources in the Roman Mediterranean*. Oxford University Press, Oxford.
- Marzano, A., 2018a. Fish and fishing in the Roman world. *J. Marit. Archaeol.* 13, 437–447. <https://doi.org/10.1007/s11457-018-9195-1>.
- Marzano, A., 2018b. Fish and seafood. In: Erdkamp, P., Holleran, C. (Eds.), *The Routledge Handbook of Diet and Nutrition in the Roman World*. Routledge, London, pp. 163–174.
- Massialot, F., 1693. *Le Cuisinier Royal et Bourgeois*. Chez Charles de Sercy, Paris.
- Mehdawy, M., Hussein, A., 2010. *The Pharaoh's Kitchen. Recipes from Ancient Egypt's Enduring Food Traditions*. The American University in Cairo Press, Cairo.
- Messisbugo, C., 1549. *Banchetti Compositioni di Vivande, et Apparochio Generale*. Giouanni de Bughat et Antonio Hucher Compagni, Ferrara.
- Möhren, F., 2016. *Il Libro de la Cocina*. Heidelberg University Publishing, Heidelberg.
- Mombiela, F., CIEAM, 2012. Introduction. In: *MediTERRA 2012. The Mediterranean Diet for Sustainable Regional Development*. Presses de Sciences Po, Paris, pp. 21–25.
- Montagné, P., 1938. *Larousse Gastronomique*. Librairie Larousse, Paris.
- Montanari, M., 2002. *Il Mondo in Cucina. Storia, Identità, Scambi*. Laterza, Bari.
- Moreira Leite, B., Campos, B., Paulo Norhona, J., Diniz, M., 2021. Are seaweeds the food of the future? Challenges for its conservation and introduction in the Portuguese diet. *Ann. Med.* 51, 169. <https://doi.org/10.1080/07853890.2018.1562018>.
- Moreno, M.P., 2017. *Madrid: A Culinary History*. Rowman & Littlefield, Maryland.
- Morris, E.P., 1895. *Plautus. Pseudolus*. trans. Allyn & Bacon, Boston.
- Mouritsen, O.G., 2013. *Seaweeds. Edible, Available & Sustainable*. Chicago University Press, Chicago.
- Mouritsen, O.G., Duellund, L., Calleja, G., Frøst, M.B., 2017. Flavour of fermented fish, insect, game, and pea sauces: *garum* revisited. *International Journal of Gastronomy and Food Science* 9, 16–28. <https://doi.org/10.1016/j.ijgfs.2017.05.002>.
- Mouritsen, O.G., Rhatigan, P., Pérez-Lloréns, J.L., 2018. World cuisine of seaweeds: science meets gastronomy. *International Journal of Gastronomy and Food Science* 14, 55–65. <https://doi.org/10.1016/j.ijgfs.2018.09.002>.
- Mouritsen, O.G., Rhatigan, P., Pérez-Lloréns, J.L., 2019. The rise of seaweed gastronomy: phycogastronomy. *Bot. Mar.* 62, 195–209. <https://doi.org/10.1515/bot-2018-0041>.
- Muro, A., 1894. *El Practicón*. Miguel Guizarro, Madrid.
- Nabhan, G.P., 2020. *Cumin, Camels, and Caravans: A Spice Odyssey*. University of California Press, California.
- Nicholson, R., Robinson, J., Robinson, M., Rowan, E., 2018. From the waters to the plate to the latrine: fish and seafood from the Cardo V sewer, Herculaneum. *J. Marit. Archaeol.* 13, 263–284. <https://doi.org/10.1007/s11457-018-9218-y>.
- O'Bryhim, S., 2017. Catullus' mullets and radishes. *Mnemosyne* 70, 325–330. <https://doi.org/10.1163/1568525X-12342251>.
- O'Connor, K., 2013. Invisible foodscapes: into the blue. In: Abbots, E.-J., Lavis, A. (Eds.), *Why We Eat, How We Eat. Contemporary Encounters between Foods and Bodies*. Ashgate Publishing Ltd., England, pp. 15–35.
- Olson, D., Sens, A., 2000. *Archestratos of Gela*. Oxford University Press, Oxford.
- Olson, S.D., 2011 (trans.). *Athenaeus. The Learned Banqueters*, vol. VII. Harvard University Press, Harvard. book 13.
- Opazo, M.P., 2012. Discourse as driver of innovation in contemporary haute cuisine: the case of elBulli restaurant. *International Journal of Gastronomy and Food Science* 1, 82–89. <https://doi.org/10.1016/j.ijgfs.2013.06.001>.
- Palmieri, N., Forleo, M., 2020. The potential of edible seaweed within the western diet. A segmentation of Italian consumers. *International Journal of Gastronomy and Food Science* 20, 100202. <https://doi.org/10.1016/j.ijgfs.2020.100202>.
- Pardo, E., 1917. *La Cocina Española Moderna*. Compañía Ibero-Americana de Publicaciones (S.A.), Madrid.
- Pérez-Lloréns, J.L., Hernández, I., Vergara, J.J., Brun, F.G., León, Á., 2018. Those Curious and Delicious Seaweeds. A Fascinating Voyage from Biology to Gastronomy. *Servicio de Publicaciones de la Universidad de Cádiz*, Cádiz.
- Pérez-Lloréns, J.L., 2019a. *Cooking-Science-Communication (CSC): the ideal trident to enjoy the dining experience*. *International Journal of Gastronomy and Food Science* 16, 100134. <https://doi.org/10.1016/j.ijgfs.2019.100134>.
- Pérez-Lloréns, J.L., 2019b. *Bluefin tuna and Cadiz: a pinch of history and gastronomy*. *International Journal of Gastronomy and Food Science* 17, 100170. <https://doi.org/10.1016/j.ijgfs.2019.100170>.
- Pérez-Lloréns, J.L., 2020. *Microalgae: from staple foodstuff to avant-garde cuisine*. *International Journal of Gastronomy and Food Science* 21, 100221. <https://doi.org/10.1016/j.ijgfs.2020.100221>.
- Perry, C., 1998. *Medieval Arab fish: fresh, dried and dyed*. In: Walker, H. (Ed.), *Fish: Food from the Waters*. Prospect Books, Devon, pp. 229–233.
- Peterson, T.S., 1994. *Acquired Taste: the French Origins of Modern Cooking*. Cornell University Press, New York.
- Peurière, Y., 2003. *La Pêche et les Poissons dans la Littérature Latine: Des Origines à la Fine de la Période Augustéenne*. Latomus, Brussels.
- Pinkard, S., 2010. *A Revolution in Taste: the Rise of French Cuisine, 1650–1800*. Cambridge University Press, Cambridge.
- Piros, E.G., 2019. *Martial and the Poetics of Popular Consumption*. PhD Thesis. University of California. <https://escholarship.org/uc/item/3fw913sb>.
- Plouvier, L., 2010. *À la table du roi Hammurabi de Babylone*. *Papilles* 35, 37–51.
- Poulain, J.P., 2005. *French gastronomy, French gastronomies*. In: Golstein, D., Merkle, K., Mennell, S. (Eds.), *Culinary Cultures of Europe: Identity, Diversity and Dialogue*. Council of Europe Pub., Strasbourg, pp. 157–169.
- Ragia, E., 2018. The circulation, distribution and consumption of marine products in Byzantium: some considerations. *J. Marit. Archaeol.* 13, 449–466. <https://doi.org/10.1007/s11457-018-9213-3>.
- Rao, H., Monin, P., Durand, R., 2003. Institutional change in toque ville: nouvelle cuisine as an identity movement in French gastronomy. *Am. J. Sociol.* 108, 795–843. <https://doi.org/10.1086/367917>.
- Redzepe, R., Zilber, D., 2018. *The Noma Guide to Fermentation: Including Koji, Kombuchas, Shoyus, Misos, Vinegars, Garums, Lacto-Ferments, and Black Fruits and Vegetables*. Workman Publishing, New York.
- Reguant-Aleix, J., CIEAM, 2012. *The Mediterranean diet: designed for future*. In: *MediTERRA 2012. The Mediterranean Diet for Sustainable Regional Development*. Presses de Sciences Po, Paris, pp. 29–50.
- Reynolds, F., 2007. *Food and drink in Babylonia*. In: Leick, G. (Ed.), *The Babylonian World*. Routledge, New York, pp. 171–186.
- Rostovtzeff, M., 1941. *The Social and Economic History of the Hellenistic World*. Clarendon University Press, Oxford.
- Salonen, A., 1970. *Die Fischerei im Alten Mesopotamien Nach Sumerischakkadischen Quellen: Eine Lexikalische und Kulturgeschichtliche Untersuchung*. Academia Scientiarum Fennica, Helsinki.

- Scully, T., 1988. *Taillevent. The Viandier*. The University of Ottawa Press, Ottawa.
- Scully, T., 1998. Anonymous. *The Neapolitan Recipe Collection: Cuoco Napoletano* (trans.). The University of Michigan Press, Michigan.
- Scully, T., 2010. *Master Chiquart (1420). Du fait de cuisine* (trans.). ACMRS Press, Arizona.
- Scully, T., 2011. (trans.) Scappi, B. (1570). *The Opera of Bartolomeo Scappi*. University of Toronto Press, Toronto.
- Segnit, N., 2010. *The Flavour Thesaurus*. Bloomsbury Publishing PLC, London.
- Sephard, J., 2009. *The Cambridge History of the Byzantine Empire C 500-1492*. Cambridge University Press, Cambridge.
- Serrano-Larráyo, F., 2008. *Confitería y cocina conventual navarra del siglo XVIII. Notas y precisiones sobre el 'Recetario de Marcilla' y el 'Cocinero religioso' de Antonio Salsete*. *Príncipe Viana* 69, 141–186.
- Snodgrass, M.E., 2004. *Encyclopedia of Kitchen History*. Taylor & Francis Group, New York.
- Soyer, A., 1853. *The Pantropheon or, History of Food, and its Preparation, from the Earliest Ages of the World*. Simpkin, Marshall and Co., London.
- Tafur, P., 1874. *Andanças é Viajes de Pero Tafur por Diversas Partes del Mundo Avidos (1435-1439)*. Imprenta de M. Ginesta, Madrid.
- Tallet, P., 2015. *Food in ancient Egypt*. In: Wilkins, J.A., Nadeau, R. (Eds.), *A Companion to Food in the Ancient World*. Wiley Blackwell, Oxford, pp. 319–325.
- Theodoropoulou, T., 2018. To salt or not to salt: a review of evidence for processing marine products and local traditions in the Aegean through time. *J. Marit. Archaeol.* 13, 389–406. <https://doi.org/10.1007/s11457-018-9216-0>.
- Toussaint-Samat, M., 2009. *A History of Food*. John Wiley & Sons, Chichester.
- Trentacoste, A., Nicholson, R., Mylona, D., 2018. The bountiful sea: fish processing and consumption in Mediterranean antiquity. *J. Marit. Archaeol.* 13, 207–217. <https://doi.org/10.1007/s11457-018-9215-1>.
- Trubeck, A.B., 2000. *Haute Cuisine: How the French Invented the Culinary Profession*. University of Pennsylvania Press, Philadelphia.
- UNEP/MAP-Plan Bleu, 2009. *State of the Environment and Development in the Mediterranean*. Report. UNEP/MAP-Plan Bleu, Athens.
- Van der Veen, M., 1998. A life of luxury in the desert? The food and fodder supply to Mons Claudianus. *J. Rom. Archaeol.* 11, 101–116. <https://doi.org/10.1017/S1047759400017219>.
- Van Neer, V., Lernau, O., Friedman, R., Mumford, G., Poblome, J., Waelkens, M., 2004. Fish remains from archaeological sites as indicators of former trade connections in the Eastern Mediterranean. *Paleorient* 30, 101–147. <https://doi.org/10.3406/paleo.2004.4775>.
- Varriano, J., 2008. At supper with Leonardo. *Gastronomica* 8, 75–79. <https://doi.org/10.1525/gfc.2008.8.1.75>.
- Vehling, J.D., 1936. *Apicius. Cookery and Dining in the Imperial Rome*. Hill, W.M. Publisher, Chicago (trans.).
- Vera, P., 2021. *El cereal que vino del mar*. https://www.diariodecadiz.es/noticias-provincia-cadiz/angel-leon-uca-cereal-vino-mar_0_1538546296.html/. (Accessed 22 April 2021). accessed.
- Villegas, A., 2014. *Cocina creativa o de autor: Nuevas tendencias gastronómicas*. Ideaspropias Editorial, Pontevedra.
- Villegas, A., 2019. *De re coquinaria* como parte de una tradición de manuales de cocina griegos y romanos. In: Chica, A.F., Mérida, J. (Eds.), *Creando Redes Doctorales*. UCO Press, Córdoba, pp. 83–85.
- Vogelzang, R.M., 2008. *The Book of Sent Soví. Medieval Recipes from Catalonia*. Barcino-Tamesis, Barcelona (trans.).
- Wells, K.D., 1988. *Clio in the Kitchen: the Work of Bartolomeo Scappi*, vol. 63. The Yale University Library Gazette, pp. 32–41.
- Wilkins, J., 2000. *The Boastful Chef. The Discourse of Food in Ancient Greek Comedy*. Oxford University Press, Oxford.
- Wilkins, J., 2005. Fish as a source of food in the antiquity. In: Bekker-Nielsen, T. (Ed.), *Ancient Fishing and Fish Processing in the Black Sea Region*. Aarhus University Press, Aarhus, pp. 21–30.
- Wilkins, J., 2018. Cook and processing fish in antiquity: questions of taste and texture. *J. Marit. Archaeol.* 13, 225–234. <https://doi.org/10.1007/s11457-018-9194-2>.
- Wilkinson, J.G., 1854. *A Popular Account of the Ancient Egyptians*, vol. 2. John Murray, London.
- Willan, A., 1979. *Nouvelle Cuisine: the Ten Commandments*. La Verenne, Paris.
- Willan, A., 2000. *Great Cooks and Their Recipes: from Taillevent to Escoffier*. Pavilion Books Ltd., London.
- Willan, A., Cherniavsky, M., 2012. *The Cookbook Library: Four Centuries of the Cooks, Writers, and Recipes that Made the Modern Cookbook*. University of California Press, California.
- WWF, 2017. *Seafood and the Mediterranean: Local Tastes, Global Markets*. WWF., Gland, Switzerland.
- Yonge, C.D., 1854. *Athenaeus. The Deipnosophists*. Bohn (trans.). H.G. Publisher, London.