

**MAYONNAISE: IT'S YUMMY & GOOD FOR HEART & TUMMY**

<sup>1</sup>\*Shouvik Sarkar, <sup>1</sup>Kushal Nandi, <sup>1</sup>Prof. Dr. Dhrubo Jyoti Sen, <sup>2</sup>Dr. Dhananjay Saha

<sup>1</sup>Department of Pharmaceutical Chemistry, School of Pharmacy, Techno India University,  
Salt Lake City, Sector-V, EM-4, Kolkata-700091, West Bengal, India.

<sup>2</sup>Deputy Director, Directorate of Technical Education, Bikash Bhavan, Salt Lake City,  
Kolkata-700091, West Bengal, India.

Article Received on  
21 March 2022,

Revised on 11 April 2022,  
Accepted on 01 May 2022

DOI: 10.20959/wjpr20226-24263

**\*Corresponding Author****Shouvik Sarkar**

Department of  
Pharmaceutical Chemistry,  
School of Pharmacy,  
Techno India University,  
Salt Lake City, Sector-V,  
EM-4, Kolkata-700091,  
West Bengal, India.

**ABSTRACT**

**Mayonnaise**, colloquially referred to as "**mayo**", is a thick, cold, and creamy sauce or dressing commonly used on sandwiches, hamburgers, composed salads, and French fries. It also forms the base for various other sauces, such as tartar sauce, fry sauce, remoulade, salsa golf, and rouille. Mayonnaise is an emulsion of oil, egg yolk, and an acid, either vinegar or lemon juice; there are many variants using additional flavorings. The color varies from near-white to pale yellow, and its texture from a light cream to a thick gel. Commercial imitations are made for vegans and those who avoid chicken eggs or dietary cholesterol as well as people with egg allergies.

**KEYWORDS:** Mayo, French cuisine, Sandwich, Hamburger, Salad, French Fries.

**INTRODUCTION & HISTORY**

*Mayonnaise* is a French cuisine appellation that seems to have appeared for the first time in 1806. The hypotheses invoked over time as to the origin(s) of mayonnaise have been numerous and contradictory. Most hypotheses do however agree on the geographical origin of the sauce, Mahón, in Menorca, Spain. Other theories other than this have been dismissed by some authors as being somewhat a retrospective invention aiming to credit the sauce as an invention of south-western France, when most likely, its origin can be found in the port city of Menorca.<sup>[1]</sup>



**Figure 1: Standard ingredients and tools to make mayonnaise.**

According to Émile Littré, it may have come from Mahón, capital of Menorca, in the Balearic Islands, Spain, occupied by the English at the time and then conquered by the Duc de Richelieu in 1756. His cook would have presented him with this sauce, called the “mahonnaise”, made with the only two ingredients he had: egg and oil. Nevertheless, this sauce was starting to be described a little before this event while several versions of similar sauces existed in France and in Spain. Mayonnaise sauce may have its origins in the ancient remoulade. Another hypothesis would have it derive from aioli. Finally, the process of emulsifying egg yolk was known for a long time to pharmacists, who used it to prepare ointments and salves. Some have pointed out that it would make sense that mayonnaise originated in Spain given its requirement of olive oil, a liquid produced and consumed mostly there at the time. This hypothesis is similar to another that places the origins of French fries in Spain for the same rationale. Remoulade sauce was known for a long time and there were hot and cold versions of it: in both cases, the base was oil, vinegar, salt, herbs, often other ingredients such as capers or anchovies, and then mustard; in short, it was just an enriched vinaigrette.

In the early 18th century, Vincent La Chapelle had the idea of incorporating “velouté”, based on roux, a mixture of flour and fat, to bind it. In 1742, François Marin published in the *Suite des Dons de Comus* a recipe called “beurre de Provence” which contains garlic cloves cooked in water, crushed with salt, pepper, capers and anchovies, then mixed with oil. This recipe is also close to the aioli, the egg yolk appearing later. In 1750, Francesc Roger Gomila, a Valencian friar, published a recipe for a sauce similar to mayonnaise in *Art de la*

*Cuina* ('The Art of Cooking'). He calls the sauce *aioli bo*. If he does not describe precisely the recipe - suggesting that it was known by everyone on the island -, the way it is used, the preparations for which it is used as a base and the dishes with which it is associated are most often inconceivable with an aioli. Earlier recipes of similar emulsified sauces, usually bearing garlic, appear in a number of Spanish recipe books, dating all the way back to the 14th century *Llibre de Sent Soví*, where it is called *all-i-oli*, literally 'garlic and oil' in Catalan. This sauce had clearly spread throughout the Crown of Aragon, for Juan de Altamiras gives a recipe for it in his celebrated 1745 recipe book *Nuevo Arte de Cocina* ('New Art of Cooking').<sup>[2]</sup>



**Figure 2: Some yummiest way to use Mayonnaise.**

On April 18, 1756, the Duke of Richelieu invaded Menorca and took the port of Mahon. A theory states that the *aioli bo* sauce was thereafter adopted by the cook of the Duke of Richelieu, who upon his return to France made the sauce famous in the French court. This would have been known as mahonnaise. A number of legends arose relating how the Duke of Richelieu first tried the sauce, including his discovery of the sauce in a local inn of Mahon where he would have allegedly asked the innkeeper to make him some dinner during the siege of Mahon, and even that he invented it himself as a quick garnish. Another version is Grimod de La Reynière's 1808 *bayonnaise* sauce which is a sort of aspic: "But if one wants to make from this cold chicken, a dish of distinction, one composes a bayonnaise, whose green jelly, of a good consistency, forms the worthiest ornament of poultry and fish salads."

In 1806, André Viard, in *Le Cuisinier impérial*, transformed this recipe for remoulade by replacing the roux with egg yolk. In another recipe, an *Indian remoulade*, without mustard, he

specifies that the binding is facilitated by incorporating the oil little by little. This would be the first modern mention of a stable cold emulsified sauce. In the same book, he also proposes a sauce called *mayonnaise* (the first recorded attestation of the name) but which is not an emulsion but a sauce linked to velouté and jelly. It is only in 1815 that Antonin Carême mentions a cold "magnonaise" emulsified with egg yolk. The word "mayonnaise" is attested in English in 1815. Auguste Escoffier wrote that mayonnaise was a French mother sauce of cold sauces, just like Espagnole or Velouté.<sup>[3]</sup>

**Etymology:** Regarding the etymology of the name, the origin is unclear; it seems to appear for the first time in 1806. The hypotheses invoked over time as to its origin have been numerous, contradictory, and all the more difficult to untangle because their authors were prestigious. A common theory is that it is named for Port Mahon, (Maó in Menorquín) itself named after its founder Mago Barca, in Menorca, in honor of the 3rd Duke of Richelieu's victory over the British in 1756, and in fact the name "mahonnaise" is used by some authors. But the name is only attested several decades after that event. One version of this theory says that it was originally known as *salsa mahonesa* in Spanish, but that spelling too is only attested later. Alexandre Balthazar Laurent Grimod de La Reynière, a lawyer by qualification who acquired fame during the reign of Napoleon for his sensual and public gastronomic lifestyle, rejected the name "mayonnaise" because the word "is not French". He also rejected the name "mahonnaise" because Port Mahon "is not known for good food", and thus he preferred "bayonnaise", after the city of Bayonne, which "has many innovative gourmands and... produces the best hams in Europe." Indeed, the city of Bayonne (sauce "à la Bayonnaise") could also have given its name to this type of sauce, by spelling deformation. This form would seem to be confirmed by the fact that there is no written record of the sauce "à la mayonnaise" before the beginning of the 19th century, long after the capture of the city of Mahón. Another hypothesis is based, according to Marie-Antoine Carême, a famous contemporary French chef, on a derivative of "magnonaise" (from the verb "magner", or "manier") or, according to Prosper Montagné, of "moyeunaise" (or "moyennaise"), based on "moyeu(x)" (or "moyen") which means "egg yolk", in Old French. It has also been suggested that the word be linked to the old verb "mailler", meaning "to beat". Joseph Favre, for his part, states in his memoirs that mayonnaise is an alteration of the word "magnonnaise", derived from Magnon (Lot-et-Garonne), and that a cook from Magnon would have popularized it first in the South of France; he notes that this sauce has been named indifferently mahonnaise, bayonnaise and mayonnaise. A more controversial hypothesis, put

forward by the linguist and historian Nicolas Lepreux, suggests that mayonnaise originated in the Mayenne region, and that the "e" would have changed into an "o" over time: the apocryphal story tells that the Duke of Mayenne would have abused too much the day before the battle of Arques of chickens seasoned with a remarkable sauce, so that the next day he fell off his horse and lost the battle.<sup>[4]</sup>



**Figure 3: Duke of Richelieu and Fronsac (25 September 1766 – 17 May 1822) Mayonnaise inventor.**

**Preparation:** Recipes for mayonnaise date back to the early nineteenth century. In 1815, Louis Eustache Ude wrote:

No 58: Mayonnaise. Take three spoonfuls of Allemande, six ditto of aspic, and two of oil. Add a little tarragon vinegar that has not boiled, some pepper and salt, and minced ravigotte, or merely some parsley. Then put in the members of fowl, or fillets of soles, & c. Your mayonnaise must be put to ice; neither are you to put the members into your sauce till it begins to freeze. Next dish your meat or fish, mask with the sauce before it be quite frozen, and garnish your dish with whatever you think proper, as beet root, jelly, nasturtiums, & c. In an 1820 work, Viard describes something like the more familiar emulsified version: This sauce is made to "take" in many ways: with raw egg yolks, with gelatine, with veal or veal brain glaze. The most common method is to take a raw egg yolk in a small terrine, with a little salt and lemon juice: take a wooden spoon, turn it while letting a trickle of oil fall and stirring constantly; as your sauce thickens, add a little vinegar; put in too a pound of good oil: serve your sauce with good salt: serve it white or green, adding green of ravigote or green of spinach. This sauce is used for cold fish entrees, or salad of vegetables cooked in salt water. Modern mayonnaise can be made by hand with a whisk, a fork, or with the aid of an

electric mixer or blender. It is made by slowly adding oil to an egg yolk, while whisking vigorously to disperse the oil. The oil and the water in the yolk form a base of the emulsion, while lecithin and protein from the yolk is the emulsifier that stabilizes it. A combination of van der Waals interactions and electrostatic repulsion determine the bond strength among oil droplets. The high viscosity of mayonnaise is attributed to the total strength created by these two intermolecular forces. Addition of mustard contributes to the taste and further stabilizes the emulsion, as mustard contains small amounts of lecithin. If vinegar is added directly to the yolk, it can emulsify more oil, thus making more mayonnaise.

For large-scale preparation of mayonnaise where mixing equipment is being employed, the process typically begins with the dispersal of eggs, either powdered or liquid, into water. Once emulsified, the remaining ingredients are then added and vigorously mixed until completely hydrated and evenly dispersed. Oil is then added as rapidly as it can be absorbed. Though only a small part of the total, ingredients other than the oil are critical to proper formulation. These must be totally hydrated and dispersed within a small liquid volume, which can cause difficulties including emulsion breakdown during the oil-adding phase. Often, a long agitation process is required to achieve proper dispersal/emulsification, presenting one of the trickiest phases of the production process. As food technology advances processing has been shortened drastically, allowing about 1000 liters to be produced in 10 minutes.<sup>[5]</sup>

**Imitations:** Miracle Whip was developed as a cheap imitation of mayonnaise. Since it does not meet the legal definition of mayonnaise, it is marketed as salad dressing.



**Figure 4:** A vegan sandwich with egg-free variety of mayonnaise.

Egg-free imitations of mayonnaise are available for vegans and others who avoid eggs or cholesterol, or who have egg allergies. In the U.S., these imitations cannot be labelled as "mayonnaise" because the definition of mayonnaise requires egg. Egg-free imitations generally contain soya or pea protein as the emulsifying agent to stabilize oil droplets in water. Well-known brands include Nasoya's Nayonaise, Vegenaïse and Just Mayo in North America, and Plamil Egg Free in the United Kingdom.

**Uses:** Mayonnaise is used commonly around the world, and is also a base for many other chilled sauces and salad dressings. For example, *sauce rémoulade*, in classic French cuisine, is a mix of mayonnaise and mustard, gherkins, capers, parsley, chervil, tarragon, and possibly anchovy essence.



**Figure 5: Mayonnaise from the Zaan district, North Holland, Netherlands and potato fries.**

**Chile:** Chile is the world's third major per capita consumer of mayonnaise and first in Latin America. Commercial mayonnaise became widely accessible in the 1980s. It is a common topping for completos.<sup>[6]</sup>

**Europe:** Guidelines issued in September 1991 by Europe's Federation of the Condiment Sauce Industries recommend that mayonnaise should contain at least 70% oil and 5% liquid egg yolk. The Netherlands incorporated this guideline in 1998 into the law *Warenwetbesluit Gereserveerde aanduidingen* in article 4. Most available brands easily exceed this target. In countries influenced by French culture, mustard is also a common ingredient that acts as an additional emulsifier.

**Japan:** Japanese mayonnaise is typically made with rice vinegar, which gives it a flavor different from mayonnaise made from distilled vinegar. Apart from salads, it is popular with dishes such as *okonomiyaki*, *takoyaki* and *yakisoba* and may also accompany *katsu* and *karaage*. It is most often sold in soft plastic squeeze bottles. Its texture is thicker than most Western commercial mayonnaise.

Kewpie (Q.P.) is the most popular brand of Japanese mayonnaise, advertised with a Kewpie doll logo. The vinegar is a proprietary blend containing apple and malt vinegars. The Kewpie Company was started in 1925 by Tochiro Nakashima, whose goal was to create a condiment that made eating vegetables more enjoyable.<sup>[7]</sup>



**Figure 6: Kewpie mayonnaise.**

**Russia:** Mayonnaise is very popular in Russia, where it is made with sunflower oil and soybean oil. A 2004 study showed that Russia is the only market in Europe where more mayonnaise than ketchup is sold. It is used as a sauce in the most popular salads in Russia, such as Olivier salad (also known as Russian salad), dressed herring, and many others. Leading brands are Calvé (marketed by Unilever) and Sloboda (marketed by Efko).

**United States:** Commercial mayonnaise sold in jars originated in Philadelphia in 1907 when Amelia Schlorer decided to start selling her own mayonnaise recipe originally used in salads sold in the family grocery store. Mrs. Schlorer's mayonnaise was an instant success with local customers and eventually grew into the Schlorer Delicatessen Company. Around the same time in New York City, a family from Vetschau, Germany, at Richard Hellmann's delicatessen on Columbus Avenue, featured his wife's homemade recipe in salads sold in their delicatessen. The condiment quickly became so popular that Hellmann began selling it in "wooden boats" that were used for weighing butter. In 1912, Mrs. Hellmann's mayonnaise was mass-marketed and was trademarked in 1926 as Hellmann's Blue-Ribbon Mayonnaise.



Hellmann's is known as Best Foods in the Western United States. Mayonnaise sales are about US\$1.3 billion per year in the U.S.<sup>[8]</sup>

**Nutritional information:** A typical formulation for commercially made mayonnaise (not low fat) can contain as much as 80% vegetable oil, usually soybean but sometimes olive oil. Water makes up about 7% to 8% and egg yolks about 6%. Some formulas use whole eggs instead of just yolks. The remaining ingredients include vinegar (4%), salt (1%), and sugar (1%). Low-fat formulas will typically decrease oil content to just 50% and increase water content to about 35%. Egg content is reduced to 4% and vinegar to 3%. Sugar is increased to 1.5% and salt lowered to 0.7%. Gums or thickeners (4%) are added to increase viscosity, improve texture, and ensure a stable emulsion. Mayonnaise is prepared using several methods, but on average it contains around 700 kilocalories (2,900 kJ) per 100 grams, or 94 kilocalories (Cal) per tablespoon. This makes mayonnaise a calorically dense food.<sup>[9]</sup>

The nutrient content of mayonnaise (> 50% edible oil, 9–11% salt, 7–10% sugar in the aqueous phase) makes it suitable as a food source for many spoilage organisms. A set of conditions such as pH between 3.6 and 4.0, and low water activity  $a_w$  of 0.925, restricts the growth of yeasts, a few bacteria and molds. Yeasts of the genus *Saccharomyces*, *Lactobacillus fructivorans*, and *Zygosaccharomyces bailii* are the species responsible for the spoilage of mayonnaise. The characteristics of spoilage caused by *Z. bailii* are product separation and a "yeasty" odor. A study suggests that adding encapsulated cells of *Bifidobacterium bifidum* and *B. infantis* prolongs the life of mayonnaise up to 12 weeks without microorganism spoilage.<sup>[10]</sup>

## CONCLUSION

Mayonnaise, both commercially processed and home-made, has been associated with illnesses from *Salmonella* globally. The source of the *Salmonella* has been confirmed to be raw eggs. Several outbreaks with fatal cases have been recorded, with a few major incidents. In a 1955 outbreak in Denmark, 10,000 people were affected by *Salmonella* from contaminated mayonnaise made by a large kitchen. The pH of the mayonnaise was found to be 5.1, with *Salmonella* counts of 180,000 CFU/g. The second outbreak, also in Denmark, caused 41 infections with two fatalities. The pH of the contaminated mayonnaise was 6.0, with *Salmonella* counts of 6 million CFU/g. In 1976 there were serious salmonellosis outbreaks on four flights to and from Spain which caused 500 cases and 6 fatalities. In the US, 404 people became ill and nine died in a New York City hospital due to hospital-

prepared mayonnaise. In all salmonellosis cases, the major reason was inadequate acidification of the mayonnaise, with a pH higher than the recommended upper limit of 4.1, with acetic acid as the main acidifying agent. Some brands use pasteurized eggs which would reduce this risk factor.

## REFERENCES

1. McGee, Harold (2004). *On Food and Cooking: The Science and Lore of the Kitchen* (2nd ed.). New York: Scribner. p. 633. Mayonnaise is an emulsion of oil droplets suspended in a base composed of egg yolk, lemon juice or vinegar, which provides both flavor and stabilizing particles and carbohydrates.
2. Moran, Victoria; Moran, Adair (2012). *Main Street Vegan: Everything You Need to Know to Eat Healthfully and Live Compassionately in the Real World*. Penguin. p. 168.
3. Glenn, Joshua; Larsen, Elizabeth F. (2013). *Unbored: The Essential Field Guide to Serious Fun*. Bloomsbury Publishing Plc. p. 158.
4. Aragon, Marine (2009). "La sauce des tropes dans le lexique de la gastronomie française : approche sémantique et pragmatique". *Neuphilologische Mitteilungen*, 110(1): 7–26.
5. Héron de Villefosse, Éloge (1971). "Éloge des Délices de la Table". *Revue des Deux Mondes*, (1829-1971): 116.
6. Trudgill, Peter (2021). *European Language Matters: English in Its European Context*. Cambridge University Press, 50–51.
7. *Revista, Litoral* (2006). "Salsa Mayonesa". *Litoral*, 241: 165.
8. Rupp, Rebecca (8 January 2015). "Are French Fries Truly French?" *Culture*.
9. Swalec, Andrea (28 July 2010). "In Belgium, frites aren't small potatoes".
10. Pelfort, Pep (24 November 2019). "La Vertadera Història de la Salsa Maonesa Altrament Dita Aioli BO" [The True History of Mayonnaise Sauce Otherwise Called Aioli BO]. *Cegmenorca.org*.