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Atlantic Diet and Diabetes

Among the causes of the rising prevalence of type 2 diabetes mellitus in Spain are lifestyle changes and dietary patterns that have moved away from our traditional culinary heritage. In this context, there is growing interest in regional dietary patterns supported by scientific evidence and that can realistically be integrated into daily life. One such model is the Atlantic Diet.

WHAT IS THE ATLANTIC DIET?

The **Atlantic Diet**, specifically the **Southern European Atlantic Diet** (SEAD), is defined as the traditional dietary pattern of the northwest of the Iberian Peninsula, encompassing Galicia and northern Portugal. This distinguishes it from other Atlantic diets in regions bordering the same ocean. This model not only includes food choices but also represents a lifestyle and gastronomic culture. It is strongly influenced by local geography (smallholdings) and the Atlantic climate, characterized by abundant rainfall that favors livestock grazing and vegetable farming, as well as a coastline rich in fish and seafood. Although it is a millennia-old practice, its scientific conceptualization and promotion were formally consolidated with the Baiona Declaration in 2006, which established its foundations. While it shares features with the Mediterranean diet—such as seasonal, fresh, and local foods, and the use of olive oil—the SEAD has **distinctive characteristics** ***(figure 1)***:

- Greater consumption of fish and seafood.
- Higher intake of dairy products and meats (especially pork and beef) compared to the Mediterranean pattern, which tends to be lower in red meat.
- High consumption of potatoes, often boiled and eaten with the skin, and whole-grain bread (wheat, corn, or rye) as sources of complex carbohydrates.
- Predominance of fruits such as apples and citrus, and vegetables from the Brassica genus (turnip greens, collard greens, cabbage, young turnip leaves), unlike the broader vegetable variety typical of the Mediterranean diet.
- Although olive oil is used, it is not always the sole fat source; historically, pork fat ("unto") was also used, although olive oil is currently the main culinary fat.

Atlantic gastronomy is characterized by simplicity in preparation to preserve the quality and nutritional value of raw ingredients. "Caldo gallego" (vegetable soup with potatoes, legumes, and some pork fat) is one of the emblematic dishes year-round. Grilling, baking, and steaming are prioritized over frying. Traditional preparations for special occasions include empanadas (stuffed bread dough) and filloas (thin crepes). Social gatherings are accompanied by long after-meal conversations with family and friends.

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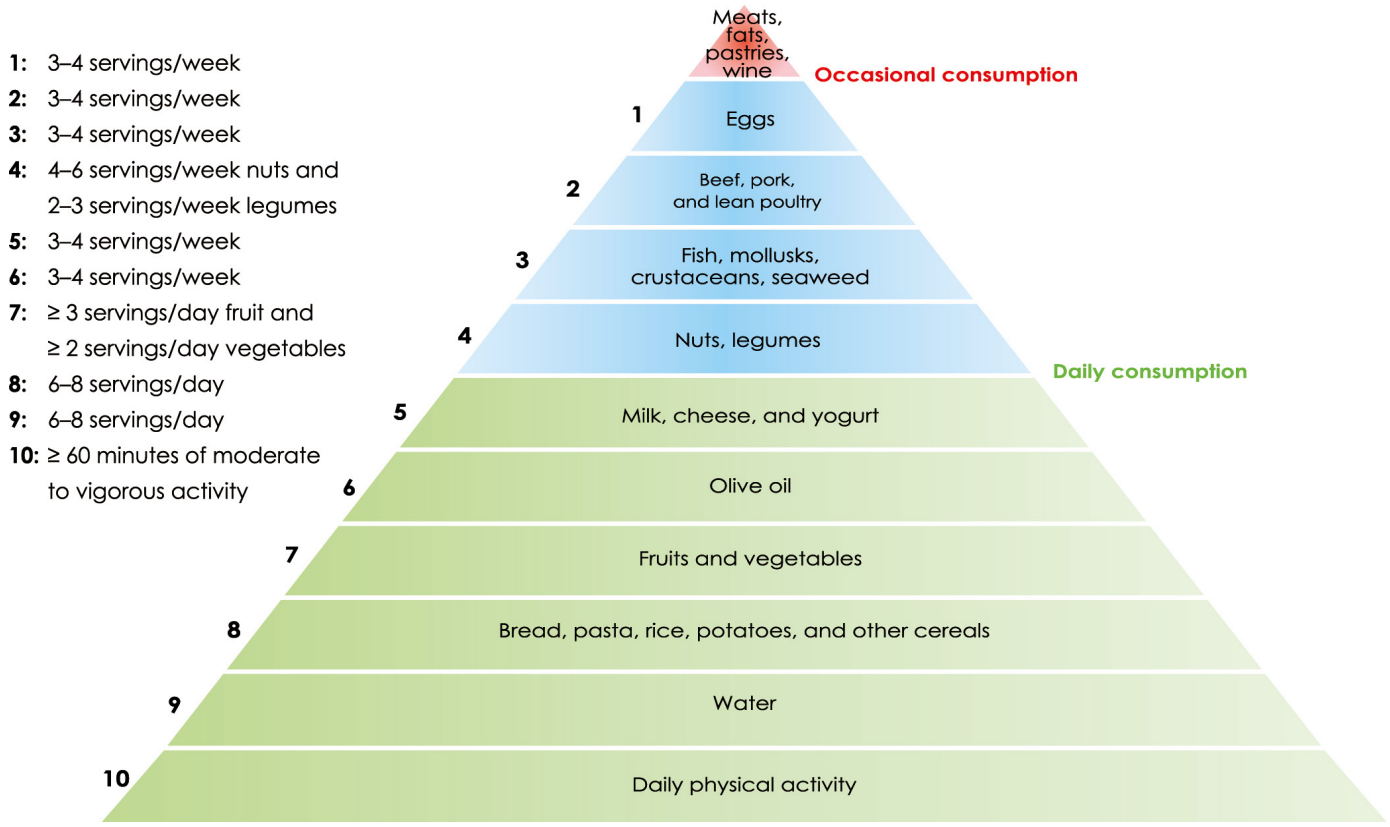
FIGURA 1



THE ATLANTIC DIET NOT ONLY ENCOMPASSES FOOD SELECTION, BUT ALSO REPRESENTS A LIFESTYLE AND A GASTRONOMIC CULTURE

» Another variant of the Atlantic Diet is the **Nordic diet**, included in the nutritional recommendations of the European Association for the Study of Diabetes (EASD) for diabetes. The SEAD and **Nordic diet** are both healthy and sustainable patterns but differ in geographic and cultural context: SEAD uses olive oil as the main fat, includes a wide variety of fish and seafood, more red meat, vegetables such as turnip greens and collards, temperate fruits and chestnuts, traditional bread, and potatoes. Wine is traditionally associated with it. The **Nordic diet** uses rapeseed oil, prioritizes fatty fish, limits red meat, incorporates berries, root vegetables, oats, barley, rye, and prefers low-fat dairy. Beer has been traditionally associated with it.

AVAILABLE SCIENTIFIC EVIDENCE

Research on the SEAD has mainly focused on Galicia and northern Portugal, regions traditionally characterized by low mortality from ischemic heart disease. Evidence comes primarily from: GALIAT Study (Galicia Atlantic Diet), conducted in A Estrada (Pontevedra), EPICardis Study (Porto), the ENRICA and HAPIEE Cohorts (Spain, United Kingdom, Poland, Czech Republic).

Cardiovascular Disease. Greater adherence to the SEAD is associated with a 33% reduction in the probability of non-fatal acute myocardial infarction. In older adults, higher adherence is associated with increased longevity and lower cardiovascular and cancer mortality. Protective associations are similar in magnitude to those observed with the Mediterranean diet. When red meat and potatoes are excluded from the SEAD index (modified score), the protective association becomes even stronger, surpassing the traditional Mediterranean diet in some analyses.

Cholesterol and Triglycerides. In the GALIAT study, the intervention group showed significant reductions in total cholesterol (–5.2 mg/dL) and LDL cholesterol (–3.4 mg/dL) after 6 months. Observational studies associate higher SEAD adherence with lower triglyceride levels.

Insulin Sensitivity. Greater adherence to SEAD is associated with lower plasma insulin concentrations and reduced HOMA-IR index, indicating improved insulin sensitivity.

Metabolic Syndrome and Glycemic Control. In GALIAT, although the intervention significantly reduced the risk of developing metabolic syndrome, no statistically significant changes were observed in fasting glucose or HbA1c after 6 months. Direct glycemic benefits may require longer follow-up or mainly manifest in preventing insulin resistance.

Body Composition. Higher adherence to SEAD is associated with lower waist circumference and body fat percentage. In adolescents, high adherence combined with good muscular and cardiorespiratory fitness is linked to lower metabolic risk and less fat accumulation.

Inflammation and oxidative stress. This diet is rich in bioactive compounds with antioxidant and anti-inflammatory properties that may mitigate oxidative stress associated with diabetes and cardiovascular diseases. Greater adherence to the SEAD is associated with lower levels of high-sensitivity C-reactive protein (hs-CRP), a marker of low-grade systemic inflammation linked to cardiovascular risk and type 2 diabetes mellitus.

Other potential benefits. The SEAD has been proposed as an "epigenetic diet," in which its nutrients modulate the expression of genes related to inflammation and metabolism without altering the DNA sequence, thereby promoting healthy aging and reducing the risk of chronic diseases.

PRACTICAL RECOMMENDATIONS

For people with diabetes, the key is increasing intake of foods rich in fiber, antioxidants, and omega-3 fatty acids to improve insulin sensitivity and lipid profile. While low-carbohydrate diets may be effective short-term, balanced patterns such as SEAD are sustainable and effective long-term without eliminating entire food groups. Recommended Food Groups:

- **Fish and Seafood (3–4 times per week).** Priority should be given to fresh fish, mollusks, and crustaceans. They are the main source of omega-3 fatty acids (EPA and DHA), which have anti-inflammatory properties and improve insulin resistance. Preferably choose small fish to avoid »

FOR PEOPLE WITH DIABETES, THE KEY LIES IN INCREASING THE INTAKE OF FOODS RICH IN FIBER, ANTIOXIDANTS, AND OMEGA–3 FATTY ACIDS, WHICH HAVE BEEN SHOWN TO IMPROVE INSULIN SENSITIVITY AND LIPID PROFILE

overexposure to heavy metals (especially relevant in pregnant women).

- **Brassica vegetables.** Regular consumption of turnip greens, young turnip tops, collard greens, cabbage, and cauliflower is recommended. These vegetables are rich in glucosinolates and fiber—bioactive compounds that help regulate metabolism and reduce chronic inflammation associated with diabetes.

- **Whole grains and whole-grain bread.** Unlike refined products, bread made from whole-grain flours (wheat, corn, or rye) is essential due to its fiber content and lower glycemic index. Portion control is important.

- **Dairy (daily).** Prefer fermented options such as yogurt or cheese, ideally low in fat. Fermented dairy products contain probiotics that may improve gut microbiota and glycemic control.

- **Eggs.** People with diabetes can safely consume up to a dozen eggs per week. Prefer free-range eggs (those labeled with codes starting with 0 or 1).

- **Olive oil.** It should be the main added and cooking fat. Its monounsaturated fatty acids and polyphenols improve lipid and glycemic profiles.

- **Nuts.** Chestnuts are distinctive in this diet; they contain less fat than other nuts and provide complex carbohydrates. Walnuts are rich in omega-3 and improve glycemic control and insulin resistance. They can be consumed daily, aiming to limit intake to 5–6 units per day.

- **Legumes.** Recommended 2–3 times per week due to their high fiber content and low glycemic index.

- **Meat.** Although pork and beef consumption is traditional in the Atlantic region, high intake is associated with increased risk of myocardial infarction and insulin resistance. It is recommended to moderate consumption, choose lean cuts, and avoid processed meats. Preferably select white meats. The potential risks of the SEAD are mainly related to the inclusion of red meat and pork products which, if consumed in excess, may increase cardiovascular risk. However, when followed according to traditional practice, the overall dietary pattern does not show increased risk in population studies.

- **Potatoes.** A staple food in the SEAD, but with a high glycemic index. They should not be eliminated but rather consumed in moderate portions, preferably boiled and cooled (to form resistant starch) instead of fried, and always accompanied by abundant vegetables to modify glucose absorption.

- **Sweets and sugars.** Traditional desserts such as filloas or cakes should be consumed occasionally.

- **Wine.** It is advisable not to consume alcohol; if consumed, it should be very occasional and not exceed 1 glass per day for women or 2 glasses per day for men.

THE WAY FOOD IS PREPARED IS JUST AS IMPORTANT AS THE INGREDIENTS, PRIORITIZING METHODS THAT PRESERVE NUTRIENTS AND DO NOT ADD UNNECESSARY FATS

Cooking methods are as important as the ingredients. Priority should be given to techniques that preserve nutrients and do not add unnecessary fats, such as boiling, stewing, steaming, poaching, baking, and grilling. Frying should be avoided, and special preparations such as empanada reserved for occasional consumption.

No specific risks associated with the SEAD have been reported in people with diabetes, provided red meat intake remains moderate and alcohol is avoided. Evidence supports the SEAD as a safe and effective dietary option to improve metabolic control and reduce cardiovascular risk in people with type 2 diabetes.

Finally, environmental analyses of the SEAD indicate that although it has a moderate carbon footprint due to animal-based products, its emphasis on local, seasonal, and minimally processed foods partially mitigates its potential environmental impact. D

DAY	BREAKFAST	LUNCH	DINNER	SNACK (OPTIONAL)
MONDAY	Plain yogurt + walnuts (15 g); whole-grain toast with EVOO; apple	Galician-style hake + potato (120 g) + broccoli; kiwi	Spinach omelet (2–3 eggs); tomato salad	Almonds (15 g)
TUESDAY	Oats (40 g) with semi-skimmed milk + blueberries	Stewed lentils (70 g raw weight) + vegetables; salad	Baked salmon; sautéed zucchini	Plain yogurt
WEDNESDAY	Whole-grain bread (40 g) + fresh cheese; pear	Stewed chicken (150 g) + brown rice (60 g raw weight); orange	Scrambled eggs with mushrooms and shrimp; arugula salad	Roasted chestnuts (4)
THURSDAY	Yogurt + chia seeds (1 tbsp); whole-grain toast with tomato	Galician-style octopus + boiled potatoes (120 g); salad	Vegetable cream soup; grilled turkey	1 small fruit
FRIDAY	Smoothie: milk + strawberries + oats	Cod with tomato; chickpeas (80 g); salad	Salad bowl: egg, tuna, roasted vegetables + EVOO	Plain yogurt
SATURDAY	Rye bread + avocado; kiwi	Stewed lean beef + baked potato (120 g); turnip greens	Baked sea bass; asparagus	Pecans (15 g)
SUNDAY	Plain yogurt + walnuts (15 g) + ½ banana	Brothy rice with fish and seafood; salad	Spanish potato omelet (one portion) + dressed tomato	0% whipped fresh cheese

TABLE 1. Example of a weekly menu; portion sizes are approximate and should be adjusted according to individual needs. EVOO: extra virgin olive oil

CONCLUSIONS

The Atlantic Diet is emerging as a dietary pattern to consider in diabetes nutritional management. Evidence shows it improves metabolic health and offers cardiovascular protection. Moreover, it is a sustainable dietary model.

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