

Fruits and Pseudofruits Can Aid in the Quality of Life of Individuals with Chronic or Other Diseases

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How to cite this paper: Nicoletti, M.A. (2024) Fruits and Pseudofruits Can Aid in the Quality of Life of Individuals with Chronic or Other Diseases. *Food and Nutrition Sciences*, 15, 1170-1199.
<https://doi.org/10.4236/fns.2024.1511075>

Received: October 8, 2024

Accepted: November 26, 2024

Published: November 29, 2024

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Abstract

The article contains a list of 25 structured technical sheets on fruits and pseudo-fruits that will serve as guidance in improving the quality of health of people, whether with chronic diseases or not. The technical sheets contain data related to the composition, active ingredients, interaction with medication, health conditions in which they may be useful in health care by various health professionals and references used to structure the material referring to each fruit or pseudo-fruit.

Keywords

Fruit, Composition, Interactions, Nutrients, Health Care

1. Introduction

Considering the globalization of the human diet, there has been a social and economic shift in nutrition and health, particularly in regions experiencing urbanization growth, which introduces influences from various countries, impacting eating habits. It is important to note that the effects of nutritional transition are especially evident in children, where obesity has been increasing worldwide. A diet rich in fats (especially saturated fats) has been linked to an increased risk of certain types of cancer. Many countries also have local eating customs that may compromise the health of those who follow them. On the other hand, certain types of diets with a high intake of fresh fruits and vegetables can reduce the incidence of some diseases [1].

Non-communicable chronic diseases (NCDs) are those that persist for more than a year in a person and require continuous medical and multidisciplinary care.

They limit patients' daily activities and account for the majority of health care visits in Primary Care and other services. They represent an inexhaustible source of health expenses that are often unaccounted for by administrators. Frequent and high consumption of fats, sugar, and salt increases the risk of diseases such as obesity, hypertension, diabetes mellitus, and heart diseases [2].

Healthy eating has increasingly played an important role in the population's quality of life and is part of the non-pharmacological therapies that are initially indicated for some chronic diseases before introducing medication [3]. Food plays a crucial role in preventing and controlling several chronic diseases. For doctors, understanding the application of specific diets can be a powerful tool in managing conditions such as diabetes, hypertension, dyslipidemia and cardiovascular disease. Personalized, evidence-based diets can significantly improve patients' quality of life and reduce disease progression [4].

The contemporary pharmacist works in direct patient care, and promotes the rational use of medicines and other health technologies, redefining his practice based on the needs of patients, family, caregivers and society, with patient-centered care in a biopsychosocial model, prioritizing humanization in health [5]. The humanized relationship that involves respect for the beliefs, expectations, experiences, attitudes and concerns of the patient or caregivers regarding their health conditions and the use of medications, in which the pharmacist and patient share decision-making and responsibility for health outcomes achieved [6].

Many diseases can be linked to the quality of food, as well as knowledge about food can help improve quality of life, in addition to avoiding compromising effectiveness due to possible interactions with some medications. Another important aspect is that considering, particularly, the fruits may contribute to the restoration of health in the face of some problems that people may present.

Studies indicate that 30% to 40% of cancer cases worldwide could be prevented by diet. The main diseases that currently affect Brazilians are no longer acute and have become chronic. It is necessary to emphasize that understanding the application of evidence-based and specific diets for chronic diseases is essential for patient management [1]. It should be noted, then, that a careful assessment is necessary so that, in particular, the fruits suggested as components of the proposed diet do not interact with the medications that are in use and that may contribute in some way to the user's health.

Recent research has demonstrated the existence of several chemical compounds with biological activity in foods, highlighting the presence of compounds with antioxidant and anti-inflammatory properties in foods such as fruits, vegetables, nuts and fish [7].

Healthy eating has increasingly played a significant role in the population's quality of life and is part of non-pharmacological therapies initially recommended for some chronic diseases before introducing medication. Nutrition plays a crucial role in preventing and managing various chronic diseases. For doctors, understanding the application of specific diets can be a powerful tool in managing

conditions like diabetes, hypertension, dyslipidemia, and cardiovascular diseases. Personalized, evidence-based diets can significantly improve patients' quality of life and reduce disease progression [4].

The contemporary pharmacist is involved in direct patient care, promoting the rational use of medications and other health technologies, redefining their practice based on the needs of patients, families, caregivers, and society, with patient-centered care in a biopsychosocial model, prioritizing humanization in healthcare [5].

The humanized relationship involves respect for the beliefs, expectations, experiences, attitudes, and concerns of the patient or caregivers regarding their health conditions and the use of medications, in which the pharmacist and patient share decision-making and responsibility for the health outcomes achieved [7]. Many diseases may be linked to the quality of one's diet, and understanding food can help improve quality of life, as well as prevent the compromise of medication effectiveness due to potential interactions with certain drugs. Another important aspect is that fruits, in particular, can contribute to restoring health in the face of certain conditions people may experience.

Studies indicate that 30 to 40% of cancer cases worldwide could be prevented through diet. The main diseases currently affecting Brazilians have shifted from acute to chronic conditions. It is important to emphasize that understanding the application of evidence-based and disease-specific diets is essential for managing patients [1] [7]-[9].

It should also be highlighted that a thorough evaluation is necessary to ensure that the fruits recommended as part of the proposed diet do not interact with the medications being used and can, in some way, contribute to the user's health.

It has been shown that foods contain various bioactive compounds, with a particular emphasis on the presence of compounds with antioxidant and anti-inflammatory properties in foods such as fruits, vegetables, greens, nuts, and fish [7]. The main goal was to develop technical sheets for twenty-five fruits/pseudofruits that may assist in the health of individuals with some degree of health impairment.

2. Method

This was a study carried out through a bibliographical survey. The technical sheets for the twenty-five described fruits/pseudofruits were structured to provide information on the composition of the fruits, active ingredients, possible interactions with medications, and the conditions under which the fruits may contribute to improving the patient's quality of life.

Below are the individualized technical sheets and with key information on the use of fruits and pseudofruits that may be included in diets for certain diseases. Additionally, they provide guidance on potential drug interactions that should be carefully analyzed to avoid altering the effectiveness of medications used by patients.

Observation: *Fruits: The ovarian region of a developed flower that holds the plant's seeds (e.g., the fruit of the cashew is what we call the "nut"). Pseudofruits: Develop from other floral parts, not the ovary, as occurs in true fruits.*

3. Results

Twenty-five Technical Sheets containing the items: composition, active ingredients, drug interactions and conditions in which it can help.

3.1. *Actinidia chinensis* (Actinidiaceae)

Kiwi is a fruit originally from southern China but is now popular worldwide. It has a thin, velvety brown skin, green creamy interior with small black seeds, and a sweet but slightly acidic taste.

Composition per 100 g [10]:

Carbohydrates: 11.5 g, Protein: 1.3 g, Lipids: 0.6 g, Fiber: 2.7 g, Minerals: calcium (24 mg), magnesium (11 mg), phosphorus (33 mg), and potassium (269 mg), Vitamin C: 70.8 mg.

Active ingredients [11]:

Antioxidants: In addition to its high vitamin C content, kiwi contains a large number of antioxidants, helping to strengthen the immune system. It also plays an important role in the maintenance and formation of collagen in tissues.

Potassium: The high potassium content in kiwi can help reduce risk factors for cardiovascular diseases by lowering high blood pressure, as this mineral promotes artery relaxation and helps eliminate excess sodium from the body.

High fiber concentration: Kiwi is rich in fiber, especially in its skin, aiding in the digestive process and balancing intestinal flora.

Drug interactions [12] [13]:

Vitamin K, presents in kiwi and other foods, promotes blood clotting and prevents hemorrhages. Therefore, consuming large amounts of it may interfere with the effectiveness of anticoagulant medications like warfarin. It's recommended to consume this vitamin in moderation and consult a doctor to adjust the diet or medication dose if necessary.

Conditions in which it can help [14] [15]:

Intestinal regulation: Kiwi is rich in fiber, especially soluble fiber, making it an excellent ally in promoting the growth of beneficial gut bacteria.

Immune system: Rich in vitamin C, kiwi helps prevent colds, the flu, and aids in wound healing.

Antioxidant action: In daily life, exposure to free radicals is frequent. Kiwi is an important agent in combating cellular damage caused by these elements, potentially reducing the risk of diseases, including cancer and cardiovascular diseases.

Cardiovascular health: Due to its good amount of potassium, a mineral that promotes artery relaxation and helps eliminate excess sodium from the body, kiwi helps prevent high blood pressure.

3.2. *Anacardium occidentale* L. (Anacardiaceae)

Originating from the northeastern region of Brazil, cashew is highly appreciated for its sweet and juicy characteristics of pseudofruit (pulp).

Composition per 100 g [16]:

Carbohydrates: 2.94 up 5.98 g, Proteins: 0.15 up 0.19 g, Dietary fiber: 2.24 up 2.30 g.

***Anacardium occidentale* L. [nuts] per 100 g [17].** Water 88 g, Protein 1g, Carbohydrates 10.3 g, Total fibers 1.7 g, Fats 0.3 g, Ash 0.3 g, Vitamin C 259 mg, Calcium 1 mg, Potassium 28 mg, Magnesium 10 mg.

Active ingredients [18]:

Dietary fiber: Rich in pectin and other polysaccharides, cashew consumption aids the functioning of the gastrointestinal tract, helping to prevent constipation. Antioxidants: Containing natural antioxidants such as polyphenols, anthocyanins, flavonoids, and carotenoids, cashew consumption enhances the body's protection against free radicals.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [19]:

Due to its high fiber content, cashew is recommended as a dietary choice for individuals with gastrointestinal tract disorders or those seeking a healthier diet.

3.3. *Ananas comosus* (L.) Merrill (Bromeliaceae)

Terrestrial plant, native to Brazil, with linear leaves, spiny edges, and a conical shape. It is large, scaly, very aromatic, and flavorful.

Composition per 100 g [20]:

Every 100 g of fresh pineapple pulp contains approximately 50 kilocalories, 89% water, 0.3% protein, 0.5% lipids, 5.8% carbohydrates, 3.2% cellulose, and 0.3% salts, with a considerable amount of potassium, iron, calcium, manganese, and magnesium.

Active ingredients [21]:

Mineral salts (calcium, phosphorus, magnesium, potassium, sodium, copper, and iodine).

Vitamins (A, B1, B2, C, and Niacin).

Bromelain: An enzyme, a byproduct of pineapple industrialization, with various uses in the food and pharmaceutical industries. All of its uses are based on its proteolytic activity, helping in the treatment of digestive issues and fat breakdown, as it breaks down proteins into peptides and amino acids that aid digestion.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [22]:

Reduces fluid retention and promotes weight loss: It is rich in water and fiber, helping to increase satiety between meals, reducing appetite, and has diuretic properties.

Regulates blood pressure: Low in sodium and rich in minerals like potassium, which helps eliminate excess sodium through urine, and magnesium, which

promotes blood vessel relaxation and has anti-inflammatory properties, helping control blood pressure and prevent hypertension.

Prevents cardiovascular diseases: Due to its good amounts of vitamin C, fiber, polyphenols, carotenoids, and phytosterols, which prevent cell oxidation and inflammation, and lower cholesterol levels, pineapple helps prevent the development of cardiovascular diseases such as heart attack, atherosclerosis, and stroke.

Boosts the immune system: Rich in vitamin C and polyphenols, pineapple is useful for strengthening the immune system.

Acts as an anti-inflammatory: Bromelain has strong anti-inflammatory properties and is useful as a complement for relieving respiratory inflammations such as sinusitis or bronchitis, as well as digestive system inflammations like ulcerative colitis.

Prevents cancer development: Pineapple is rich in antioxidant compounds such as vitamin C, polyphenols, carotenoids, tannins, and bromelain, which help combat excess free radicals in the body, preventing damage to healthy cells and avoiding the development of cancer in various parts of the body.

Prevents clot formation: Pineapple has antithrombotic and fibrinolytic properties, promoting the elimination of blood clots and thus preventing thrombosis.

Recommended amounts [23]:

There is no specific amount recommended for pineapple consumption. The minimum daily fruit recommendation is 2 to 3 portions, equivalent to 160 g to 240 g per day.

3.4. *Annona muricata* (Annonaceae)

Originating from Latin America and primarily cultivated in the North and Northeast regions of Brazil, soursop is appreciated for its sweet and sour flavor.

Composition per 100 g [24]:

Carbohydrates: 15.8 g, Proteins: 0.9 g, Dietary fiber: 1.9 g Vitamin C: 19.1 mg, Potassium: 49.7 mg, Magnesium: 23.5 mg

Active ingredients [25]:

Lutein and Quercetin: Both are bioactive compounds with antioxidant properties, protecting against free radicals. Additionally, lutein plays a role in the maintenance and repair of the retina.

Drug interactions [26]:

The effects of antihypertensive drugs are enhanced with soursop consumption, leading to increased hypotension. Similarly, it can potentiate the effects of antidepressants and hypoglycemic drugs.

Conditions in which it can help [27]:

Moderate consumption of soursop is recommended for the prevention and alleviation of gastrointestinal disorders (e.g., ulcers and gastritis) and for moderating blood sugar levels.

Notes [27]:

Excessive consumption of soursop is not recommended for pregnant or

breastfeeding women and individuals with neural disorders, as its cyanogenic components can result in neurotoxic metabolites that may be passed through breast milk.

3.5. *Artocarpus heterophyllus* L. (Sapindaceae)

Originating from the tropical forests in southwestern India, this fruit can weigh up to 40 kg and is extremely versatile, as it can be consumed fresh or in savory dishes.

Composition per 100 g [28]:

Energy: between 21 and 98 kcal depending on ripeness, Carbohydrates: 25.4 g, Protein: 1.9 g, Dietary fiber: 1.5 g, Additionally, it contains Vitamin C, Vitamin A, Vitamin B6, Calcium, Potassium, and Phosphorus.

Active ingredients [29]:

Flavonoids: These compounds have antioxidant and anti-inflammatory effects, protecting the body from the damaging process of oxidation by free radicals and inhibiting the release of inflammatory cells.

Carotenoids: A natural pigment responsible for the fruit's color, which also exhibits antioxidant properties.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [30]:

Cardiovascular actions: Studies indicate that the bioactive compounds in jackfruit, such as Potassium, isoflavones, and saponins, may help lower blood pressure and prevent heart diseases.

Skin health: The Vitamin C present in the fruit can protect the skin from natural damage caused by aging and is also essential for collagen production, which provides firmness to the skin.

Prevention of constipation: The fruit is rich in dietary fiber, promoting good intestinal function.

Wide-ranging benefits: Jackfruit is a good source of B-complex vitamins, such as B3, also known as niacin. This nutrient is essential for energy metabolism.

Notes: Due to its compounds that help control blood glucose levels, consuming jackfruit alongside anti-diabetic medications may lead to excessively low blood sugar. This combination should be approached with caution and monitored closely.

3.6. *Averrhoa carambola* L. (Oxalidaceae)

The starfruit, a tropical fruit native to Southeast Asia, is recognized for its star shape when sliced and its sweet-tart flavor.

Composition per 100 g [31] [32]:

Carbohydrates: 11.5 g, Protein: 0.9 g, Dietary fiber: 2.0 g

Active ingredients [33]:

Antioxidants: Starfruit is rich in Vitamin C and gallic acid, which reduce the production of free radicals.

Dietary fibers: These are composed of approximately 60% cellulose, 27% hemicellulose, and 13% pectin.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [33] [34]:

Studies indicate the presence of anti-inflammatory activity in alcoholic extracts of the starfruit plant's leaves, as well as antimicrobial activity. The dietary fibers in starfruit aid in intestinal transit by facilitating the formation of fecal matter and promoting peristaltic movements. They also help regulate blood glucose levels by delaying the absorption of carbohydrates. Additionally, they assist in regulating total cholesterol levels. Therefore, they may be beneficial for pre-diabetic and diabetic patients, as well as those with dyslipidemia.

Notes: Starfruit contains a high amount of oxalates in its composition, which can have toxic effects for individuals with kidney problems.

3.7. *Carica papaya* L. (Caricaceae)

Tropical and sweet fruit, with greenish skin and orange pulp. The most consumed varieties in Brazil are papaya and formosa.

Composition per 100 g [35]:

Approximately 46 kcal, 9.74 g of carbohydrates, 0.82 g of proteins, 0.12 g of total fats, 1.81 g of dietary fiber, and 3.26 mg of sodium.

Active principles [36]-[39]:

Vitamins C and A, Lycopene, and Beta-carotene: Antioxidants that combat free radicals.

Vitamin B2: Essential for proper energy metabolism and maintaining cellular health
Pectin: An important fiber that aids digestion and intestinal function, ideal for regular consumption and preventing constipation.

Drug interactions [40]:

Infusions and extracts of papaya leaves may interact with oral hypoglycemic medications (enhancing their effect), P-glycoprotein substrates (inhibiting transport), chelating antibiotics (reducing absorption and half-life), and antimalarial drugs (causing subsinergism or additive effects).

Conditions in which it can help [41] [42]:

Reduces the risk of colon cancer: The bio-modified pectin present in ripe fruit inhibits the development of pre-neoplastic lesions in the intestines, inducing cell death and preventing proliferation and migration.

Constipation: The fibers and papain increase intestinal motility, acting as a laxative.

3.8. *Citrus × latifolia* (Rutaceae)

Originally from India, Tahiti lime is one of the most consumed types of lime in the world. Due to its high acidity, it is used in a wide variety of preparations and is an excellent source of vitamins.

Composition per 100 g [43]:

9.2 g of carbohydrates; 1.1 g of protein; 0.3 g of fat; 2.8 g of fiber, 2 mg of sodium, and 138mg of potassium.

Active ingredients [44]: Citric acid, pectin, limonene, pinene, and phellandrene are some of the main active compounds in lime. These provide antioxidant, anti-inflammatory, and bactericidal properties.

Drug interactions [45]: Although with limited clinical significance, lemon juice inhibits the CYP3A4 enzyme, which is responsible for metabolizing several drugs such as paracetamol, codeine, cyclosporine, diazepam, erythromycin, and chloroquine. When consumed in large amounts, lemon juice can increase the toxicity of these medications.

Conditions in which it can help:

Weight loss [46]: Due to its high fiber content, lime can help increase the feeling of fullness and thus aid in reducing calorie intake.

Anemia [47]: Due to its high acidity, lime can convert and maintain iron from food in its bioactive form, enhancing iron absorption in the body.

Acne [48]: Due to its anti-inflammatory properties, lime helps control and prevent acne.

Hypertension [49]: Lime contains flavonoids that inhibit blood vessel constriction, helping to lower blood pressure. It also has diuretic effects that assist in the elimination of retained fluids.

Gastroprotective effect [50]: When consumed by healthy individuals, lime helps form a protective mucus layer in the stomach and aids in controlling the bacteria that cause gastritis, *H. pylori*.

3.9. *Citrullus lanatus* (Cucurbitaceae)

Sweet fruit with green skin, red flesh, and high-water content.

Composition per 100 g [51]:

Approximately 30 calories, 0.7 g of protein, 6.5 g of carbohydrates, and 0.1 g of fiber. Additionally, it is a source of magnesium, iron, calcium, vitamin C, vitamin A, and folate equivalent.

Active ingredients [52]:

Vitamin C: An antioxidant that helps prevent cellular damage caused by free radicals.

Carotenoids: A class of plant compounds that includes alpha-carotene and beta-carotene, which the body converts into vitamin A.

Lycopene: A type of carotenoid that converts to vitamin A. A potent antioxidant is responsible for the red color in some plant foods.

Cucurbitacin E: A plant compound with antioxidant and anti-inflammatory effects.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help:

Reduction of cardiovascular disease risk [53]: Due to one of its components, lycopene, it helps lower cholesterol, blood pressure, and oxidative damage.

Reduction of muscle fatigue [54]: In addition to containing citrulline, watermelon juice appears to increase the absorption of the supplemented substance.

Reduction of cancer risk [52] [53] Due to its antioxidant components, such as vitamin C and carotenoids.

3.10. *Citrus reticulata* Blanco (Rutaceae)

Originally, from Southeast Asia, it is known for its thin, easy-to-peel skin, revealing juicy buds full of flavor.

Composition in 100 g [55]:

It has approximately 38 calories, 9.6 g of carbohydrates, 0.9 g of proteins and 0.9 g of dietary fiber. In addition, it has Vitamin C, Calcium, Potassium, Phosphorus and Magnesium in its composition.

Active ingredients [56]:

Flavonoids: Dry tangerine peel has flavonoids in its composition. Among them, nobiletin and hesperidin. Antioxidants: tangerine has a considerable amount of Vitamin C, which, in addition to being an antioxidant, is important in several biological processes, such as the absorption of iron from vegetables, for example. Furthermore, it has coumarins in its shell, which also act by reducing the production of free radicals. Essential oils: tangerine peel contains essential oils, rich in compounds such as Limonene, which has neurological activity.

Drug interactions: Data not found in the consulted literature.

Conditions in which it helps [57] [58]:

Nobiletin is a substance that exhibits interesting anti-cancer properties, promoting the formation of reactive oxygen species within tumor cells.

Hesperidin shows inhibitory activity on pancreatic lipase, an enzyme that plays a significant role in the breakdown of lipids and their absorption in the intestines. By inhibiting this enzyme, lipid absorption in the intestine is reduced, which may help with obesity.

Vitamin C is an important antioxidant that helps strengthen the immune system.

Limonene suppresses acetylcholinesterase activity, in addition to suppressing the production of reactive oxygen species and hyperfunction of voltage-dependent potassium channels, factors that influence the development of Alzheimer's disease.

3.11. *Citrus spp.* (Rutaceae)

Orange is one of the most widely consumed fruits worldwide, known for its distinctive taste and fragrance, as well as the many health benefits it can provide.

Composition per 100 g [59]:

Pêra Orange: Each 100 g of raw Pêra orange contains approximately 37 kcal, 0.1 g of fat, 8.9 g of carbohydrates, 1 g of protein, 0.8 g of fiber, and 53.7 mg of Vitamin C.

Lima Orange: Each 100 g of raw Lima orange contains approximately 46 kcal, 0.1 g of fat, 11.5 g of carbohydrates, 1.1 g of protein, 1.8 g of fiber, and 43.5 mg of

Vitamin C, with 1 mg of sodium.

Active ingredients [60]:

Flavonoids: The main flavonoid present in oranges is Hesperidin, found in the peel and fruit, which protects against reactive oxygen species.

Essential Oils: The essential oil of orange is found in its peel and is rich in Limonene. It has antibacterial activity, being capable of inhibiting the growth of *Shigella* at concentrations starting from 20 µg/mL and *S. aureus* at 30 µg/mL.

Vitamin C: A powerful natural antioxidant important for many physiological functions and helps prevent scurvy. It aids in the absorption of iron from vegetables, making it a powerful ally for vegetarians and vegans. However, caution is advised, as consuming more than 100 mg per day consistently can lead to kidney stones. Due to its reactivity, it is recommended to consume the fruit or freshly made juice for greater benefits.

Coumarins: Found mainly in the peels, coumarins can reduce the cellular production of free radicals and act as chelators of transition metals, giving them antioxidant properties.

Drug Interactions: Data not found in the consulted literature.

Conditions in which it can help:

Obesity [61]: There are studies that prove that oranges play a role in the control and prevention of obesity. A study with Wistar albino rats showed a decrease and maintenance of weight in obese rats consuming orange segments over four weeks.

Scurvy [62]: A disease characterized by a severe deficiency of vitamin C. Although rare, the disease can still occur in people who do not include enough fruits and vegetables in their diet. It can be prevented by consuming oranges or their juice, as citrus fruits are excellent sources for the curative and preventive treatment of scurvy. Hypovitaminosis C is severe after serum levels have fallen below 0.2 mg per 100 ml.

3.12. *Cucumis melo* L. (Cucurbitaceae)

Melon is a fruit with refreshing and hydrating properties, as it is composed of 90% water.

Composition per 100 g of melon pulp [63]:

It contains approximately 29 calories, 7.5 g of carbohydrates, 0.3 g of crude fiber, and 0.7 g of proteins.

Active ingredients [64]:

Vitamin C: Orange-fleshed melons provide more than half of the recommended daily dose of vitamin C per 100 g, acting as an antioxidant in the body.

Carotenoids: These compounds help prevent cardiovascular diseases and strengthen the immune system.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [65]:

Melon has mild laxative and infusion properties, aiding in blood clotting and preventing hemorrhages. It also slows down bone decalcification in the elderly.

Some studies report that melon has medicinal properties, being considered calming, refreshing, alkalizing, mineralizing, oxidizing, and diuretic.

Notes [66]: Melon seeds are rich in vegetable oils and proteins and can be consumed roasted, like nuts.

3.13. *Diospyros kaki* L. (Anacardiaceae)

A tropical fleshy fruit with a bright orange-red color, highly valued for its sweet and pleasant taste.

Composition per 100 g [67]:

Water: 80.6 g, Carbohydrates: 18.3 g, Fiber: 4.56 g, Protein: 0.48 g, Vitamins A, C, and E: 239 mcg, 20.6 mg, and 0.77 mg, respectively.

Active ingredients [68]:

Vitamins A, C, and E: These have antioxidant activity. Additionally, vitamin C helps with iron absorption. Vitamin E is related to the prevention of non-communicable chronic diseases, the modulation of the aging process, and immune system stimulation.

Phenolic compounds and carotenoids: These have antioxidant activity, anti-cancer properties, and cardioprotective effects.

Fiber: Its pulp mainly consists of mucilage and pectin. The fibers reduce the absorption of sugars and fats and promote satiety.

Tannins: They have antibacterial, antioxidant, and cardioprotective activities.

Drug interactions [69]:

Studies suggest interactions with Chlorpromazine and Fluphenazine (antipsychotics) and Promethazine (antihistamine), as the presence of tannic acid in persimmons can cause the precipitation of these drugs. Additionally, when consumed with antihypertensives, it can cause hypotension, and with anticoagulants, it may increase the risk of bleeding.

Conditions in which it can help [70]:

Prevention of dyslipidemia and heart disease: Due to its active ingredients (fiber, minerals, and phenolic compounds), which have lipid-lowering and antioxidant effects in the plasma, persimmons have the potential to improve lipid metabolism and the individual's total antioxidant activity, thereby reducing the risk of developing dyslipidemia and heart diseases.

Protection against DNA damage: Reactive oxygen/nitrogen species or free radicals can cause DNA damage, leading to carcinogenesis and are important mediators in aging and degenerative diseases. Due to its high content of antioxidant compounds, persimmons can provide protection by inactivating these free radicals.

Cancer prevention: Besides inhibiting free radicals through antioxidant substances, studies have explored other compounds present in persimmons. One of these is 24-hydroxyursolic acid, which has demonstrated the ability to inhibit cell proliferation through two different pathways, and it also induces apoptosis in cancer cells.

Blood pressure reduction: Studies indicate that flavonoids can reduce the activity of the angiotensin-converting enzyme. There are also studies showing that tannins can lower blood pressure.

Notes [70]: Excessive consumption of persimmons may cause constipation. Despite studies showing anticancer and hypotensive activities, more research is needed to fully understand the therapeutic mechanisms.

3.14. *Eugenia uniflora* (Myrtaceae)

The pitanga is the fruit of the pitangueira tree, shaped like small, fleshy globes, and comes in red (the most common), orange, yellow, or black.

Composition per 100 g [71]:

Water: 90.8 g, Carbohydrates: 7.4 g, Protein: 0.8 g, Calcium: 9 mg, Vitamin C: 26.3 mg, Vitamin A (RAE): 75 µg, Magnesium: 12.0 mg, Lipids: 0.4 g; Phosphorus: 11 mg, Iron: 0.2 mg, Potassium: 103 mg, Niacin: 0.3 mg, Riboflavin: 0.04 mg, Sodium: 3 mg

Active ingredients [72]:

Terpenes: These compounds are common in essential plant oils and are known for their aromatic, medicinal properties, and even their industrial applications.

Flavonoids: They have various beneficial biological activities, such as antiviral, antioxidant, and vasodilatory effects.

Alkaloids: Alkaloids, nitrogen-containing compounds with heterocyclic rings found in plants like *Passiflora*, serve various functions, including protection against herbivores and microorganisms, detoxification of harmful substances, and nitrogen storage.

Vitamin C: It is an antioxidant that helps prevent cellular damage caused by free radicals.

Drug Interactions [73]: Data not found in the consulted literature.

Conditions in which it can help [72]:

Cardiovascular Diseases: Studies have examined the effects of intraperitoneal administration of its crude aqueous extract, observing a dose-dependent decrease of up to 47.1% in blood pressure levels.

Diabetes: The leaves of *E. uniflora* act on the enzymes α -glucosidase, maltase, and sucrase, making them useful in diabetes treatment.

Analgesic: An anti-inflammatory effect has been reported with an infusion made from fresh leaves; the infusions and decoctions tested showed analgesic action.

3.15. *Euterpe oleracea* (Arecaceae)

The açai palm tree (*Euterpe oleracea* Mart.), a species belonging to the palm family (Arecaceae), is native to several countries in the Amazon region of Central and South America, including Brazil, Ecuador, and Venezuela.

Composition per 100 g [74]:

Each 100 g of fresh açai pulp contains approximately 58 kilocalories, 3.9 g of

fat, 6.2 g of carbohydrates, 0.8 g of protein, 2.6 g of fiber, and 5 mg of sodium.

Active ingredients [75]:

Polyphenols: These are the most significant constituents of the chemical profile. The main secondary polyphenolic metabolites include anthocyanins (ACNs) and proanthocyanidins (PACs), as well as other flavonoids.

Carotenoids (terpenoids): The predominant ones found in açai fruit are lutein, α -carotene, 13-cis- β -carotene, and 9-cis- β -carotene.

Drug Interactions: Data not found in the consulted literature.

Conditions in which it can help [76]:

Gastroprotective effects.

Dyslipidemia: It may help reduce total cholesterol and low-density lipoprotein (LDL) levels, as well as increase high-density lipoprotein (HDL) levels. In summary, açai has anti-hypertriglyceridemic and anti-cholesterolemic properties, making it a promising option for the treatment and prevention of lipid disorders.

Cardiovascular diseases: It is a potential cardiovascular therapeutic agent due to its cardioprotective bioactive compounds.

3.16. *Fragaria x ananassa* (Rosaceae)

The strawberry, a low-growing plant, is an infructescence of the strawberry plant. It is red and has a sweet, slightly acidic taste. It is consumed fresh, industrialized, or in the form of juices, jams, and sweets.

Composition per 100 g [77]:

Carbohydrates: 6.8 g, Protein: 0.9 g, Lipids: 0.3 g, Fiber: 1.7 g, Minerals: calcium (11 mg), magnesium (10 mg), phosphorus (22 mg), and potassium (184 mg).

Active ingredients [78] [79]:

Vitamin C: Plays an important and well-known role as an antioxidant. It also helps in the maintenance and formation of collagen in tissues, the development and regeneration of muscles, skin, teeth, and bones, and the regulation of body temperature.

Flavonoids: Compounds with scientifically demonstrated antioxidant and anti-mutagenic activity. There is also evidence of their role in protecting tissues from free radicals and lipid peroxidation in pathological conditions such as cancer and chronic inflammation, and in reducing the risk of coronary heart disease.

Ellagic acid: Evidence suggests this compound has chemopreventive and antioxidant properties, although it is still under study.

Anthocyanin: In addition to the functions mentioned for flavonoids, anthocyanin is responsible for the plant's red color.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [80]:

Antioxidant action: Strawberries are rich in vitamins, minerals, and phenolic compounds. As a result, one of their main benefits is their powerful antioxidant capacity, neutralizing free radicals involved in pathological processes such as cardiovascular diseases and some types of cancer.

Antimutagenic action: Due to their high flavonoid content, which acts as antioxidants, studies suggest that they may inhibit eicosanoid synthesis, platelet aggregation, and, in some cases, induce enzymes involved in regulatory processes such as cell division and proliferation.

3.17. *Malpighia punicifolia* L. (Malpighiaceae)

A small red fruit well-known for its high vitamin C content. The fruit is typically red or orange when ripe and has a flavor that ranges from sour to sweet.

Composition per 100 g [81]:

Calories: 30 Kcal, Carbohydrates: 6.89 g, Protein: 0.71 g, Dietary fiber: 1.75 g, Fats: 0.38 g, Vitamin C: 1505 mg, Sodium: 0.67 mg.

Active ingredients [81]:

Vitamin C: Acerola is one of the richest natural sources of vitamin C, also known as ascorbic acid. It is an essential vitamin for the immune system and a powerful antioxidant.

Flavonoids: Acerola contains flavonoids such as rutin, quercetin, and kaempferol, which have antioxidant and anti-inflammatory properties.

Carotenoids: The fruit contains carotenoids, such as beta-carotene, which have antioxidant properties and may contribute to skin, eye, and immune system health.

Drug interactions [82]:

Vitamin C may alter the effectiveness of antineoplastic medications by preserving mitochondrial membrane potential. Naringin and vitamin C in fruit juice may increase blood concentrations of lovastatin, potentially reducing the need for more frequent dosing or prescription of lovastatin.

Conditions in which it can help [83]:

Antioxidant: Acerola has a high amount of vitamin C, which has important antioxidant properties that help combat infections by strengthening the immune system and aid in collagen synthesis.

Antimicrobial: The fruit contains various compounds, such as flavonoids, phenolic acids, and furans, which exhibit antimicrobial activity, particularly for food preservation.

Iron absorption: The vitamin C in acerola can enhance the absorption of iron from food, which is beneficial for preventing and treating iron deficiency anemia.

3.18. *Malus domestica* Borkh (Rosaceae)

It is a globose pseudofruit with red or green coloration, sometimes showing small greenish or yellowish spots.

Composition per 100 g [84]:

Carbohydrates: 15.7 g; Fiber: 2.07 g; Protein: 0.29 g; Saturated fatty acids: 0.20 g; Vitamins A and C: 7.0 mcg and 1.95 mg, respectively.

Active ingredients [85]:

Vitamins A and C: These have antioxidant activity. Additionally, vitamin C aids

in iron absorption.

Phenolic compounds and carotenoids: They have antioxidant activity and also provide protection against breast cancer (phlorizin), and stomach protection from damage and inflammation (polyphenolic compounds), among other benefits.

Fiber: Pectin is the main fiber found in apples. Fibers reduces the absorption of sugars and fats and promotes satiety.

Drug interactions [86]:

Apples may decrease the absorption of certain drugs due to their potential to inhibit OATPs (Organic Anion Transporting Polypeptides), which are important proteins for the absorption of substances, for example, through the gastrointestinal wall.

Conditions in which it can help [87]:

Antioxidant activity: The flavonoids and phenolic compounds in apples have antioxidant and antimicrobial properties.

Anti-inflammatory activity: Certain acids, such as chlorogenic acid and maslinic acid, have potential anti-inflammatory activity. Particularly, maslinic and pomolic acids have anti-inflammatory and anti-arthritis effects due to the inactivation of NF- κ B.

Diabetes: Studies suggest that some phenolic compounds, along with soluble fibers, can reduce glucose absorption.

Cancer prevention: Animal model studies indicate that apples are effective in preventing skin, breast, and colon carcinogenesis. Epidemiological studies suggest that regular consumption of one or more apples per day may reduce the risk of lung and colon cancer.

3.19. *Musa spp.* (Musaceae)

Fruits with soft, tasty, and sweet flesh. They grow in clusters on a tree called the banana plant. There are various varieties of bananas. Originally, from Southeast Asia, they are currently cultivated in practically all tropical regions of the planet.

Composition per 100 g [88]:

Energy 371 kJ (89 kcal); Water 74.91 g; Carbohydrates 22.84 g; Sugars 12.23 g; Dietary Fiber 2.6 g; Vitamins B5 0.334 mg (7%); B6 0.4 mg (31%); Choline 9.8 mg (2%); Vitamin C 8.7 mg (10%); Minerals Magnesium 27 mg (8%); Phosphorus 22 mg (3%); Potassium 358 mg (8%); Sodium 1 mg (0%); Zinc 0.15 mg (2%).

Active ingredients [89]:

Phenolic Compounds: Bananas are rich in phenolic compounds, such as ferulic acid, rutin, quercetin, myricetin, kaempferol, and cyanidin. These compounds act as antioxidants, eliminating free radicals, reactive oxygen species (ROS), and reactive nitrogen species (RNS). Phenolic compounds also exhibit antibacterial, antiviral, anti-inflammatory, anti-allergic, antithrombotic, and vasodilatory activities.

Flavonoids: The flavonoids present in bananas, such as leucocyanidin analogs, have shown significant anti-ulcer activity and therapeutic potential in treating

gastric diseases. Flavonoids also possess antioxidant properties, chelating actions, and can inhibit enzymes involved in various body processes

Carotenoids: Bananas contain carotenoids such as α -carotene, β -carotene, β -cryptoxanthin, lycopene, and lutein. Carotenoids have antioxidant capacity and can eliminate reactive oxygen species (ROS). Lycopene provides protection against prostate cancer, while lutein inhibits age-related macular degeneration.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [89]:

Antioxidant Protection: The bioactive compounds in bananas, such as phenolic compounds and carotenoids, act as antioxidants, helping to neutralize harmful free radicals and reduce oxidative stress in the body. This antioxidant protection may help prevent chronic diseases and support overall health.

Anti-inflammatory Effects: Some bioactive compounds in bananas, like flavonoids, have anti-inflammatory properties. By reducing inflammation in the body, bananas may help lower the risk of inflammatory diseases and promote better health.

Gastrointestinal Health: Bananas are known for their high fiber content, which supports digestive health by promoting regular bowel movements and nourishing beneficial gut bacteria. The resistant starch in bananas also acts as a prebiotic, aiding gut health.

Cardiovascular Health: Potassium, a mineral abundant in bananas, plays a vital role in maintaining heart health by regulating blood pressure and supporting proper heart function. Consuming potassium-rich foods, like bananas, can help reduce the risk of cardiovascular diseases.

Recommended amounts [88]: It is recommended to consume one banana per day, with at least three bananas per week to gain the fruit's benefits.

3.20. *Passiflora edulis* Sims (Passifloraceae) [90]

Composition per 100 g:

Carbohydrates: 12.3 g (4%), Proteins: 2.0 g (3%), Dietary Fiber: 1.1 g (4%), Soluble Fiber: 0.1 g, Calcium: 5.4 mg, Vitamin C: 19.8 mg, Manganese: 0.1 mg, Magnesium: 28.0 mg, Lipids: 2.1 g, Phosphorus: 50.7 mg, Iron: 0.6 mg, Potassium: 338.4 mg, Zinc: 0.4 mg, Sodium: 1.6 mg

Active ingredients:

Alkaloids: Alkaloids, nitrogenous compounds in heterocyclic rings found in plants such as *Passiflora*, serve various functions, including protection against herbivores and microorganisms, detoxification of harmful substances, and nitrogen storage.

Saponins: Saponins, glycosides of steroids or triterpenes, are common in plants and act in defense against pathogens.

Flavonoids: They possess various beneficial biological activities, such as antiviral, antioxidant, and vasodilatory effects.

Vitamin C: It is an antioxidant that helps prevent cellular damage caused by

free radicals.

Drug interaction: May potentiate the sedative effects of certain medications.

Conditions in which it can help:

Cardiovascular diseases: The peel of the passion fruit is rich in soluble fibers, mainly pectin, which helps prevent cardiovascular diseases.

Calming effects: In Brazil, the use of leaves in tea form is popularly indicated as a calming agent, as alkaloids and flavonoids act as tranquilizers in our central nervous system.

Gastrointestinal diseases: The peel of the passion fruit is rich in soluble fibers, mainly pectin, which helps prevent gastrointestinal diseases.

Diabetes: Preliminary studies have shown that flour from the passion fruit peel reduces blood sugar levels. Additionally, the peel is rich in soluble fibers and pectin.

3.21. *Plinia trunciflora* (Myrtaceae)

Plinia trunciflora (brazilian denomination: Jaboticaba) is a typical fruit from Brazil, characterized by a dark purple skin and sweet, juicy white or pink flesh.

Composition per 100 g [91]:

Calories: Approximately 58 kcal, Carbohydrates: About 15 g, Proteins: Around 0.7 g, Fats: Nearly negligible, usually less than 0.2 g, Fiber: About 1 g.

Active ingredients [92]:

Anthocyanins: These are potent antioxidants that help combat free radicals in the body. They are associated with reducing the risk of cardiovascular diseases, protecting against premature aging, and potentially having anti-inflammatory effects.

Vitamin C: It plays a crucial role in strengthening the immune system, skin health, and iron absorption. In addition to its antioxidant capacity, it helps protect body cells from damage caused by free radicals.

Ellagic Acid: It has demonstrated antioxidant and anti-inflammatory properties. Additionally, ellagic acid may be associated with protection against certain types of cancer and support for cardiovascular health.

Minerals: Jaboticaba contains a variety of minerals, such as potassium, calcium, and phosphorus, which play important roles in various body functions, including bone health, blood pressure regulation, and muscle function.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [92]:

Cardiovascular diseases: Due to its high content of antioxidants, such as anthocyanins, jaboticaba may help protect the cardiovascular system by reducing LDL oxidation and inflammation, which can contribute to the prevention of cardiovascular diseases.

Skin health: The vitamin C in jaboticaba is essential for collagen production, a protein important for skin health.

Digestive health: The fiber helps promote intestinal regularity, prevent

constipation, and may aid in blood sugar control by reducing glucose spikes after meals.

3.22. *Psidium guajava* L. (Myrtaceae)

Cultivated on the American and Asian continents, guava is characterized mainly by the juiciness of its pulp.

Composition per 100 g [93]:

Calories: 50 kcal, Carbohydrates: 7.65 g, Dietary fiber: 5.78 g, Calcium: 6.45 mg, Potassium: 200 mg, Magnesium: 8.75 mg, Vitamin A: 53.1 mg, Vitamin C: 89.9 mg.

Active ingredients [94]:

Anthocyanins and Carotenoids: They have antioxidant effects and prevent injuries caused by free radicals.

Vitamins: A, B2, B3 e C

Fiber: With pectin as the main soluble fiber constituent, moderate consumption of guava is beneficial for the digestive system and helps prevent gastrointestinal disorders.

Drug interactions [94]:

Consumption of guava may enhance the action of constipating medications.

Conditions in which it can help [95]:

Due to its potential to induce constipation, guava consumption is recommended for diarrhea.

3.23. *Prunus pérsica* (Rosaceae)

The peach is the fleshy fruit that comes from the peach tree. The skin of the peach is thin, velvety, and orange in color. Its flesh is yellowish and is commonly used to make sweets, cakes, jellies, preserves, and juices.

Composition per 100 g [96]:

Water: 89 g, Carbohydrates: 9.5 g, Protein: 0.9 g, Sugars: 8.4 g, Fiber: 1.5 g, Calcium: 6 mg, Vitamin C: 6.6 mg, Vitamin A: 16 µg, Potassium: 103 mg

Active ingredients [97]:

Vitamin C: It is an antioxidant that helps prevent cellular damage caused by free radicals.

Vitamin A: It is important for the immune system, helping to maintain the integrity of mucous membranes, which serve as a physical barrier against pathogens.

Drug Interactions: Data not found in the consulted literature.

Conditions in which it can help [97]:

Antioxidant: Vitamin C, β -carotene, and lycopene, due to their antioxidant functions, help combat free radicals.

Intestinal Transit: Rich in fibers such as pectin, the fruit helps increase water absorption in the intestine, preventing constipation.

Immunity: Foods rich in beta-carotene, such as peaches, are also known as “provitamin A” because this vitamin aids the immune system.

3.24. *Tamarindus indica* L. (Fabaceae)

Fruit originating from equatorial Africa, it has a distinctive sweet yet sour taste.

Composition per 100 g [98]:

Proteins 2.8 g, Carbohydrates: 62.5 g, Dietary fiber: Also contains potassium, phosphorus, calcium, and vitamin C.

Active ingredients [99]:

Flavonoids: Specific compounds have been isolated from tamarind, such as procyanidin, catechin, taxifolin, apigenin, luteolin, and naringenin. By suppressing the synthesis of leukotrienes and other inflammatory mediators, these flavonoids have anti-inflammatory and analgesic effects.

Alkaloids and tannins: These are present in large amounts in the fruit and also have anti-inflammatory properties.

Drug interactions: Data not found in the consulted literature.

Conditions in which it can help [98] [100]:

Laxative effect: In traditional medicine, tamarind is used for its laxative properties. The fruit contains malic and tartaric acids, which may be responsible for this effect.

Anti-inflammatory and analgesic effect: Another traditional use of tamarind is for pain relief. Tamarind extracts containing sterols and triterpenes have shown analgesic activity in animal models, suggesting that these compounds may be responsible for this property.

3.25. *Vitis vinifera* L. (Vitaceae)

The grape is the fruit of the vine, a plant from the Vitaceae family. It is commonly used to produce juice, jams, wine, and raisins, and can also be eaten fresh.

Composition per 100 g [101]:

Energy value: 57 kcal, Carbohydrates: 12.8 g, Protein: 0.55 g, Dietary fiber: 0.93 g, Calcium: 7.58 mg, Magnesium: 6.04 mg, Vitamin: 5.33 mcg, Vitamin C: 4.58 mg

Active ingredients [102]:

Flavonoids, anthocyanins, and catechins [4]: These compounds have antioxidant action and promote protection against the effects of free radicals. Additionally, these compounds work synergistically to reduce the action of enzymes related to carbohydrate absorption, consequently lowering blood sugar levels.

Resveratrol [5]: A natural antioxidant found mostly in dark grapes and their derivatives.

Drug interactions [103]-[105]:

Excessive consumption of grapes, especially with their skins, is contraindicated for people taking oral cyclosporine, as their compounds reduce the absorption of these immunosuppressants. Additionally, grape consumption may enhance the effect of acarbose and other hypoglycemic agents.

Conditions in which it can help [102]:

The consumption of grapes is recommended for people with elevated blood

sugar levels who are not using hypoglycemic agents. Additionally, due to their richness in natural antioxidants, there are recommendations for cardioprotective effects.

4. Discussion

The economic, political, social, and cultural transformations produced by human societies over time alter the ways in which individuals and communities organize their lives and choose certain ways of living. Such changes both facilitate and hinder populations' access to living conditions that favor health and, therefore, directly impact the shift in disease patterns. Currently considered an epidemic, non-communicable chronic diseases (NCDs) represent a serious public health issue in both high-income and middle- to low-income countries [106].

It is important to highlight that NCDs have a multifactorial etiology and share several modifiable risk factors, such as smoking, obesity, dyslipidemia, physical inactivity, and inadequate diet. Epidemiological studies emphasize that cardiovascular diseases (CVDs), for example, would be a relatively rare cause of death in the absence of these major risk factors [107].

In the case of type 2 diabetes mellitus, for example, medication should be initiated when nutritional and physical activity recommendations are not effective in maintaining HbA1c levels below 7.0, even in patients without symptoms, with a good quality of life, and who adhere to nutritional and physical activity guidelines [3].

Nutritional therapy can delay or even prevent the onset of type 2 diabetes in at-risk individuals, and its complications can be prevented through good glycemic control. Nutritional therapy is essential for achieving good glycemic control and is crucial for the success of pharmacological therapy. It should address lifestyle changes, dietary education, and weight management, especially through a healthy diet [108].

Food plays a crucial role in the prevention and control of several chronic diseases such as diabetes, hypertension, dyslipidemia and cardiovascular diseases. The World Health Organization (WHO) states that Chronic non-communicable diseases are responsible for 71% of a total of 57 million deaths that occurred worldwide in 2016 [109] [110].

For doctors, understanding the application of specific diets can be a powerful tool in managing these diets, for example, the Mediterranean diet is widely recognized for its benefits in the prevention and treatment of cardiovascular diseases [111]. In the case of arterial hypertension, diet plays a significant role in the management of hypertension (DASH diet—Dietary Approaches to Stop Hypertension), and for the management of dyslipidemia, the diet should focus on improving the patient's lipid profile with the benefits of a plant-based diet and Vitamin D supplementation [112].

Continuous education on the importance of nutrition in the management of chronic diseases is essential. Promoting healthy eating habits can have a lasting

impact on public health and the prevention of complications associated with these conditions. Personalized, evidence-based diets can significantly improve patients' quality of life and reduce disease progression [4].

5. Conclusion

The twenty-five technical sheets can be of great use in patient management. Health education is necessary for everyone, regardless of whether they are healthcare professionals or the general population. Dietary habits can aid in the prevention and control of numerous diseases. The technical sheets can serve as a tool to support the development of healthcare practices for patients, potentially having a positive impact on public health and the prevention of complications from existing diseases.

Acknowledgments

I would like to express my sincere gratitude to all those who supported me throughout this project. Special thanks to the interns of the University Pharmacy, who are undergraduate students in the Pharmacy program at the Faculty of Pharmaceutical Sciences of the University of São Paulo, for their invaluable contributions. Your assistance was essential in gathering information and enhancing the quality of this work.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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