**Switching Mediterranean Consumers to Mediterranean Sustainable Healthy Dietary Patterns**

| | | | |
|---|---|---|---|
| Grant Agreement No | 2133 | Project Acronym | SWITCHtoHEALTHY |
| Project Title | Switching Mediterranean Consumers to Mediterranean Sustainable Healthy Dietary Patterns | | |
| Funding scheme | PRIMA – Partnership for research and innovation in the Mediterranean area | | |
| Project Coordinator | ENCO | | |
| WP Number | 1 | | |
| Deliverable number | D1.1 | | |
| Deliverable Title | Report of Mediterranean, local and healthy plant-based ingredients | | |
| Lead Beneficiary | SLOWFOOD | | |
| Start date of the project | 01.04.2022 | Duration of the project | 36 months |
| Contractual delivery date | 31.07.2022 (deadline as stated in the DoA) | | |
| Actual delivery date: | 03.08.2022 | | |
| Type of Deliverable | R (Document, Report) | | |
| Dissemination level: | PU (Public) | | |
| Authors: | SLOWFOOD, BUU, KOC, UMP, CHOCO, DELAFRUIT, CNTA | | |
| Contributors: | SLOWFOOD, BUU, KOC, UMP, CHOCO, DELAFRUIT, CNTA | | |
| Version: | 1.0 | | |

The SWITCHtoHEALTHY project is part of the PRIMA Programme supported by the European under the Grant Agreement number 2133 – Call 2021 Section 1 Agrofood IA

*Disclaimer: The content of this deliverable reflects only the authors' view and PRIMA Foundation is not responsible for any use that may be made of the information contained therein.*

## History of changes

| Version | Author | Date | Comments |
|---|---|---|---|
| 0.1 | Slow Food | 18.07.2022 | 1st draft |
| 0.2 | Slow Food | 23.07.2022 | 2nd draft |
| 0.3 | Slow Food | 26.07.2022 | 3rd draft |
| 0.4 | Slow Food | 01.08.2022 | 4th draft |
| 0.5 | BUU-Slow Food | 03.08.2022 | 5th draft |
| 1.0 | ENCO | 03.08.2022 | Quality Assessment and final version |

*Table 1: History of changes*

## Table of Contents



### Index of Tables

## 1. Executive Summary

This document constitutes the operational and scientific report of the research carried out by the partners in the WP1 - Task 1.1, led by Slow Food.

In the introduction, the document illustrates the premises relating to the Mediterranean diet and the benefits that this diet, combined with a healthy lifestyle, has for human health and well-being.

The description of the research methods used, followed by the lists of ingredients selected for the three Mediterranean countries under study (Spain, Morocco, Turkey) is provided.

Food traditions and the use of selected ingredients in traditional cuisine are also illustrated for each country.

The document includes a preliminary analysis of the commercial use of the ingredients and a rich scientific bibliography and a selection of weblinks.

The conclusions indicate the reasons that for each country led to the choice of 2 ingredients useful for the first experimentation to realize prototypes of snacks, that will be the subject of the next Task of the project.

## 2. Introduction

The aim and target of this task is the research of **plant-based food ingredients** which are rich in **bioactive components**, to make important contributions to health (especially in the diet of children and adolescents) and which play (or played in the past and now are abandoned) an important role in recipes and cultures of the Mediterranean countries involved in the project.

A diet rich in vegetables, fruits, whole grains, beans, and fish is essential for maintaining good health. Regular physical activity is another important factor in preventing disease and ensuring a long and healthy life. Equally important is not to smoke and to limit the use of alcohol. Finally, facing life with optimism and positivity, having solid emotional relationships, carrying out intellectual and creative activities, protecting and respecting the environment with our daily actions, are all actions that have a beneficial effect on health and together contribute to the "well-being" of the person (psychological, physical, and social). It is important that this lifestyle is set from youth.

These rules form the identity card of the **Mediterranean Diet (MD)**, which is not just a diet, but a real lifestyle.

In our food agenda, therefore, we should have; a) an abundant presence of vegetables and fruits of all colors; whole grains and beans; b) fats of vegetable origin such as extra virgin olive oil and nuts; c) fish; d) little salt; e) a limited and only occasional consumption of sweets and sugary drinks. Children and adolescents should not consume alcohol, adults only in moderation; often vary the menu of our meals.

A useful concept to explain what we should eat during each meal is that of the **HEALTHY EATING PLATE** (on the plate divided into 4 portions, fruit and vegetables take up half of it, while cereals and proteins are divided up in the other half), which helps us to choose, among the different food groups, what to eat in adequate quantities and in the right variety (https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/) .

Through food our body receives what it needs to live well and in health: proteins, carbohydrates, fats, vitamins, mineral salts, water are contained in all foods, which are divided into 5 groups:

**Group 1** - *cereals and derivatives, tubers*. They provide complex carbohydrates (starch and fiber), vegetable proteins and vitamins of the B complex, selenium and phytocompounds.

**Group 2** - *fruit and fresh vegetables*. They provide a lot of water and fiber and ensure a "full" of vitamins, mineral salts and other beneficial chemical compounds (called phytocompounds);

**Group 3** - *legumes, fish, meat, and eggs*. They supply proteins, mineral salts (such as iron, zinc, copper), fats and vitamins of the B complex. Legumes also provide good quantities of starch, fiber and phytocompounds.

**Group 4** - *milk and derivatives*. They provide animal proteins, mineral salts (especially calcium), vitamin A, some vitamins of the B complex and saturated fats.

**Group 5** - *seasoning fats* (oil and other seasoning fats). They provide fat, fat-soluble vitamins A, D, E and K.

**Proteins -** are very important compounds in our body. They are essential for the construction of all our cells and also serve to make the most delicate organs function (heart, brain, kidneys and liver). Proteins of animal origin (in fish, meat, eggs, milk, yogurt, and cheeses) and proteins of vegetable origin (in legumes, such as beans, lentils, chickpeas, broad beans; in cereals such as wheat, rice, barley, corn, etc.).

Proteins are made up of "amino acids", of which the "essential" ones come from food. An aliment is therefore all the more complete the more essential amino acids it contains. Foods of animal origin contain all the essential amino acids, but also contain "saturated" fats, which taken in excess are harmful, especially for the heart. Plant-based foods are rich in essential amino acids, but to have them all we have to combine different ingredients: for example, legumes lack an essential amino acid, "methionine" which is instead present in large quantities in cereals; these, on the other hand, have low concentrations of "lysine", another essential amino acid which is also contained in high quantities in legumes. Cereals and legumes have a low-fat content and are rich in fiber, vitamins, mineral salts and phytocompounds.

**Carbohydrates** – also called "sugars" - they are very digestible and quickly give energy to our body. They should never be missing in a good diet. They are divided into "simple sugars" (they come into action immediately and burn in a few minutes: they are found in sugar, sweets, and sugary drinks); "complex" sugars (they are absorbed slowly, but the energy lasts a long time: starch and fiber). Starch can be found in cereals (products such as bread, pasta, rice) and potatoes. Fibers are present in legumes, whole grains, fruit, vegetables, and are very important for bowel functionality.

**Vegetable fats** – they are rich in unsaturated and monounsaturated fatty acids, defined as "good" because they perform protective functions and are found in olive, peanut, sunflower oil, nuts, and seeds. Among the unsaturated fats, the “essential” fatty acids (Omega3 and Omega6) stand out for their functions and properties. In particular, Omega-3 fatty acids perform many important functions: they protect the heart from dangerous diseases, contribute to the correct development and functioning of the retina, improve brain functions and intervene in the formation of eicosanoids (powerful chemical messengers that protect us from infections and cure inflammation). Omega3 fatty acids are linolenic acid, contained in flax seeds and walnuts and EPA and DHA acids, which are found mainly in fish. Omega6 are linoleic acid, found in soybean, seed and sunflower vegetable oils and arachidonic acid present in small quantities in chicken meat and eggs.

**Animal fats** – contain saturated fats and are found in foods of animal origin (butter, meat, eggs, milk, cheese).

**Mineral salts** – they do not provide calories but perform important functions for the body. They are divided into Macro elements (calcium, phosphorus and magnesium, which are used for the construction of bone, muscle, nervous tissue and cell membranes; potassium, sodium and chlorine, which regulate the pressure of cell fluids); Oligo elements (iron, which intervenes in the formation of red blood cells and serves to transport oxygen to the cells; iodine, which intervenes in the formation of thyroid hormones and regulates the development of the body; zinc, which is important for making white blood cells work).

*Table 2: Macro Elements*

| | FOOD SOURCES | FUNCTIONS |
|---|---|---|
| Calcium (Ca) | Milk, yogurt, cheese, beans, broccoli, spinach | It builds the bones and teeth, indispensable for all ages. It is also used for blood clotting |
| Phosphorus (P) | Meat, fish, eggs, peanuts, lentils | It builds up bone and muscle tissue, serves to manufacture nerve tissue and cell membranes |
| Magnesium (Mn) | Whole grains, peanuts, walnuts and greens | It builds bone tissue and is found in cell nuclei, plasma, and muscle and nerve tissue |

*Table 3: Oligoelements*

| | FOOD SOURCES | FUNCTIONS |
|---|---|---|
| Potassium | Bananas, potatoes, orange and plum juice, cooked spinach and artichokes | It regulates the pressure of organic liquids |
| Sodium | Cooking salt | It regulates blood volume and pressure and promotes the absorption of amino acids, glucose and water |
| Iron (Fe) | Beef, chicken, lentils, beans, tuna and shrimp | It forms red blood cells and allows the transport of oxygen for the respiration of the cells. It performs the function of antioxidant to protect cells |
| Iodine (I) | Iodized salt, cod, shrimp, canned tuna, milk | It forms thyroid hormones, affect growth. Its deficiency causes the “goiter” |
| Zinc (Zn) | Shellfish, beef, nuts and legumes | It is essential for the function of many enzymes essential for growth, for the immune response, for the functioning of the nervous and reproductive systems |

**Vitamins** - They are organic compounds that contain nitrogen (amines) which are indispensable in small quantities for our body. Vitamin deficiency causes serious illness. They are divided into two large groups:

water-soluble (which dissolve in water) and fat-soluble (which dissolve in fats). Water-soluble vitamins (B and C) do not accumulate and therefore must be "taken" from food every day. The fat-soluble (A, D, E, K), can accumulate in the liver and adipose tissue and be released slowly.

*Table 4: Water-Soluble Vitamins*

| VITAMINS | FOOD SOURCES | FUNCTIONS |
|---|---|---|
| Vitamin B1 or thiamine | whole grains, legumes such as lentils and peas, nuts and pork | makes the heart, muscles and nervous system work well |
| Vitamin B2 or riboflavin | grains, nuts, milk, eggs, green leafy vegetables, and lean meat | protects skin cells and helps red blood cells to grow healthy and functioning |
| Vitamin B3 or niacin | chicken meat, "red" fish such as tuna and salmon, cereals, legumes and seeds | safeguards the health of the nervous system and ensures proper functioning of the digestive system |
| Vitamin B6 | beans, legumes, nuts, eggs, lean meat and grains | protects the functions of the brain and red blood cells, promotes the formation of antibodies that protect us from infections |
| Pantothenic acid | eggs, fish, dairy products, cereals, legumes, broccoli and lean beef | it intervenes in the production of hormones and cholesterol |
| Vitamin B12 | only foods of animal origin and some foods with added B12 | essential for the formation of red blood cells and for the health of the nervous system |
| Folic acid B9 | green leafy vegetables, asparagus, legumes, avocados and oranges | promotes the health of red blood cells and other cells; prevents cancer and some diseases of the nervous system |
| Vitamin C | citrus, cabbage, strawberries, kiwi | it makes iron absorb well and increases resistance to infections |

*Table 5: Fat-Soluble VITAMINS*

| VITAMINS | FOOD SOURCES | FUNCTIONS |
|---|---|---|
| Vitamin A | egg, liver, carrots, mango, melon, spinach, broccoli | important for eyesight, bone growth and defense against infections |
| Vitamin D | fish and cow's milk (if from non-intensive farms) | develops and solidifies bones and prevents cancer |
| Vitamin E | vegetable oils, nuts and green leafy vegetables | antioxidant, protects cells |
| Vitamin K | green leafy vegetables | blood clotting |

Important to know: all foods after cooking change their appearance and color, taste and their nutrient composition. It is therefore also important to evaluate how (type of cooking) and in which containers (materials) the food is cooked. Some vitamins are sensitive to heat. For example, steam cooking limits the loss of vitamins and minerals.

**The water**. Our body is mainly made up of water (65% in adults, 70% approx. In children). Water performs important biological functions keeps body temperature constant; dissolves the nourishing principles and transports them throughout the body; eliminates waste. Therefore, it is important to teach children to drink a lot of water (at least 1 liter and a half a day). Vitamins, minerals, and water are mainly contained in fruit and vegetables. These foods are essential for our health because they contain "friendly" substances that are important for improving our well-being, the phytocompounds. It is therefore necessary to eat foods containing the 5 colors and at least 5 portions of fruit and vegetables a day (better if fresh and in season). Each color has a different content of phyto-compounds which, if taken regularly, contribute to our health.

*Table 6: THE 5 COLORS OF FOOD*

| COLOR | FOOD | FUNCTIONS |
|---|---|---|
| **RED** | tomato, strawberries, raspberries, red currants, cherries, watermelon, blood orange, radish, peppers, etc. | rich in lycopene, anthocyanins, flavonoids, pigments with antioxidant and anticancer activity |
| **ORANGE** | carrots, squash, oranges, mandarins, clementines, lemons, apricots, khakis, melon, peaches and other vegetables | useful because they contain beta-carotene and vitamin C, protect eyesight, strengthen the immune system, prevent tumors, cardiovascular diseases, cellular aging. They contain flavonoids and anthocyanins. Another important phytocompound is "curcumin" contained in the powder of curry and turmeric, which has antioxidant and anti-inflammatory properties. |
| **BLUE - PURPLE** | blueberries, blackberries, currants, plums, plums, figs, red grapes, radicchio and other vegetables | they prevent aging of the brain, skin and heart. They contain anthocyanins, vitamin C, carotenoids, beta-carotene, magnesium, potassium and phenolic compounds |
| **GREEN** | green leafy vegetables such as chard, spinach, kale, broccoli, rocket, basil, asparagus, zucchini, parsley, cucumbers, artichokes, and fruits such as kiwifruit | they prevent heart disease and tumors, are important for the proper functioning of the nervous system and sight. Characteristic compounds are: chlorophyll, isothiocyanates, lutein, carotenoids, magnesium, folic acid, vitamin C |
| **WHITE** | Cauliflower, apple, pear, onion, fennel, mushrooms, spring onion, leek, shallot, etc. | vegetables and fruit are good for the heart, lungs and bones health. Important for the prevention of tumors, hypertension, cellular aging and anemia. Characteristic compounds: quercetin, flavonoids, vitamin C, allyl sulfide, selenium |

# 3. Information and background on the selection of plant-based ingredients

When starting research on the foods of a specific nation, we often refer to the culture of its culinary history, going to the roots of its food traditions and habits to evaluate which of these still affect the preparation of (daily) meals, distinguishes its food culture and makes that country recognizable from other peoples.
In the research activity, it is also important to ask oneself whether the eating habits and traditions of the country being researched correspond to today's needs to respond to a healthy lifestyle, which therefore also includes the daily consumption of foods useful for health and above all for the prevention of diseases.

For this reason, this research was carried out considering those ingredients produced in the countries under study (Spain, Morocco, and Turkey) and due to their importance in terms of nutritional value (particularly for antioxidants, vitamins, and mineral salts), which may have a beneficial effect on the body, also for the prevention of diseases affecting the cardiovascular, endocrine, lymphatic system, etc.

Other elements that were considered concern commercial interest, annual production (in tons) and those factors that determine the possibilities of marketing or consumer's interest. These factors are important elements for an assessment of the supply and demand of each single food.

Slow Food participated in this Task also with additional research on the ingredients for Spain and Morocco. For Turkey the research was carried out only by BUU.

# 4. Research and product development strategy used

## 4.1 SLOW FOOD

We started by considering the culinary traditions of the single countries (Spain and Morocco) still present, typical, and well-known.

We have thus selected manly fresh ingredients (fruits) or other (legumes, cereals, nuts) with positive effects on health; then we assessed the interest in marketing them according to the quantity produced annually (in tons) and the success of each single product in the country of origin and in Europe (EU-Med region). The selection was determined not only with respect to the use of the single ingredient, but also with respect to its possible transformation processes and the combination with other ingredients to produce typical and local food products. The research highlighted the production of some ingredients that are common in the countries under study. The main sources of information consulted were scientific publications (see bibliography and websites) such as those of the Ministry of Health, the ISS, the WHO, sector organizations (agricultural organizations), Slow Food, FAO and FAOSTAT (for the determination of the annual tons produced).

A sample list of snacks / drink already existing on the market was drawn up.

## 4.2 BUU - KOC

We have identified Mediterranean diet-related food groups that are rich in bioactive components, which can make important contributions to health and that play important role in recipes and Mediterranean culture by reviewing scientific research conducted in recent years, especially in the last 5 years.

Then, we determined the food groups that we can use in the production of snack bars and the foods within these food groups. These food groups have been fruits (fresh/dry), vegetables, and nuts. We have thus selected **16 ingredients** from these food groups, considering physicochemical characteristics, shelf-life, food safety, sensory characteristics, energy and nutrient profile, Turkish cuisine culture, children's energy and nutrient requirements, Turkish children's nutritional habits, facility possibilities, and production line, price, and commercialization opportunities.

In addition, we also considered the production, consumption, and trade statistics of these ingredients in Turkey.

Considering the commercial availability, **we have chosen 2 of these 16** ingredients most commonly consumed by Turkish children for the production of prototypes. In addition, we also considered the

contents of the snack bars that children frequently consume in Turkey. We researched the ingredients of these snack bars and selected 2 ingredients that are frequently used in them.

### 4.3 UMP - CHOCO

The modern food environment is distinguished by the widespread availability of unhealthy foods high in sugar, fat, and salt. This is a significant impediment to the establishment of healthy eating habits in children and preadolescents.

In this work package we conduct research on plant-based food ingredients that are high in nutrients and bioactive components to make significant contributions to health (particularly in the diets of children and adolescents) and that play an important role in the recipes and cultures of the Mediterranean countries involved in the project.

Thereby, we chose in this task healthy fresh ingredient (**19**) that are readily available, such as fruits, legumes, cereals, and nuts to produce fresh and healthy food snacks.

Regarding potential transformation procedures and the combination with other ingredients for the development of traditional and regional healthy foodstuffs, the choice of Mediterranean-derived components was made. The study focused on specific substances whose manufacturing is widespread in the regions under investigation.

The primary sources of information studied were scientific publications (see bibliography and websites) from Moroccan Ministry of agriculture.

A sample list of currently available snacks, dried fruits snakes was listed in the section 8.4.

### 4.4. CNTA - DELAFRUIT

Scientific evidence shows that the diet currently consumed, especially by children and adolescents, is not balanced. In the Mediterranean area there is a wide variety of ingredients with interesting nutritional properties that included in snacks could improve the diet of children and adolescents. The work carried out has focused on reviewing the scientific literature to select ingredients of Spanish origin with high nutritional content and bioactive compounds that provide beneficial nutritional properties for the target population.

In addition, and with the aim of promoting the use of species of Mediterranean origin with interesting nutritional properties that were consumed in ancient times but whose consumption has drastically decreased nowadays, species of interest have been selected.

In all cases, the availability of supply has been taken into account, as well as food safety and the possibility of transformation into food production lines.

In this sense, we have selected 12 plant species (fruits, cereals and legumes) that meet these criteria and we consider of great interest to be studied in the focus groups.

## 5.Description of the ingredients

(Fruits, nuts, legumes, leaves vegetable, grains/cereals, and tubers, etc.)

### 5.1. Selected Ingredients of Turkiye (BUU & KOC): 16 ingredients

| | Ingredient | Content and health benefits |
|---|---|---|
| 1. | Fruits<br>(Fresh)<br>*Fig* | Variety *Ficus carica* L. cv. *Sarılop*, produced in Bursa region.<br>Fig polyphenols have associated antioxidant activities and impart many health benefits such as antihyperglycaemic, hepatoprotective, and antispasmodic activities. It reduces lipid peroxidation and postischemic histological damage. It has strong antimicrobial activity and anticancer potential. It also helps to regulate blood pressure and blood cholesterol due to the presence of potassium, omega 6 and omega 3 fatty acids.<br>Vitamins: A, C, K, B3, B7, B9<br>Minerals: K, Ca, P, Mg, Fe, Zn<br>Nutritional and commercial interest; commercial availability; production 306799 Tn/year |
| 2. | Fruits<br>(Fresh)<br>*Peach* | Variety *Prunus Percia*, produced in Bursa region.<br>Peach are preventive effects on multiple chronic and age-related diseases such as diabetes, obesity, hypertension, inflammation, cardiovascular, neurodegenerative, and oncologic diseases due to its phenolic compounds.<br>Vitamins: C, E, A, K, B3, B9<br>Minerals: K, P, Mg, Ca, S, Fe, Zn<br>Carotenoids: Beta-caroten<br>Nutritional and commercial interest; commercial availability; production 306499 Tn/year |
| 3. | Fruits<br>(Fresh)<br>*Pear* | Variety *Pyrus communis*, produced in Bursa region.<br>Pear exhibits anti-carcinogenic, antioxidant and anti-hypoglycaemic effects due to presence of several phytochemicals. It is effective against cancer, diabetes, obesity, ulcer, wounds, inflammation, and cardiovascular diseases due to strong radical scavenging capacity.<br>Vitamins: A, B3, B6, C, E, B9<br>Minerals: K, P, Ca, Mg, S, Fe, Zn<br>Carotenoids: Beta-caroten<br>Others: Fiber<br>Nutritional and commercial interest; commercial availability; production 317750 Tn/year |
| 4. | Fruits<br>(Fresh)<br>*Banana* | Variety *Musa Sapientum,* produced in Anamur, Antalya region.<br>Banana contains several bioactive compounds, such as phenolics, biogenic amines, and phytosterols, which are highly desirable in the diet as they exert many positive effects on human health and well-being. It has antioxidant activity and is effective in protecting the body against various oxidative stresses. Banana has effectively used in the treatment of various diseases, including reducing the risk of many chronic degenerative disorders. It prevents metabolic degenerative diseases, fights intestinal disorders like ulcers, and treatment for burns and wounds.<br>Phenolic compounds: Quercetin, catechin, gallocatechin, epicatechin, procyanidin, catechin hydrate<br>Vitamins: A, K, B3, B7, B9, C<br>Minerals K, Cl, Mg, P, S, I, Ca, Na<br>Others: Fiber<br>Nutritional and commercial interest; commercial availability; production 369009 Tn/year |
| 5. | Vegetables<br>(Fresh)<br>*Carrot* | Variety *Daucus carota,* produced in Konya region.<br>Carrot has a high content of proanthocyanidins, saponins, and fibers. Due to the high content of biologically active compounds, it has an antioxidant, cardiovascular, and anti-cancer effect, reducing the occurrence of degenerative diseases. It is good for the eyes. It reduces the risk of anemia. It also strengthens the liver.<br>Phenolic compounds: Proanthocyanidin<br>Vitamins: A, K, B9, B7, C |

| | | |
|---|---|---|
| | | Minerals: K, Cl, Ca, P, Mg, Fe<br>Others: Fiber<br>Nutritional and commercial interest; commercial availability; production 650000 Tn/year |
| 6. | Fruits (Dry)<br><br>*Fig* | Variety *Ficus carica* L. cv. *Sarılop*, produced in Bursa region.<br>Fig polyphenols have associated antioxidant activities and impart many health benefits such as antihyperglycaemic, hepatoprotective, and antispasmodic activities. It reduces lipid peroxidation and postischemic histological damage. It has strong antimicrobial activity and anticancer potential. It also helps to regulate blood pressure and blood cholesterol due to the presence of potassium, omega 6 and omega 3 fatty acids.<br>Phenolic compounds: Anthocyanins, Coumaric acid, Ferulic acid, Caffeic acid<br>Vitamins: A, B1, C<br>Minerals: Ca, P, K, Mg, Fe, Zn, Se<br>Nutritional and commercial interest; commercial availability; production 80000 Tn/year |
| 7. | Fruits (Dry)<br><br>*Mulberry* | Variety *Morus alba*, produced in Bursa region.<br>Mulberry has a positive effect on blood glucose troubles, lipid accumulation, and inflammation. It has several beneficial properties: anti-cholesterol, anti-obesity, hepatoprotective, antimicrobial, anti-Alzheimer's, anti-tumor, and anticancer activity.<br>Vitamins: A, B1, C<br>Minerals: Ca, P, K, Mg, Fe, Zn, Se<br>Nutritional and commercial interest; commercial availability; production 74600 Tn/year |
| 8. | Fruits (Dry)<br><br>*Apricot* | Variety *L.Prunus armeniaca,* produced Malatya region.<br>Apricot contains rich antioxidants and presents cardiovascular benefits, anti-microbial, anti-diabetic, hepatoprotective, nephroprotective, anti-inflammatory, anti-nociceptive, anti-amyloidogenic, and anti-cancer activitis. It also improves eye health, protects against bone diseases, and repairs intestines.<br>Vitamins: A, K, B3, B9, C<br>Minerals: K, P, Ca, Mg, S, Fe<br>Carotenoids: Carotene<br>Nutritional and commercial interest; commercial availability; production 750000 Tn/year |
| 9. | Fruits (Dry)<br><br>*Grape* | Variety *Vitis vinifera L.,* produced in Ege region.<br>The nutrients present in grapes exert an antioxidant and anti-inflammatory action. Grapes reduce glucose absorption, give a feeling of satiety, and reduce LDL cholesterol and cardiovascular risk of heart disease.<br>Phenolic compounds: Flavonoids (in particular Anthocyanins)<br>Vitamins: A, C, E, K, B9<br>Minererals: Ca, K, P, Mg, Fe<br>Nutritional and commercial interest; commercial availability; production 268977 Tn/year |
| 10. | Fruits (Dry)<br><br>*Apple* | Variety *Malus communis,* produced in Amasya region.<br>Apples are a widely consumed, rich source of phytochemicals, and the consumption of apples reduces risk of some cancers, cardiovascular disease, asthma, and diabetes. Apples solve the problem of constipation. It strengthens the immune system.<br>Phenolic compounds: Flavonols, Quercetin, Kempferol, Phenolic acid (Caffeic acid)<br>Vitamins: A, E, K, B7, B9, C<br>Minerals: P, Ca, Mg, K, S, Fe<br>Nutritional and commercial interest; commercial availability; production 3600000 Tn/year |
| 11. | Fruits (Dry)<br><br>*Persimmon* | Variety *Diospyros kaki L.,* produced in Bursa region.<br>Persimmons are important to prevent oxidation of low-density lipoproteins, safeguard beta cells of the pancreas, and reduce cardiovascular diseases, cancer, diabetes mellitus, and damage caused by chronic alcohol consumption. Persimmons strengthens the immune system.<br>Phenolic compounds: Ferulic acid, p-coumaric acid, gallic acid, beta-cryptoxanthin, lycopene, beta-carotene, zeaxanthin, lutein<br>Vitamins: A, E, K, B9, C<br>Minerals: P, K, S, Fe, Mn<br>Nutritional and commercial interest; commercial availability; production 175000Tn/year |

| | | |
|---|---|---|
| 12. | Nuts<br><br>*Walnut* | Variety *Juglans regia L.,* produced in Bursa region.<br>It is known the potential role of walnut consumption against a series of diseases including cancer, gut dysbiosis, cardiovascular, and neurodegenerative diseases. It has used the treatment of various diseases like microbial infections, stomach aches, thyroid dysfunctions, heart diseases, and sinusitis. It lessens symptoms attributed to age-related and other neurological disorders.<br>Phenolic compounds: Gallic acid, protocatechuic acid, syringic acid, coumaric acid, gentsic acid, vanillic acid, caffeic acid<br>Vitamins: A, E, K, B3, B6, B7, B9, C<br>Minerals: K, P, S, Fe, Zn<br>Nutritional and commercial interest; commercial availability; production 287000 Tn/year |
| 13. | Nuts<br><br>*Hazelnut* | Variety *Corylus colurna,* produced in Trabzon and Ordu region.<br>Hazelnut reduces the risk of cardiovascular diseases, decreases cholesterol levels, and prevents metabolic syndrome. It has anti-inflammatory and hypolipidemic effects.<br>Phenolic compounds: Gallic acid, ferulic acid<br>Vitamins: E, K, B9, B7, C<br>Minerals: K, Mg, Ca, S, Mn, Zn, Fe, Cu<br>Carotenoids: Beta-carotene<br>Nutritional and commercial interest; commercial availability; production 77600 Tn/year |
| 14. | Nuts<br><br>*Peanut* | Variety *Arachis hypogaea L.,* produced in Konya region.<br>Peanut has anticancer, antioxidant, anti-inflammatory, antibacterial, and antifungal activities. It reduces the risk of heart disease, and certain types of cancers and improves weight management.<br>Phenolic compounds: Protocatechuic acid, p-coumaric acid, ferulic acid, ellagic acid<br>Vitamins: B1, B2, B3, B5, B6, B9, E<br>Minerals: Fe, S, P, Ca, Mg, K, Na, Zn<br>Nutritional and commercial interest; commercial availability; production 56680 Tn/year |
| 15. | Nuts<br><br>*Almond* | Variety *Prunus dulcis,* produced in Ege region.<br>The ingestion of almonds positively affects cardiovascular diseases. It reduces the risk factor of non-communicable diseases, especially type 2 diabetes, obesity, cancer, and hypercholesterolemia. It has modulatory effects on serum glucose, lipid, and uric acid levels, the regulatory role on body weight.<br>Phenolic compounds: Protocatechuic acid, p-coumaric acid, ferulic acid, ellagic acid<br>Vitamins: A, E, B2, B3, B5, B7, B9, C<br>Minerals: K, Ca, Mg, P, S<br>Nutritional and commercial interest; commercial availability; production 80000 Tn/year |
| 16. | Nuts<br><br>*Chestnut* | Variety *Castanea sativa,* produced in Bursa region.<br>The consumption of chestnuts prevents cancer, reduces allergies, and strengthens the immune system in children. It is obvious that chestnut fruits are a good source of essential dietary nutrients and minerals. The low crude fat content, in combination with the high polyunsaturated fatty acids in this fat, makes chestnuts a very healthy food. The free sugars and high starch content also make chestnuts an energetically valuable food crop. Phenolic compounds: Gallic acid, syringic + caffeic acid, vanillic acid, rutin, ellagic acid, catechin, chlorogenic acid, p-Coumaric acid, ferulic acid, naringin<br>Vitamins: A, C, E, B3, B5, B9<br>Minerals: K, P, Mg, Ca, S<br>Nutritional and commercial interest; commercial availability; production 76045 Tn/year |

### 5.1.1. Culture of food and using of the ingredients in the MD traditional cuisine

Turkish cuisine consists of soups, cereals, meat dishes, vegetable dishes, legumes, olive oil dishes, pilafs, pastries, salads, desserts, and traditional drinks. It is also a source of Mediterranean cuisine, as it contains a variety of unique foods such as fish, olive oil, haricot bean, chickpeas, bulgur, yogurt, and *tarhana*.

In Turkish cuisine, soups are a type of hot food that can be consumed at every meal and served at the beginning of the meal. Soups such as *tarhana*, *toyga*, *dugun, tutmac*, and *ezogelin* are consumed locally and

are often cooked on special occasions. It is said that cereals, especially wheat, which takes first place in the Mediterranean diet, have been grown in the Mediterranean since the first periods of history. The use of wheat products such as *bulgur, couscous*, and *firik* is common, especially in the Mediterranean and the South.

In traditional Turkish cuisine, *bulgur* is preferred more frequently in Eastern and Southeastern Anatolia, and rice in Western regions. Dishes such as *cıg kofte, kısır, fellah koftesi*, and *ıclı kofte* are made from bulgur, which is frequently used in Turkish cuisine. In Turkish cuisine, the most important product made using various grains such as wheat, rye, bran, and corn is bread. In addition to bread, *borek, gozleme, katmer*, *kete* and *pide* have an important place in Turkish cuisine. Kebabs, meat dishes in the form of juicy stews, and pastries are in the majority. It is common to cook vegetables with onions and tomato paste together with meat. Turkish cuisine includes many olive oil dishes made with artichokes, grape leaves, eggplant, green peppers, green beans, okra, broad beans, zucchini flowers, and leeks.

There are many olive oil dishes made with various herbs in the Aegean and Mediterranean regions. They are obtained by stuffing all kinds of vegetables that can be carved or wrapped, such as cabbage and vine leaves, with a core consisting mainly of rice, minced meat, onions, greens, and various spices. It is a well-balanced eating habit that wraps and stuffing are usually served with yogurt or *ayran*. Vegetable dishes with olive oil, which are consumed more in the Aegean, Marmara, and Mediterranean regions of Turkey, are generally consumed cold. Salads, which are mostly prepared from raw or cooked vegetables, are flavored with lemon, vinegar, and olive oil. They are used to accompany the main dish in Turkish cuisine, and apart from salads made with onions, tomatoes, green peppers, and lettuce salads made with greens, there are also those prepared with legumes, known as *piyaz*. In addition, there are also salads such as *barren* and *sunken*, in which bulgur is used together with vegetables.

Meat and vegetable dishes are usually accompanied by salad. Especially when cooking legumes, adding vegetables such as potatoes, carrots, and onions, and serving these dishes with *bulgur pilaf*, *ayran* or yogurt increase their nutritional value. Olives and olive oil form the second important aspect of the traditional Mediterranean diet. Olive oil is mostly used in dishes made in Turkey. Especially in Hatay, the traditional production of olive oil is still continued. The olive oil produced by this method called "*su zeyti*" is intended to meet the needs of the household.

The use of spices in food is common. The most commonly used spice is black pepper, thyme, cumin, and red pepper powder. Yogurt is an indispensable part of Turkish tables. Most of the dishes are consumed by pouring garlic or plain yogurt on them.

The most common desserts made with vegetables and fruits are *hosaf* and *komposto*. Usually, these are consumed at family meals. Dried fruits are used in desserts such as *asure*. Fresh fruits, dried fruits, and nuts are usually consumed after family meals. Oranges, apples, tangerines, bananas, and pomegranates are generally consumed during the winter months. Watermelon, cherries, grapes, apricots, strawberries, and plums are the most frequently consumed fruits in the summer months. Walnuts, hazelnuts, and almonds are among the most consumed nuts.

### 5.2.Selected Ingredients of Spain (SLOW FOOD & DELAFRUIT & CNTA): 31 Ingredients

| | Ingredient | Content and health benefits |
|---|---|---|
| 1. | Fruits<br><br>*Mandarin* | variety *Nadorcott* produced in Valencia region.<br>Mandarin is an excellent dietary source of vitamin C. This micronutrient can help fighting free radicals, preventing cell damage thanks to its antioxidant action. The antioxidants of mandarin could help protect the cardiovascular system by fighting the oxidation of cholesterol, a phenomenon associated with the formation of atherosclerotic plaques.<br>Mandarin reduces the risk of liver cancer.<br>Vitamins: A, B1, B2, B3, B5, B6, C.<br>Minerals: K, P, Ca, Fe, Na.<br>Carotenoids: alfa and beta-catotene, beta-criptoxantina, Lutein, Zeaxanthin<br>Nutritional and commercial interest; commercial availability; production 149,766 Tn/year |
| 2. | Legumes<br><br>*Beans* | variety *Bolisches*, produced in Embún close to Aragon Subordán River Valley, in Aragon region.<br>Like all legumes, beans have several beneficial properties. Among the main features certainly stands out the high fiber content, which stimulates the functioning of the intestine and increases the sense of satiety. The lecithin contained in beans is a valuable aid against excess cholesterol in the blood: this substance works by dissolving lipids and preventing their deposit in the blood. According to some studies, beans appear to be a valuable aid against atherosclerosis, but it is a feature that has yet to be scientifically confirmed. Beans contain - even if the data can vary greatly from variety to variety - calcium, phosphorus, potassium and iron. Bean pods appear to have diuretic and antidiabetic properties.<br>Minerals: Fe, Zn, Se<br>Nutritional and commercial interest; commercial availability; production 24000 Tn/year |
| 3. | Fruits<br><br><br>*Orange* | Variety *Sweet grain of gold*, produced in Andalucía region<br>Orange is a source of antioxidants, first of all vitamin C. This has an anti-tumor and anti-inflammatory action, can protect cholesterol from oxidation and promote the proper functioning of the immune system, and has been associated with a lower incidence of Helicobacter pylori infections. Orange flavonoids also exert an anticoagulant action, while herperidine and beta-cryptoxanthin could help fight high cholesterol and lung cancer, respectively.<br>The fibers help to counteract high cholesterol and diabetes and promote good bowel function, and orange juice has been associated with a reduction in the risk of kidney stones and rheumatoid arthritis.<br>Phenolic compounds: flavones<br>Vitamins: A, B1, B2, B3, B5, B9, C, M<br>Minerals: P, K, Mg, Ca, Na, Fe, Cu<br>Carotenoid: Alfa and Beta-carotene, beta-criptoxantina, Lutein, Zeaxanthin<br>Others: anthocyanins, hydroxycinnamic acid<br>Nutritional and commercial interest; commercial availability; production 517,825 Tn/year |
| 4. | Cereals<br><br>*Grain*<br><br>(durum wheat) | Variety *Florencia Aurora* produced in Alto Palancia (Comunidad Valenciana) egión<br>The high fiber content makes durum wheat a valid ally for intestinal function, stimulating digestion. The total absence of cholesterol makes it suitable even for people with cardiovascular problems. It has a high satiating power and is therefore able to reduce appetite.<br>Durum wheat is a laxative, therefore it is not recommended for use in subjects with |

| | | |
|---|---|---|
| | | intestinal problems such as colitis.<br>Vitamins A, B1, B2, B3<br>Minerals K, P, Ca, Fe, Mg, Zn, Cu, Se<br>Carotenoids<br>Nutritional and commercial interest; commercial availability; production 8 million Tn/year |
| 5. | Cereals<br><br>*Barley* | Variety *Tritordeum* produced in Valentia region<br>Thanks to the important fiber content, barley is laxative and stimulating and therefore particularly suitable for those with constipation and lazy bowel problems. Since it swells a lot once cooked, this cereal has a high satiating power and can be included in slimming diets with the aim of limiting the amount of food introduced during meals. Rich in minerals, barley turns out to be a fairly remineralizing food. Some studies have recently highlighted that some substances contained in barley are able to inhibit the production of bad cholesterol by the liver, helping to reduce the levels of bad cholesterol in the blood and the consequent cardiovascular risk. The beta-glucan contained in it is able to slow down the absorption of carbohydrates, keeping blood glucose levels under control. It also has anti-inflammatory and emollient properties against the gastrointestinal system and is able to exert an anti-infective action in favor of the intestinal mucous membranes.<br>Vitamins: A, B1, B2, B3, B6, B9, K<br>Minerals: Ca, Fe, Mg, K, P, Na, Zn<br>Nutritional and commercial interest; commercial availability; production 9,3 million Tn/year |
| 6. | Cereals<br><br>*Corn* | Variety *Bt* produced in Aragon region<br>Corn is a good source of carbohydrates and also contains numerous antioxidants, such as vitamin A and carotenoids, vitamin C and vitamin E. It also provides a good number of molecules allied to the proper functioning of the organism (in particular B vitamins), the development of the nervous system during gestation (folate), the cardiovascular system (potassium, fiber and unsaturated fatty acids), bones and teeth (phosphorus, calcium, magnesium and vitamin K) and coagulation (vitamin K). Corn provides iron, which is important for the production of red blood cells.<br>Phenolic compounds: Anthocyanins, Coumaric acid, Ferulic acid, Caffeic acid<br>Vitamins: A, B1, B2, B3, B6, B9, M, K<br>Minerals: P, K, Mg, Ca, Na, Fe, Zn<br>Carotenoids: Beta-carotene, Lutein, Zeaxanthin<br>Nutritional and commercial interest; commercial availability; production 3777 million Tn/year |
| 7. | Fruits<br><br>*Peach* | produced in Cataluña, Aragon and Murcia regions.<br>The consumption of peaches provides the body with moderate amounts of vitamin C, a molecule with antioxidant properties that is also important for the synthesis of collagen. These fruits are also a source of vitamin A, an ally for the health of eyes, skin and mucous membranes and more. This vitamin helps to prevent lung and oral cavity tumors. Iron is important for red blood cell production, fluoride for bone and tooth health, and potassium for heart and arterial health. Flavonoids such as lutein, zeaxanthin and beta-cryptoxanthin help fight reactive oxygen species.<br>Vitamins: A, B1, B2, B3, B6, C, K<br>Minerals: P, K, Mg, Ca, Mg, Fe, Zn, Cu<br>Carotenoids: Beta-carotene, beta-criptoxantina<br>Others: Pantothenic acid<br>Nutritional and commercial interest; commercial availability; production 1,114 million Tn/year |

| | | |
|---|---|---|
| 8. | Legumes<br><br>*Chickpeas* | 1-Variety *Valencia del Ventoso* produced in Valencia del Ventoso, Extremadura egión<br>Chickpeas have several beneficial properties: in addition to being excellent sources of vegetable proteins, fibers and vitamins (especially of the B group) and of two minerals very important for the well-being of the organism, magnesium and phosphorus, they also contain many saponins, substances useful for reducing cholesterol and triglyceride levels in the blood. The quantity of omega3 fatty acids (especially linoleic acid) contained in them makes chickpeas particularly healthy for the heart.<br>Vitamins: A, B1, B2, B3, C, D, E<br>Minerals: Na, K, P, Se, Fe, Ca, Mg, Zn, Cu<br>Carotenoids: Lutein, Zeaxanthin<br>Nutritional and commercial interest; commercial availability; production 56.498 Tn/year |
| | | 2-Variety *Cicer arietinum* from Andalucía, Castilla la Mancha, Castilla y León y Extremadura.<br>Help weight management, improve digestion, reduce risk of diseases like heart disease, cancer, type 2 diabetes. Promote brain health. Antioxidative, inhibition of tumor cell proliferation, anti-inflammatory, hypoglycemic, lipid-lowering, bacteriostatic activity.<br>Phenolic compounds: phytic acid, tannins, isoflavones<br>Vitamins: B9, B1, B6, K<br>Minerals; Mn, Cu, Fe, Zn, P, Mg, Se, K<br>Others: Lycopene, protein, fiber<br>Nutritional and commercial interest; commercial availability; production 45100 Tn/year |
| 9. | Vegetables<br><br>*Beet* | Variety *Sugar beet* produced in Castilla y León, Navarra, Aragón and Andalucia regions.<br>Thanks to the high content of mineral salts and vitamins, beets are remineralizing and restorative and particularly beneficial in flu conditions. The fibers and the high amount of water make them purifying and digestive. Since some chemical compounds present in the vegetable appear to be able to revitalize red blood cells, the consumption of beets is especially recommended for anemic subjects. It is advisable to consume them raw, just stewed or au gratin. Instead, it is better to avoid long cooking.<br>Given the presence of high quantities of mineral salts and oxalates, its use is not recommended for those suffering from kidney stones. Since they stimulate the production of gastric juices, the consumption of beets is not recommended for those suffering from stomach acid.<br>Phenolic compounds: Flavonoids (in particular Anthocyanins)<br>Vitamins: B1, B2, B3, C<br>Minerals: K, Ca, Fe, Na, P<br>Others: Oxalates<br>Nutritional and commercial interest; commercial availability; production 7,998 million Tn/year |
| 10. | Fruits<br><br>*Grape* | Variety *White mouth* produced in Castilla La Mancha (close to Madrid) region<br>The nutrients present in grapes exert an antioxidant and anti-inflammatory action. The cardiovascular system can benefit from this, but not only that. These molecules could, in fact, also help fight aging and cancer. Grapes have a low glycemic index and the intake of its juice, extracts or individual phytonutrients has been associated with better insulin control and greater sensitivity to the action of this hormone. This fruit can exert cognitive benefits and some of its components have antimicrobial properties.<br>Phenolic compounds: Flavonols, Quercetin and Kempferol, Phenolic acid (Caffeic acid)<br>Vitamins: A, B1, B2, B3, C, K<br>Minerals: P, K, Ca, Na, Fe, Cu, Zn<br>Carotenoids: Beta-carotene, Lutein, Zeaxanthin |

| | | |
|---|---|---|
| | | Others: Stilbene<br>Nutritional and commercial interest; commercial availability; production 4969 million Tn/year |
| 11. | Cereals<br><br>*Rice* | Variety *Arroz Bomba* produced in Albufera (Valencia) region<br>Rice is an easily digestible and gluten-free cereal, therefore also suitable for the diet of those suffering from celiac disease. Provides a wax dose of micronutrients: B vitamins, allies for the proper functioning of the metabolism; potassium which helps regulate blood pressure and heart rate; calcium, phosphorus and magnesium for healthy bones and teeth; copper and iron to be used in the production of red blood cells; selenium with antioxidant properties. From a nutritional point of view, it is above all a source of starchy carbohydrates. Whole rice should be preferred as source of insoluble fiber which is precious for intestinal health.<br>Vitamins: B1, B2, B3<br>Minerals: P, K, Ca, Na, Fe, Cu, Se, Zn<br>Nutritional and commercial interest; commercial availability; production 845 000 Tn/year |
| 12. | Fruits<br><br>*Pomegranate* | Variety *Mollar de Elche* produced in Elche, Crevillente, Catral e Albatera regions<br>The pomegranate is a good source of soluble and insoluble fiber, useful for good digestion and for protecting intestinal health. This fruit is also associated with benefits in terms of weight reduction, cholesterol control, improvement of immune defenses and circulation and protection from tumors (in particular from the prostate and lymphomas). Its regular consumption has also been associated with benefits against benign prostatic hyperplasia and diabetes. The intake of ellagitannins such as grenadine B and punicalagin present in pomegranate juice can reduce cardiovascular risk by counteracting the action of free radicals.<br>Vitamins: B1, B2, B3, B6, B9, C, E, K<br>Minerals: P, K, Mg, Ca, Na, Zn, Fe, Cu, Mn, Se<br>Others: Pantothenic acid, Riboflavin, Ellagitannins<br>Nutritional and commercial interest; commercial availability; production 40000 Tn/year |
| 13. | Vegetables<br><br>*Pumpkin* | Variety *Curcubita moschata* cultivars *Butternut, Butterskin, Futsu, Shishigatani, Orange Butternut, Yuxijiangbinggua* from Comunidad Valenciana, Andalucía and Canary Islands<br>Pumpkings exhibit a broad spectrum of health-promoting effects, i.e., cardioprotective, hypoglycaemic, antioxidative, anti-cancer, anti-bacterial, immunomodulatory, neuroprotective and anti-inflammatory effects<br>Vitamins: C, B1, folates, tocoferol<br>Minerals: K, Mg, Ca, Na, Zn, Fe, Cu, Mn<br>Others: Zeaxanthin, lutein, rutin, kaempferol, isoquecetin, astragalin, quercitin<br>Nutritional and commercial interest; commercial availability |
| 14. | Vegetables<br><br>*Sweet potatoes* | Variety *Ipomoea batatas* (L.). from Andalucia, Extremadura, Levante and Murcia region<br>A number of different health benefits, such as antioxidant, cardioprotective, antiinflammatory, anti-cancer, anti-diabetic, antimicrobial, anti-obesity and prevention of vitamin A malnutrition<br>have been reported due to the ingestion of different parts of sweet potato<br>Vitamins: A, E, Folate, Niacin, Riboflavin, Thiamine, B6, C<br>Minerals: Ca, Fe, K, Na, P, Zn, Se<br>Others: Carotenoids<br>Nutritional and commercial interest; commercial availability |
| 15. | Fruits<br><br>*Sumac* | Variety *Rhus coriaria* L. from middle East and east of the mediterranean<br>*R. coriaria* is well-known for its traditional use for the treatment of a variety of inflammatory diseases such as skin diseases, liver inflammation, rheumatism and necrotizing enterocolitis. Besides, many studies suggest that *R. coriaria* extracts and |

| | | |
|---|---|---|
| | | its phytochemicals exert a wide range of biological and pharmacological activities including anti-tumor, anti-diabetic, antihypertensive, anti-oxidative and anti-inflammatory activities.<br>Vitamins: B1, B2, B6, B12, biotin and ascorbic acid<br>Minerals: P, Ca, K, Cd, Se<br>Others: flavonoids, anthocyanins, terpenoids |
| 16. | Fruits<br><br>*Strawberry tree*<br><br>*(madroño)* | Variety *Arbutus unedo* L. (Ericaceae)<br>Arbutus unedo is well-known in folk medicine for the antiseptic, diuretic, laxative, urinary antiseptic, antidiarrheic, astringent, depurative and antihypertensive properties of the infusions and decoctions prepared from roots, barks, leaves and fruits.<br>Vitamins: C, A<br>Minerals: Mg, Ca, K, Na, Fe, Zn, Cu, Mn<br>Others: high carotenoid content |
| 17. | Vegetables<br><br>*Cichory* | Variety *Cichorium intybus* L. from Mediterranean region.<br>Chicory shows many types of biological activity: hepatoprotective, anti-inflammatory, antioxidant, sedative, immunological, cardiovascular, hypolipidemic, antidiabetic, anticancer, gastro-protective, antimicrobial and many others.<br>Inulin provided health benefits including: regulation of blood lipids (LDL-cholesterol and triacylglycerol) concentration, positive effect on constipation, bifidogenic effect with bacteria in the colon, decreasing the risk of many gastrointestinal diseases (ulcerative colitis, Crohn's disease, colon cancer), enhancing mineral absorption (especially Ca, Mg and Fe), regulates appetite by affecting gastrointestinal hormones, immune-modulating effects and others.<br>Vitamins: C, Thiamin, Roboflavin, Niacin; pantothenic acid, B6 and folates<br>Minerals: Ca, Fe, Mg, P, K, Na, Zn, Cu, Mn, Se<br>Others: flavonoids, gallic acid<br>Nutritional and commercial interest; commercial availability; production 81183 Tn/year |
| 18. | Fruits<br><br>*Fig* | Variety *Ficus carica* L. Cuello Dama blanca, Cuello Dama negro, Banana from Extremadura region<br>Fig may prevent cell damage, reduce risck of chronic diseases, may aid in cancer prevention, aids irritable bowel syndrome and constipation relief.<br>Others: phenolic compounds<br>Commercial availability; production 60257 Tn/year |
| 19. | Fruits<br><br>*Medlar* | Variety *Nespilus germanica* L. from the Mediterranean region<br>Medlar are rich in polyphenolic compounds, are known to be a source of antioxidants that may reduce the risk of cardiovascular disease and some forms of cancer.<br>Minerals: Cu, Zn, Na, Fe, K, Ca, Mn<br>Others: gallic acid, neochlorogenic acid<br>Commercial availability; production 28805 Tn/year |
| 20. | Vegetables<br><br>*Spinach* | Variety *Spinacia oleracea*<br>Epidemiological investigations highlighted the disease preventive role of these bioactive constituents against cardiovascular diseases, in improving immune health, and providing chemoprotection against different cancers<br>Juice →Others: flavonols, flavonoids, anthocyanin, chlorophyll<br>Dry → Minerals: Ca, K, Mg, Fe, Zn, Cu, Mn<br>Commercial availability; production 94754 Tn/year |
| 21. | Vegetables<br><br>*Chard* | Variety Beta vulgaris L. from the Mediterranean region<br>Chard has been employed for its beneficial health effects as a folk remedy for kidney and liver diseases, for stimulation of the immune and hematopoietic systems, and as a distinctive diet in the cancer treatment.<br>Vitamins: A, C, E, K, B |

| | | |
|---|---|---|
| | | Minerals: Cu, Zn, na, Fe, K, Ca, Mn, Mg<br>Others: flavonoids,flanols, tannins, rosmarinic acid, chlorophyll, lycopene, carotene<br>Commercial availability; production 57317 Tn/year |
| 22. | Vegetables<br><br>*Kohlrabi* | Variety *Brassica oleracea* L. from the Mediterranean region<br>Kohlrabi protects against cell damage, may boost cancer prevention, may reduce inflammation, may protect against diabetes and provide better heart health.<br>Others: flavonoids, hydroxycinnamic acids (chlorogenic, ferulic, pcoumaric and sinapic acids), methanol<br>Commercial availability; production <50826 Tn/year |
| 23. | Fruits<br><br>*Grapefruit* | Variety *Citrus paradise* var. Star Ruby from Mediterranean region and Asia<br>Prevention of degenerative processes and the reduced risk of certain chronic diseases such as<br>cancer, osteoporosis and cerebrocardiovascular diseases.<br>Vitamins: C, A, B3, E, Folic acid<br>Minerals: Ca, Fe, K, Mg, Na, P, I, Se, Zn<br>Others: citric acid, malic acid, tartaric acid, ascorbic acid<br>Commercial availability; production 34911 Tn/year |
| 24. | Fruits<br><br>*Nopal* | Variety *Opuntia ficus-indica* L. from the Mediterranean region<br>Opuntia ficus-indica (L.) Miller extract can be beneficious for health and metabolism. It can be principally applicable for inhibition of fat generation and oxidation and, therefore, of obesity in animals and humans.<br>Minerals: Ca, K<br>Others: dietary fiber, glucose, galacturonic acid, phenolic acid and flavonoids |
| 25. | Vegetables<br><br>*Borage* | Variety *Borago officinalis* from Navarra and Ebro valley<br>Vitamins: A, D, folate, riboflavine, thiamine, B6 and C<br>Minerals: Ca, Fe, K, Mg, Na, P, Se, Zn |
| 26. | Tubers<br><br>*Tiger nut* | Variety *Cyperus esculentus.* It is an important representative crop of the Spanish Mediterranean region.<br>It was made into a refreshing drink called “horchata de chufa” with the appearance of dairy look in the Mediterranean area, which is usually consumed in summer. Its content of protein is relatively small, but it is found to be suitable for diabetic patients or those with digestive dysfunctions and may prevent heart disease after consumption. The dietary fiber in this tuber is effective in the prevention of colon cancer, obesity and gastrointestinal disorders. Due to the presence of flavonoids, the tiger nut has good antioxidant properties and can be used as a source of natural antioxidants.<br>Vitamins: A and C<br>Minerals: Mg, K, P, Ca, Na, Cu, Fe, Zn<br>Others: fiber and GAE<br>Commercial availability; production 9000 Tn/year |
| 27. | Nuts<br><br>*Almond* | Variety *Prunus dulcis* from Cataluña, Castilla la Mancha, Andalucía, Murcia y Comunidad Valenciana<br>Modulation of serum lipid/glucose levels, regulation of body weight, protection from diabetes/obesity/hypertension/cardiovascular diseases, improves blood cholesterol status (lipid modulation), uricemia-lowering effect, anti-oxidative properties.<br>Phenolic compounds: Flavonoids<br>Vitamins: E and B group<br>Minerals; Mg, Fe, Zn, K and Na<br>Others: protein, fiber and oleic acid<br>Nutritional and commercial interest; commercial availability; production 371460 Tn/year |

| | | |
|---|---|---|
| 28. | Nuts<br><br>*Walnut* | Variety *Juglans regia* from Cataluña, Castilla la Mancha, Andalucía, Castilla y León, Comunidad Valenciana y Extremadura.<br>Anti-cardiovascular disease, anti-oxidative properties. Prevent cancer. Improve brain function: antioxidant and anti-inflammatory effects, daily consumption (1-2 oz) can reduce the risk of depression, type-2 diabetes, which are risk factors for dementia development (degenerative disorders). Long term supplementation can significantly inmprove memory, learning skills, motor coordination and anxiety-related behaviour. Protection vs age-related cognitive decline.<br>Phenolic compounds: caffeic acid, juglone, p-coumaric, vanillic acid, myricetin, syringic acid, ferulic acid, ellagic acid, catechin, melatonin, phytic acid.<br>Vitamins: Folic acid (vit. B9), vitamin B6, vitamin E<br>Minerals; Co, P, Mn<br>Others: omega-3 (ALA) and omega 6 (linoleic acid) fatty acids<br>Nutritional and commercial interest; commercial availability; production 20030 Tn/year |
| 29. | Nuts<br><br>*Hazelnut* | Variety *Corylus avellana L.* from Cataluña<br>Increase antioxidant protection in the body, lower cholesterol levels in blood, improves artery health and inflammation markers in the blood.<br>Phenolic compounds: phyosterols, favonols<br>Vitamins: E, B6, B1 y B3<br>Minerals; K, P, Mg, Fe, Ca<br>Others: oleic acid, dietary fiber<br>Nutritional and commercial interest; commercial availability; production 7854 Tn/year |
| 30. | Cereals<br><br>*Oat* | Variety *Avena sativa L* from Cataluña, Castilla la Mancha, Andalucía, Castilla y León, Comunidad Valenciana y Extremadura.<br>Weight loss, lower blood sugar levels, reduced risk of heart disease. Cholesterol-lowering and antidiabetic effects. Its consumption promotes immunomodulation, improves gut microbiota and assists in preventing atherosclerosis, dermatitis and some forms of cancer. Antioxidant activity.<br>Phenolic compounds: caffeic acid, juglone, p-coumaric, vanillic acid, myricetin, syringic acid, ferulic acid, ellagic acid, catechin, melatonin, phytic acid<br>Vitamins: B9, B1, B5, E<br>Minerals; Mg, P, Mn, Co, Fe, Zn<br>Others: Dietetic fiber (Beta-glucans)<br>Nutritional and commercial interest; commercial availability; production 808306 Tn/year |
| 31. | Legumes<br><br>*Faba bean* | Variety *Vicia faba* from Cataluña, Islas Baleares, Andalucía, Navarra, Comunidad Valenciana y Extremadura.<br>Improve motor function and immunity. Prevent bone loss. Improve symptoms of anemia. Help weight loss, lower cholesterol, L-dopa as medicine for Parkinson, antihypertensive effect, protective effect against oxidative stress, antidiabetic properties.<br>Phenolic compounds: quercetin<br>Vitamins: B9, B1, E, C<br>Minerals; Zn, K, Mg, P, Ca, Se, Mn, Co, Fe<br>Others: protein, soluble fiber<br>Nutritional and commercial interest; commercial availability; production 80500 Tn/year |

### 5.2.1. Culture of food and using of the ingredients in the MD traditional cuisine

Soup is a typical starter for a Spanish meal followed by a main course, maybe a roast or as simple as steak and fries, and a simple salad. Fruit is the dessert of choice in most Spanish households for a family meal:

the fruit bowl (or fruit salad) will be brought to the table, already prepared, and cut. In the Spanish culinary culture, the ingredients selected for this research are used for hot dishes of soups and stews but also for mixed salads and desserts, for breakfast or snacks for children and adults with fruit juices, jams, and marmalades. As well are used in a variety of fruit salads and snacks in bars of various kinds for all tastes even for vegans. In traditional Spanish cuisine the ingredients included in the research are present in the following dishes:

Beans: Paella and Asturian Fabada

Rice: Paella and Caldero. Sweet Arroz con leche

Chard: Cocido Madrileño

Chickpeas: Cocido Madrileño

Barley-Wheat-Corn: flour for bread and desserts; bread as a crouton is used in soups such as in the typical Andalusian Gazpacho dish, corn flour for sweet frangollo

Grapes: sweet frangollo

Pomegranate, peaches, oranges, mandarins as jams and marmalades for desserts, candied fruit, flavorings for desserts (tortell, panellets, arroz con leche)

Tiger nut: horchata de chufa (tiger nut milk)

Beside the most common food ingredients selected, that play an important role in recipes and in the Mediterranean culture, it has also been identified other ingredients that, nowadays, they are not commonly used but they have played an important role in the past and it could be interesting their recovery or, at least, it could be worth including some of them in the formulations due to its innovative character (such as, sumac, nopal, fig, etc.).

We have decided to start our research with **two ingredients**: **oat** and **chicory**. Such ingredients are nutritious and easy to make with the kids. Oats are one of the top lists of snack food loaded with nutritional benefits. They are rich in fiber, protein, and heart-healthy antioxidants, and can be combined with various foods to create delicious snacks. Thanks to the content among other of insulin in chicory has a positive effect on the intestinal microflora, stimulates appetite and supports digestive processes. Moreover, delivers substances important for the child development, as protein, phosphorous selenium, potassium, and magnesium and contains antioxidants which eliminate the detrimental action of free radicals. In addition to their healthy and nutritional benefits, we also selected these ingredients since they are widely available at the local market.

## 5.3.Selected Ingredients of Morocco (SLOW FOOD & UMP & CHOCO): 19 Ingredients

| | Ingredient | Content and health benefits |
|---|---|---|
| 1. | Fruits<br><br>*Watermellon* | Variety *Crimson Sweet*, produced in Marrakech, Tifelt, Zagoura regions.<br>Watermelon is one of the fruits with the highest content of lycopene, a carotenoid with beneficial properties for the cardiovascular system and, according to some more recent research, for bones. Furthermore, this fruit is a source of citrulline, an amino acid that once in the body is converted to arginine, which is important for a good cardiovascular health. The phenolic compounds of the watermelon provide anti-inflammatory and antioxidant protection; Vitamin C is also present in this fruit in abundant quantities.<br>Phenolic compounds: Flavonoidi<br>Vitamins: A, B1, B2, B3, B6, B9, C, E, M<br>Minerals: K, P, Ca, Na, Fe, Zn<br>Carotenoid: Beta-carotene, Lycopene<br>Triterpenoids (in particular of Cucurbitacin E); Citrulline<br>Nutritional and commercial interest; commercial availability; production 74200 Tn/year |
| 2. | Fuits<br><br>*Dates*<br><br>(fresh, dry or syrup) | 1- Varieties Boufeggous, produced in Draâ-Tafilalet region and Aziza produced in Figuig.<br>Date fibers help lower cholesterol, are laxative and protect against colon cancer. The tannins are anti-infective, anti-inflammatory, antioxidant and anti-haemorrhagic. Vitamin A protects sight, mucous membranes and skin and defends against lung and oral cavity tumors; beta carotene, lutein and zeaxanthin (which defends against age-related macular degeneration) could instead protect against cancers of the prostate, breast, endometrium, lung and pancreas. Vitamins B is important for metabolism, as vitamin K, which is also important for good coagulation.<br>Among the minerals, iron is important for the transport of oxygen, potassium for cardiovascular health, calcium for bones, muscle contraction, coagulation and conduction of the nerve impulse, manganese for antioxidant defenses, copper for the production of red blood cells and magnesium for bones.<br>Many studies have shown that date fruit has antioxidant, anti-mutagenic, anti-inflammatory, gastro- protective, hepato-protective, nephro-protective, anticancer, immune-stimulant activities<br>Vitamins: Tocopherols (457 mg/kg oil; Other vitamins: Biotine, Folate, B3; B6; B2, B1<br>Minerals: K, P, Ca, Fe, Na, Cu,Mg, Mn, Zn<br>Carotenoid: Beta-carotene, Lutein, Zeaxanthin<br>Phenolic Compounds: p-coumaric, ferulic, sinapic acids Caffeic acid, The total concentration of these phenolic acids varied from 0,06 to 0,14 g/Kg<br>Nutritional and commercial interest; commercial availability; production 72000 Tn/year |
| 3. | Cereals<br><br>*Grain*<br><br>(whole durum wheat) | Grain variety *Triticum durum* produced in Haut-Ziz Valley, Eastern Atlas to Draâ-Tafilalet region.<br>The high fiber content makes durum wheat a valid ally for intestinal function, stimulating digestion. The total absence of cholesterol makes it suitable even for people with cardiovascular problems. It has a high satiating power, and is therefore able to reduce appetite.<br>Durum wheat is laxative, therefore it is not recommended for use in subjects with intestinal problems such as colitis.<br>Vitamins: A, B1, B2, B3<br>Minerals: K, P, Ca, Fe, Mg, Zn, Cu, Se<br>Nutritional and commercial interest; commercial availability; production 7.3 million Tn/year |
| 4. | Cereals<br><br>*Barley* | variety *Hordeum disticum (Hordeum spontaneum),* produced in Draâ-Tafilalet region.<br>Thanks to the important fiber content, barley is laxative and stimulating and therefore particularly suitable for those with constipation and lazy bowel problems. Since it swells a lot once cooked, this cereal has a high satiating power and can be included in slimming diets with the aim of limiting the amount of food introduced during meals.<br>Rich in minerals, barley turns out to be a fairly remineralizing food. Some studies have recently highlighted that some substances contained in barley are able to inhibit the production of bad |

| | | |
|---|---|---|
| | | cholesterol by the liver, helping to reduce the levels of bad cholesterol in the blood and the consequent cardiovascular risk. The beta-glucan contained in it is able to slow down the absorption of carbohydrates, keeping blood glucose levels under control. It also has anti-inflammatory and emollient properties against the gastrointestinal system and is able to exert an anti-infective action in favor of the intestinal mucous membranes.<br>Vitamins: A, B1, B2, B3, B6, B9, K<br>Minerals: Ca, Fe, Mg, K, P, Na, Zn<br>Nutritional and commercial interest; commercial availability; production 2.8 million Tn/year |
| 5. | Fruits<br><br>*Mandarin* | variety *Nadorcott* produced in Soumia Lomri ed Emile Grac (between Essaouira and Marrakech) region.<br>Mandarin is an excellent dietary source of vitamin C. This micronutrient can help fight free radicals, preventing cell damage thanks to its antioxidant action. The antioxidants of mandarin could help protect the cardiovascular system by fighting the oxidation of cholesterol, a phenomenon associated with the formation of atherosclerotic plaques.<br>Mandarin reduces the risk of liver cancer.<br>Vitamins: A, B1, B2,B3, B5, B6, C<br>Minererals: K,P,Ca,Fe, Na<br>Carotenoid: alfa and beta-catotene, beta-criptoxantina, Lutein, Zeaxanthin<br>Nutritional and commercial interest; commercial availability; production 1.2 million Tn/year |
| 6. | Fruits<br><br>*Fig*<br><br>(fresh and dry) | Variety Ficus produced in Chefchouen and Northeastern region of Morocco.<br>This fruit is known for their health properties including acetyl cholinesterase inhibition, antifungal, anti-helminthic and anticarcinogenic activities.<br>Thanks to the potassium content, fig helps keeping blood pressure under control. It is also a good source of fiber, which in addition to promoting good bowel function can also help maintaining (or bring back) the weight to normal and fight some forms of cancer.<br>Figs are also a source of oxalates, molecules that, if too concentrated, can generate the formation of stones. For this reason, the consumption of these fruits could be not recommended in case of uncontrolled kidney or gallbladder problems.<br>Vitamins: A, B1, B2, B3, C<br>Minerals: K,P,Ca, Fe, Na<br>Carotenoid: Beta-carotene, Lutein, and Zeaxanthin<br>Others: Oxerutina, phenolic compounds such as), hydroxylbenzoic acids, hydroxylcinnamic acid and flavonoids<br>Nutritional and commercial interest; commercial availability; production 128000 Tn/year |
| 7. | Fruits<br><br>*Apple* | Variety *Midelt* produced in El Hajeb , Midelt , Sefrou , Khénifra, Mekness, Drâa-Tafilalet region.<br>The low caloric and the limited intake of fat and sodium make the apple ideal for the health of the cardiovascular system. The main benefits of consuming apples derive from their phytonutrients and their fibers. In particular, the soluble ones such as pectin, help reducing blood cholesterol levels and to normalize sugar and insulin levels. Pectin can be useful in case of diarrhea. Insoluble fibers promote intestinal regularity, facilitating the movement of food in the digestive system. For this reason, apple can be useful in case of constipation, diverticulitis and some types of cancer, inhibition of lipid oxidation, cholesterol-lowering effects, apple consumption may also be associated with a lower risk for diabetes. Apple and pear intake has also been associated with weight loss.<br>The consumption of apples is recommended in case of: cancers, diabetes, dysentery.<br>Phenolic compounds: Flavonoids (flavanols, procyanidins, dihydrochalcones, hydroxycinnamic acids)<br>Vitamins: A, B, C, E<br>Minerals: K, Ca, Fe<br>Others: Phytic acid<br>Nutritional and commercial interest; commercial availability; production 697000 Tn/year |
| 8. | Leave vegetables<br><br>*Beet* | variety *Sugar beet* produced in Alnif, Drâa-Tafilalet region<br>Thanks to the high content of mineral salts and vitamins, beets are remineralizing and restorative and particularly beneficial in flu conditions. The fibers and the high amount of water make them purifying and digestive. Since some chemical compounds present in the vegetable appear to be able to revitalize red blood cells, the consumption of beets is especially recommended for anemic subjects. It is advisable to consume them raw, just stewed or au |

| | | |
|---|---|---|
| | | gratin. Instead, it is better to avoid long cooking.<br>Given the presence of high quantities of mineral salts and oxalates, its use is not recommended for those suffering from kidney stones. Since they stimulate the production of gastric juices, the consumption of beets is not recommended for those suffering from stomach acid.<br>Phenolic compounds: Flavonoids (in particular Anthocyanins)<br>Vitamins: B1, B2, B3, C<br>Minererals:K, Ca, Fe; Na, P<br>Others: Oxalates<br>Nutritional and commercial interest; commercial availability; production 3.7 million Tn/year |
| 9. | Nuts<br><br>*Almond* | Produced in Fès Meknes and Northeastern region of Morocco. Varieties: Ferragnes, Ferraduel<br>Almonds are mainly used as a food source of proteins, unsaturated fats, minerals, vitamins (especially vitamin E) and phytonutrients. Among the possible benefits associated with their consumption is the improvement of the lipid profile (further long-term clinical studies will be able to establish whether it is really possible to improve blood fat levels by eating almonds). Currently, an intake of dried fruit between 28.35 and 56.7 grams per day is recommended. Other possible benefits that need to be further explored include the management of diabetes type 2 and weight control.<br>Various studies have shown that the consumption of nuts has a positive effect against many pathologies such as hypertension, obesity, and metabolic syndrome. These positive effects of almond kernels are related to its com- position which is rich in different sources of nutrients and health-promoting compounds, almonds also present a good dietary source of antioxidants, such as tocopherols, polyphenols<br>Fatty acids: C16:0 (7%), C18:1 (62%), C18:2 (25%)<br>Gluten Free<br>low amounts of carotenoids<br>Phenolic compounds: Lignin, Isoflavones<br>Vitamins: B1, B2, B3, E<br>Minererals: K, P, Mg, Ca, Fe, Zn<br>Others: Amigdalina and low amounts of carotenoids<br>Nutritional and commercial interest; commercial availability; production 112.681 Tn/year |
| 10. | Fruits<br><br>*Orange*<br>Dry or syrup | Variety *Washington Navel and Valencia Late*, produced in Béni Mellal region<br>Orange is a source of antioxidants, first of all vitamin C. This has an anti-tumor and anti-inflammatory action, can protect cholesterol from oxidation and promote the proper functioning of the immune system, and has been associated with a lower incidence of Helicobacter pylori infections. Orange flavonoids also exert an anticoagulant action, while herperidine and beta-cryptoxanthin could help fight high cholesterol and lung cancer, respectively.<br>The fibers help to counteract high cholesterol and diabetes and promote good bowel function, and orange juice has been associated with a reduction in the risk of kidney stones and rheumatoid arthritis.<br>Phenolic compounds: flavones<br>Vitamins: A, B1, B2, B3, B5, B9, C, M<br>Minererals: P,K,Mg,Ca,Na, Fe,Cu<br>Carotenoid: Alfa and Beta-carotene, beta-criptoxantina, Lutein, Zeaxanthin<br>Others: anthocyanins, hydroxycinnamic acid<br>Nutritional and commercial interest; commercial availability; production 1 million Tn/year |
| 11. | Fruits<br><br>*Olive*<br><br>(in brine, seasoned or other preservation methods) | variety *Zitoun Beldi* produced in Chefchouen-Tangeri-Tetouan-Al Hoceima region.<br>The consumption of olives supplies the body with numerous substances beneficial for health, such as monounsaturated fatty acids, allies of the heart and arteries because they help to reduce bad cholesterol and increase the good one. To these benefits are added those of polyunsaturated fats (omega3 which help to increase good cholesterol and reduce triglycerides and omega6 which help to lower cholesterol). The presence of phytosterols also helps to protect cardiovascular health and the absorption of cholesterol in the intestine. Olives are also sources of antioxidant molecules (vitamins, carotenoids and minerals) and of oleocanthal which helps fighting inflammation and its consequences.<br>Vitamins: A, B1, B2, B3, B5, B6, C, E, K<br>Minerals: Fe, Na, Zn,Se, Cu |

| | | |
|---|---|---|
| | | Nutritional and commercial interest; commercial availability; production 1.9 million Tn/year |
| 12. | Fruits<br><br>*Melon* | variety *Netted melon* produced in Marrakech, Dakhala, Agadir region.<br>The nutrients present in melon make it a good source of substances with antioxidant and anti-inflammatory properties. Its consumption has been associated with a lower risk of metabolic syndrome, a health-threatening condition characterized by a variety of problems, including high blood lipid levels, hyperglycemia, high blood pressure and overweight.<br>The phytonutrients present in melon can improve insulin and blood sugar metabolism and they could, in the case of diabetes, help reduce oxidative stress and improve insulin resistance.<br>Phenolic compounds: Flavonoids (in particular Lutein)<br>Vitamins: A, B1, B2, B3, B6, B9, C, K, M<br>Minerals: K, P, Ca, Fe, Mg, Na<br>Carotenoid: alpha-carotene, beta-carotene, lutein, beta-cryptoxanthin and zeaxanthin<br>Other: ferulic acid, caffeic acid and cucurbitacin B and E.<br>Nutritional and commercial interest; commercial availability; production 500.000 Tn/year |
| 13. | Fruits<br><br>*Carobs*<br><br>carob<br><br>powder | Local varieties<br>The consumption of this carobs improves digestion, lowers cholesterols, acts as an antioxidant. It can be used to treat diarrhea, caffeine free, Helped in the spastic colon, anti-bacterial, antiviral, antiseptic. Carobs are very rich in polyphenols (1.688 g/Kg), free flavones and flavanones (0.132 g/Kg), glycosylated flavonols (0.879 g/Kg), isoflavones (0.0005 g/Kg), flavonones (0.019 g/Kg) and gallotannins (1.15 g/Kg). Gallic acid was again the most abundant compound (1.65 g/Kg).<br>Vitamins: C, Niacin, Folic acid, B6, B12, B2, A, E, D.<br>Minerals: K, P, Ca, Mg , Fe , Mn and Cu.<br>Others: Phenoolic compounds and gluten free<br>Nutritional and commercial interest; commercial availability; production 55400 Tn/year |
| 14. | Fruits<br><br>*Clementine*<br><br>Dry or syrup | Clementine of Berkane is known for its sweetness.<br>Clementine is an excellent dietary source of vitamin C. This micronutrient can help fight free radicals, preventing cell damage thanks to its antioxidant action. The antioxidants of clementine could help protect the cardiovascular system by fighting the oxidation of cholesterol, a phenomenon associated with the formation of atherosclerotic plaques. Clementine has several beneficial effects on lipid metabolism, antitumor, and antioxidant activity, among Others.<br>Vitamins: A, B1, B2, B3, B5, B6, C<br>Minererals: K,P,Ca,Fe, Na<br>Carotenoid: alfa and beta-catotene, beta-criptoxantina, Lutein, Zeaxanthin<br>Nutritional and commercial interest; commercial availability; production 644000 Tn/year |
| 15. | Nuts<br><br>*Peanuts* | Studies have shown an association between nut consumption and health benefits in adults such as lower lipid levels, lower body mass indices, and reduced risk of coronary artery disease. also, peanut consumers were less likely to be overweight or obese.<br>Peanuts are rich in Lipids (49.66 %)<br>Fatty acids: C16:0 (10.46%), C18:1 (53.77%), C18:2 (26.96%), C18:3 (1.42%); C20:1 (2.73%)<br>Phenolic compounds: phenolic acids, flavonoids, A-type procyanidins, coumaric acid, isoflavones, phytosterols, resveratrol, Caffeic acid, and rutin trihydrate.<br>Vitamins: Choline, Tocopherol, Niacin, B1, B6, Folic acid.<br>Minerals: K, P, N.<br>Nutritional and commercial interest; commercial availability; production 37000 Tn/year |
| 16. | Fruits<br><br>*Apricots*<br><br>fragment<br><br>dried | Local varieties<br>Apricots include ingredients that make them a rich source of vitamin C as well as compounds with antioxidant and other biological activities. It has been shown that apricots can help with chronic gastritis, oxidative intestinal damage, hepatic steatosis, atherosclerosis, coronary heart disease, and tumor development.<br>Phenolic compounds: Catechin, Chlorogenic acid, Cyanidin-3-glucoside, Epicatechin, Epigallocatechin, Neochlorogenic acid, Quercetin-3-glucoside, Quercetin derivative.<br>Vitamins: A, C, E.<br>Minerals: B, P, Ca, Na, Mg, Fe, Cr, Se.<br>Carotenoid: β-carotene, β-cryptoxanthin , Lutein, Zeaxanthin |

| | | |
|---|---|---|
| | | Nutritional and commercial interest; commercial availability; production 101612 Tn/year |
| 17. | Fruits<br><br>*Banana*<br><br>Dried | Variety Dwarf Cavendish grown in the Aourir area.<br>Banana pulp was observed to contain bioactive compounds, like phenolic acids and flavanoids with high antioxidant potential and antitumor activity, eating bananas provides high quantity of potassium to the body, which is beneficial for the muscles. Antidiarrheal activity.<br>Phenolic compounds in banana peel ranges from 0.90 to 3.0 g/100 g DW [dry weight] include gallic acid, catechin, epicatechin, tannins and anthocyanins.<br>Vitamins: C, niacin (vitamin PP), thiamine (vitamin B1) and folic acid.<br>Minerals: K, Mg, Ca, Na, Cu, and Fe.<br>Carotenoid: lutein, alfa and beta-carotene, violaxanthin, auroxanthin, neoxanthin, iso-lutein, alfa and beta-cryptoxanthin.<br>Nutritional and commercial interest; commercial availability; production 335 542 Tn/year |
| 18. | Cereals<br><br>*Oats*<br><br>Flakes | Variety, "Tutrice 153"<br>One of the world's healthiest cereals is oats. They include significant amounts of essential vitamins, minerals, fiber, and antioxidants and are a gluten-free whole grain.<br>Oats and oatmeal offer several health advantages, according to studies. These consist of decreased blood sugar levels, weight loss, and a lower risk of heart disease.<br>Oats provide health benefits due to their antioxidant, anti-inflammatory, and antiproliferative activities.<br>Phenolic compounds: gallic acid, esters of 5-hydroxyanthranilic acid with p-coumaric, ferulic, or caffeic acids.<br>Vitamins: A, B, and E.<br>Minerals: Ca, Na, Zn, Fe.<br>Carotenoids: lutein, zeaxanthin, and carotenes.<br>Nutritional and commercial interest; commercial availability; production 2780 Tn/year |
| 19. | Legumes<br><br>*Chickpeas*<br><br>Flour | Local varieties (Bochra, Arifi) grown in Taza-Al hoceima, Meknes-Fes, and Gharb provinces.<br>Chickpea is a substantial component of human nutrition and a vital foodlegume of the semi-arid tropics and warm temperate zones. It is a good source of protein, fiber, and minerals, and it plays a significant role in sustainable farming, particularly in wheat-based cropping systems, because of its capacity to fix atmospheric nitrogen in soils.<br>Chickpeas contain many saponins, substances useful for lowering cholesterol and triglyceride levels in the blood, in addition to being excellent sources of vegetable proteins, fibers, and vitamins (especially of the B group) and of two minerals very important for the well-being of the organism, magnesium and phosphorus. Chickpeas are particularly heart-healthy due to their high concentration of omega-3 fatty acids (particularly linoleic acid).<br>Vitamins: A, B1, B2,B3, C, D, E<br>Minerals: Na, K, P, Se, Fe, Ca, Mg, Zn, Cu<br>Carotenoids: Lutein, Zeaxanthin<br>Nutritional and commercial interest; commercial availability; production 42600 Tn/year |

### 5.3.1. Culture of food and using of the ingredients in the MD traditional cuisine

Moroccans like a broad variety of fruits and vegetables. A Moroccan fruit tray may consist of oranges, grapefruits, and lemons together with melons, plums, apricots, grapes, figs, and dates. Potatoes, onions, zucchini, carrots and pumpkin are common vegetables in a Moroccan dish.

Eggplant is a favourite vegetable in Morocco and turns up in many cooked vegetable salads or fried dishes. Being a country with a Mediterranean side, olives are common in their cooking. The Mediterranean coast and the much larger Atlantic coast make fish well liked in Morocco. Chicken is the most popular meat eaten followed by beef and lamb, the preferred option.

Moroccan cuisine is also rich in spices: local spices are coriander, parsley and cumin, often mixed with the ones introduced by the Arabs (saffron, cinnamon, cumin, pepper and ginger). Paprika is also very common

and turmeric appreciated. Mediterranean spices, such as basil or marjoram, also appear in Moroccan cuisine and you can find also dishes flavoured with olives and preserved lemons.

Vegetable are central also in the popular Moroccan foods like couscous and tagine (both Berber dishes). Tagine is a stew made with meat and vegetables, sometimes fruit. There are tagines with only vegetables and beans - or lentils - which are very close to the original Berber recipes. Moroccan cuisine also shows the influences of Arab, Mediterranean, Spanish and neighbour African countries.

Moroccan cuisine has been impacted by Morocco's generations of encounters and exchanges with different cultures and nations. Moroccan cuisine is often a fusion of Arab, Berber, Andalusi, and Mediterranean cuisines, with sub-Saharan and European (French and Spanish) influences. Morocco grows a wide variety of Mediterranean fruits and vegetables, as well as tropical products such as snails. Beef, goat, mutton, and lamb are common meats that, together with poultry and shellfish, form the foundation of the cuisine. Lemon pickle, argan oil, preserved butter (smen), olive oil, and dried fruits are all distinctive flavors.

Moroccan cuisine makes significant use of spices. Although certain spices have been imported into Morocco via the Arabs for thousands of years, many components, such as saffron from Talaouine, mint and olives from Meknes, and oranges and lemons from Fes, are cultivated in Morocco and exported. Cinnamon, cumin, turmeric, ginger, paprika, coriander, saffron, mace, cloves, fennel, anise, nutmeg, cayenne pepper, fenugreek, caraway, black pepper, and sesame seeds are all common spices.

Moroccan lunch meals often start with a sequence of hot and cold salads, followed by a tagine or dwaz. For a formal lunch, a lamb or chicken dish, or couscous topped with meat and vegetables, is usually served next.

Seasonal fruits, rather than prepared sweets, are typically presented at the end of a meal. Kaab el ghzal (gazelle ankles), a pastry loaded with almond paste and topped with sugar, is a popular dessert. Another is halwa chebakia, which is deep-fried pretzel-shaped dough drenched in honey and topped with sesame seeds and consumed throughout Ramadan. Jowhara is a Fes specialty comprised with fried waraq pastry, cream, and toasted almond segments.

### 3.6. Annotation regarding commercial use of the ingredients

All the ingredients identified for Turkiye, Morocco and Spain, demonstrate a satisfactory production in terms of quantity for their commercial use. Most of these are also ingredients that present a palatal pleasantness and are already part of traditional food consumption, so they can be an interesting alternative to produce nutritious and natural snacks for children and teenagers, if processed according to transformation and integration criteria with other natural ingredients, avoiding the use of added sugars and/or fats of animal origin or vegetable, preservatives or dyes, sweeteners, etc.

We believe that according to the principles of the Mediterranean lifestyle (MD), the snacks should as much as possible recall traditional recipes (home-made snacks) and their family preparation.

### 6.1 SPAIN (CNTA-DELAFRUIT-SLOW FOOD)

Delafruit will not develop soft drinks but products like **smoothies/drinks** with blends of fruit and vegetables purées and juices. Smoothies are a great mid-day snack to serve up. They allow for unlimited customization and can help you get a considerable boost of nutrients in a short amount of time. Smoothies are also easy on your digestive system and easy to take with you on the go. Some smoothies/drinks with blends of fruit and vegetables purées and juices consumed in Spain:

In the time available, it was possible to carry out sample research on some products (snacks / soft drinks) already on the market in Spain and Morocco, which we illustrate below (the best-known brands of international multinationals that still have global distribution have been deliberately excluded):

| | |
|---|---|
| Smothie/drink with fruit and vegetables juices and purées | Brand: *be plus*<br>Smoothie in a pouch. Mix of mango, pineapple, banana, quinoa, chamomile, etc. |
| | Brand: Hero Baby<br>Pouch with mix of fruits like strawberry, banana, pear, orange, apricot, etc. Also with cereals.<br>Presented as: milk, egg, gluten free and no sugar added. |
| | Brand: Smileat<br>Pouch with mix of fruits like apple, strawberry, banana, pear, orange, etc.<br>Presented as: no sugar added. |
| | Brand: Nestle<br>Yogolino: dairy product with fruit purées like banana, strawberry, etc. |

| | |
|---|---|
| Snacks | Brand: *EGLASSON*<br>single bars: milk chocolate, dark chocolate, green apple, banana, orange, coconut.<br>Based on cereals with proteins, carbohydrates, vitamins and minerals |
| | Brand: *EL ALMENDRO*<br>One bar contains: soy, almonds, nuts, milk, peanuts<br>Based on cereals and chocolate |
| | Brand: *PALEO BULL* - Solidarity bar<br>Banana bar with: dates, dehydrated egg white, dehydrated banana, hazelnuts and natural banana flavor.<br>Cocoa & Reishi bar with: dates, hazelnuts, dehydrated egg white, cocoa and reishi.<br>Coconut & Maca Bar with: dates, dehydrated egg white, coconut, almonds, maca and natural coconut flavor.<br>Orange & Chia Bar with: dates, dehydrated egg white, almonds, chia, dehydrated orange and natural orange flavor. |

| | |
|---|---|
| | Peach & Baobab Bar with: dates, dehydrated egg white, fish, almond, coconut, baobab, natural fish flavour |
| | Brand: *BLANCA MARTI*<br>chickpea flour, quinoa, walnuts, almonds, raisins, dates, hibiscus petals, cinnamon, chocolate, sweetened with honey and tagatoza.<br>They are 100% natural, without preservatives, without dyes and without gluten.<br>GENERIC INGREDEITES FOR VEGAN BARS: the basis of these bars are hazelnuts, dried fruit, oat flakes and flax seeds. |
| | Brand: *AORA FOOD*<br>Ingredients present in a single bar: FRUIT (grapes, red grapes, blueberry, grapefruit, papaya, pineapple, strawberry, apple, apricot, cherry, orange, black currant); VEGETABLES (tea, carrots, tomatoes, cabbage, broccoli, onions, cucumbers, asparagus. vitamins and minerals per bar: Zinc 1.5 mg, Vitamin D 0.8 ug and Vitamin C 12.1 mg).<br>Flavors of white chocolate and plum or milk chocolate |
| | Brand: *TOKI BARRITAS*<br>Tofu and vegetables |
| Soft drinks | Brand: *TYMBARK*<br>SINGLE INGREDIENT FOR EACH JUICE: artichoke, pepper, tomato, carrots, spinach, broccoli, beetroot and red carrots, cucumbers. |
| | Brand: *V8 ORIGINAL*<br>ingredients present in a single drink: tomato, celery, carrots, beets, parsley, milk, watercress, spinach, 2% salt, antioxidant E300, (vitamin C), natural flavor, acid regulator E330. GMO products |

### 6.2 MOROCCO (UMP-CHOCO-SLOW FOOD)

Some snack foods produced by Chocorica

| | |
|---|---|
| NUTS | **Brand: Powdered almonds**<br>The fine and easy-to-use almond powder for the preparation of frangipane creams, tart bases, cakes and macaroons. 100% almond and natural, ground almonds will give your creations a unique taste.<br>**Composition or Ingredients:** Almond. Without dye or preservative. |
| | **Brand: The flaked almond**<br>The flaked almond will bring you a remarkable crispness for your oriental cakes and a perfect decoration for your creations.<br>**Composition or Ingredients:** Almond. Without dye or preservative. |
| | Brand: chopped almonds<br>The chopped almond is very easy to use whether in cooking or baking for the preparation of your most original recipes.<br>**Composition or Ingredients:** Almond. Without dye or preservative. |
| | **Brand: Millet seeds**<br>“Naturally gluten-free” millet seeds are shelled and crunchy, small in size, round and yellow in color. Ideal for sprinkling or mixing with your bread dough, you can test new recipes with this highly digestible cereal.<br>**Composition or Ingredients:**Hulled millet seeds. |
| | **Brand: hazelnut chocolate spread**<br>**Composition or Ingredients:** Sugar, Vegetable oil, Hazelnuts 9%, Fat reduced cocoa powder, skimmed milk powder, whey powder, emulsifiers: soy lecithin; vanillin. Without preservative. |
| | **Brand: praline-almond-hazelnut**<br>Ideal for incorporation into pastries, ice creams<br>**Composition or Ingredients:** sugar 50%, almond 50%, or hazelnut 50% |

| | |
|---|---|
| Snacks | Brand: *Organics Happy Creamies Superfood*<br>Mashed BALLS (blackberry, strawberry and carrot; coconut, mint, green apple, kiwi; apple, spinach, peas and kiwi).<br>Flower-shaped cereal-like (sweet potatoes and carrots, apple and broccoli, kale and spinach; banana and pumpkin; red carrots and blueberries; strawberry and beetroot)<br>Presented as "gluten free"<br>Other products based on cereals and peanuts, figs |
| Soft drinks | *ECOSAY:* cereal drink, soya, cocoa, coffee, almond, coconut<br>Fruit juices (cherries, pomegranate) or rare combinations and mixes similar to centrifuged (e.g. cucumbers, tomatoes, beetroot)<br>*JUST COOL:* tamarind<br>*1 UP NATURAL:* organic vegan protein mango and avocado<br>*DUG:* potato milk<br>*V8:* strawberries and cucumbers (refreshing and moisturizing)<br>Juices with basil, dates, banana or apple, carrots, beetroot, lemon |

**N.B.** Not being able to buy the products and analyze them, it is not possible to carry out an organoleptic analysis, to understand the % of the ingredients indicated on the label and if for some ingredients are natural or synthetic aromas, the quantity of any added sugars and / or fats of animal origin or vegetable.

### 6.3 TURKIYE (BUU-KOC)

Snack bars consumed most frequently by children in Turkey

| | |
|---|---|
| Snacks | Brand: *FELLAS*<br>**Dates**, date pulp, hazelnuts, peanuts, carob flour, coconut flour, almonds, cocoa mass, cocoa, chicory root fiber (inulin).<br>100% natural, no added sugar, healthy snack fruit bar.<br>Gluten-free, additive-free and preservative-free, vegan. High fiber and low calories |
| | Brand: *ZUBER KIDS*<br>**Dates**, **apricot**, hazelnut, almond, cocoa Mass, chicory root fiber<br>No gluten, added sugar, trans fatty acids, sweeteners, lactose, additives, and preservatives |
| | Brand: *TADIM*<br>Raw pumpkin seeds, roasted peanuts, roasted almonds, cranberries |
| | Brand: *ZUBER*<br>**Date**, pistachio, chickpea flour, cocoa mass, chicory root fiber, hazelnut |
| | Brand: *ORGANIX*<br>Whole grain oats, raisins, sunflower oil, carrot juice concentrate, apple juice concentrate, cinnamon, orange oil |
| | Brand: *KIDDYLICIOUS*<br>Whole grain gluten-free oats, raisins, grape juice concentrate, rice starch, coconut oil, pineapple juice concentrate, apple juice concentrate, dried coconut, mango juice concentrate |
| | Brand: *TIMIOS BERRY*<br>Oat, **date**, cranberry, blackberry, strawberry, crispy rice, honey, refined vegetable oil blend |
| | Brand: *FRU CREW*<br>Whole grain gluten free oats, fruit juice concentrates (grape juice, rice starch, mango juice, orange juice), raisins (raisin, sunflower oil), mango, **apricot**, coconut oil |

As we mentioned above, we chose the **two ingredients** in the snack bars that children consume the most in Turkey. These have been **apricots** and **dates**.

It has also carried out an evaluation on any additional ingredients to be integrated into the prototypes, respecting the requirements of the project specification, to obtain healthy prototypes. These additional ingredients could be **walnut, hazelnut, peanut, and almond**.

## 7. Conclusions

From the research conducted in the three countries (Turkey, Morocco, Spain) by the Task 1.1 partners, it emerged that the traditional food cultures of these countries are still rich in recipes that offer a healthy and varied mix of ingredients at the base of MD. The document therefore offers in-depth elements on the recipes of the culinary tradition in the three countries under study.

Even the central ingredients for the MD (cereals, fruit, vegetables, nuts, etc.) are well represented in local production, as can be seen from the lists of ingredients selected and analyzed for the three countries.

The brief research on the production in individual countries of snacks aimed at younger generations, presents the possibility of enriching the offer and varying it, trying to meet the tastes of the youngest, but at the same time preserving the principles of health and quality of the products.

The research in **Turkey** was conducted by the **BUU** which presented an analysis of **16 ingredients** by selecting two of them: **apricots** and **dates.**

The research for **Spain** was carried out by **Slow Food** and **Delafruit-CNTA**, reaching a total of **31 ingredients**. From this list, Delafruit then considered starting a trial on two ingredients: **oat** and **chicory.**

The research on **Morocco** was carried out by **Slow Food** and **UMP-CHOCO**, for a total of **19 ingredients**, from which two ingredients were then selected by CHOCO for experimentation: **almonds** and **dates.**

Finally, we will have **5 different ingredients**, while **dates** will be used in the prototypes for Turkey and Morocco. Fruit, nuts, vegetables, and cereals are thus represented.

This Task 1.1 has also produced the selection of a rich bibliography and website, which may be useful as an in-depth study, not only for the further phases of the project, but also for other study or research projects.

# 8. Bibliography

## 8.1. References of SLOW FOOD


AA.VV., *Barley: An overview of a versatile cereal grain with many food and feed uses*, in "Encyclopedia of Food Grains", II ed., vol. 1, pp. 147-152, 2016

AA.VV. *Determinants of barley grain yeld in a wide range of Mediterranean environments*. Field Crop Research, 120: 169-178, 2011

AA.VV., *Dual-purpose barley and oats in a Mediterranean environment*, Field Crop Research, 99: 158-166, 2006

AA.VV., The FAO/AEA/CNEN *Near east uniform regional trials of radio-induced durum wheat mutants, 1966-1970, Proceedings of the Symposium on Genetics and breeedng of durum wheat*, pp. 349-371, Bari 1973

AA.VV., *Reducing the incidence of cereal head infection and mucotoxins in small grain cereail species,* Journal of Cereal Science doi 10.1016/j.jcs. 2013.10.005, 2014

Auballe-Sallenave, *La Mediterranée, une cusine, des cusines,* 1996

Baldini M., Pasqui F., Bordoni A., Maranesi M., *Is the Mediterranean lifestyle still a reality? Evaluation of food consumpation and energy expenditure in Italian and Spanish university students,* Public Health Nutrition, 2008

Batello C., Avanzato D, Akparov Z., Kartvelishvili T., Melikyan A., *Gardens of biodiversity*, FAO, Rome 2010

Braudel F., *La Mediterranée. L'espace et l'histoire,* Paris, 1985

Capouchova I., *Technological quality of spelt (Triticum spelta L.) from ecological growing system*. Scientia Agriculturae Bohemica, 32, 307-322, 2001.

Carcea M., Bruschi L., Salvatorelli S., Foddai M. S., *Phenolic acids and other quality parameters of Italian emmer (Triticum dicoccon Shrank) landraces and their products*. Tecnica Molitoria International, yearly issue 57(5), 116-122, 2006.

Cloutier M., Adamson E., *The Mediterranean Diet*

Counihan C., Van Esterik P., *Food and Culture: a reader,* II edition, 2008

Damania A.B., *Domestication of cereal crop plant and in situ conservation of their genetic resources in the Fertile Crescent*. In: Damania, A.B., Valkoun, J., Willcox, G., Qualset, C.O. (editors). The origin of agriculture and crop domestication. ICARDA, Aleppo, pp 307–316, 1998

David E., *A book of Mediterranean food*, 1950

De Garine I., *The trouble with meat: an ambiguous food,* in A. Igor de Garine, Huber and R. Avila (eds.). Man and Meat. Estudions de l'Hombre, n. 19, University of Guadalajara: 33.54.2005

De Vita P., Riefolo C., Codianni P., Cattivelli L., Fares C., *Agronomic and qualitative traits of T. Turgidum ssp. Dicoccum genotypes cultivated in Italy*. Euphytica 150(1–2),195–205, 2006.

Galterio G., Cappelloni M., Desiderio E., Pogna N. E., *Genetic, tecnological and nutritional charachteristics of three Italian populations of 'farrum' (Triticum turgiddum ssp dicoccon),* Journal of Genetics and Breeding 48: 391-398, 1994.

Hydalgo A., Brandolini A., *Nutritional properties of einkorn wheat (Triticum monococcum L.),* Journal of the Science of Food and Agriculture, 94: 601–612, 2014.

Kersting M., Alexy U., Clausen K., *Using the concept of food based dietary guidelines to develop an optimized mixed diet (OMD) for German children and adolescents,* Journal of Pediatric Gastroenterology and Nutrition 40:301-308, March 2005, Lippincott Williams & Wilkins, Philadelphia

Nesbitt M., Samuel D., *From staple crop to extinction? The archaeology and history of the hulled wheat*. In: Padulosi S., Hammer K., Heller J. (editors). Hulled wheats, promoting the conservation and used of underutilized and neglected crops. International Plant Genetic Resources Institute (IPGRI), Rome, pp 40–99, 1996.

Ovaskainen M.L., Reinivuo H., Tapanainen H., Hannila M., Korhone T., Pakkala H., *Snacks as an element of energy intage and food consumption*, European Journal fo Clinical Nutrition, 2006

Özkan H., Brandolini A., Schäfer-Pregl R., Salamini F., *AFLP analysis of a collection of tetraploid wheat indicated the origin of emmer and hard wheat domestication*. Molecular Biology and Evolution, 19(10), 1797–1801, 2002.

Pagnotta M.A., Mondini L., Codianni P., Fares C., *Agronomical, quality, and molecular characterization of twenty Italian emmer wheat (Triticum dicoccon) accessions*. Genetic Resources and Crop Evolution 56(3), 299–310, 2009.

Padulosi S., Hammer K., Heller J. (editors). H*ulled wheat. Proceedings of the first international workshop on hulled wheats*, 21-22 July 1995 Castelvecchio Pascoli (LU), Italy. International Plant Genetic Resources Institute (IPGRI), 1996.

Piergiovanni A.R., Laghetti G., Perrino P., *Charactreristics of meal from hulled wheats (Triticum dicoccon Schrank and T. spelta L.): an evaluation of selected accessions*. Chereal chemistry 73 (6), 732-735, 1996.

Piccini F., *La dieta più antica del mondo. Come ritrovare la salute e la linea seguendo la "vera" dieta mediterranea*, Dalai ed., 2014

Pollan M., *The Omnivore's Dilemma: A Natural History of Four Meals*. New York, Penguin Press, 2006

Salamini F., Ozkan H., Brandolini A., Schäfer-Pregl R., Martin W. (2002) *Genetics and geography of wild cereal domestication in the near east*. Nature Reviews Genetics vol. 3,pages 429– 441.

Saltini A., *I semi della civiltà. Frumento, mais e riso nella storia delle società umane*, Bologha, Avenue Media, 1996

Scarascia Mugnazza G.T., *The contribution of Italian wheat geneticists: from Nazareno Strampelli to Francesco D'Amato*, in Proceedings of the International Congress, the Wake of the Double Helix – From the Green Revolution to the Gene Revolution, 27-31 May 2003 (Avenue Media, Bologna, 2005, pp. 53-75)

Tekin M., Cengiz M.F., Abbasov M., Aksoy A., Canci H., Akar T., *Comparison of some mineral nutrients and vitamins in advanced hulled wheat line*s. Cereal Chemistry 95 (3), 436-444, 2018.

Tuberosa R., Graner A., Frison E., *Genomics of Plant Genetic Resources*, 2014

Vavilov S., Ivanovich N., *Origini and Geography of Cultuvated Plants*, Cambridge University Press, 1992

Zohary, D., Hopf M., *Domestication of plants in the Old World: the origin and spread of cultivated plants in West Africa, Europe, and the Nile Valley*, 2nd ed. Clarendon Press, Oxford 278, 1993.

**Weblinks**

agronotizie.imagelinenetwork.com/vivaismo-e-sementi/2019/03/28/legumi-il-cece-alla-riscossa/62371

COLDIRETTI, PARLAMENTO EUROPEO

colturaecultura.it/content/agrumi-marocco# (sostenuto da BAYER)

crea.gov.it/web/alimenti-e-nutrizione/-/dossier-scientifico-linee-guida-per-una-sana-alimentazione-2018

EUROSTAT: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agricultural_products/it&oldid=87365

FAO.org (FAOSTAT)

flw-it.imadeself.com/1/virashivanie/vyraschivaemye-sel-skohozyaystvennye-kul-tury-v-ispanii.html

fondazioneslowfood.com/it/arca-del-gusto-slow-food/cece-di-valencia-del-ventoso/

fondazioneslowfood.com/it/arca-del-gusto-slow-food/datteri-boufeggous/

fondazioneslowfood.com/it/arca-del-gusto-slow-food/grano-guemh-ziz/

fondazioneslowfood.com/it/arca-del-gusto-slow-food/samet/

Foodandtec.com

FOSAN.org

freshplaza.it/article/4047338/spagna-cresce-del-20-la-produzione-biologica-di-melograno

freshplaza.it/article/4099646/marocco-quasi-un-mese-di-anticipo-per-la-raccolta-delle-angurie

fruitnet.com/eurofruit

humanitas.it/ (ENCICLOPEDIA MEDICA, IRCCS Istituto Clinico Humanitas )

ice.it/it/news/notizie-dal-mondo/178294

iss.it/

istitutotumori.mi.it/documents/848032/7150478/MINI_CATALOGO_FRUTTA_E_VERDURA.pdf/c1169eee-0c0e-837a-2496-b5765aec5d57

it.frwiki.wiki/wiki/Agriculture_en_Espagne

italiafruit.net/DettaglioNews/26579/mercati-e-imprese/meloni-dati-medfel-la-spagna-stacca-il-marocco-e-consolida-la-seconda-posizione-nel-mediterraneo-dietro-la-francia

italiafruit.net/DettaglioNews/67232/dallestero/spagna-le-speculazioni-non-mancano

MINISTERO PER LO SVILUPPO ECONOMICO AGENZIA ICE

myfruit.it/focus-mese/2020/05/pesche-europa-perde-il-17-della-produzione.html#:~:text=Con%20una%20previsione%20di%20poco,al%20alla%20media%202014%2D18.

OMS: salute.gov.it

PubMed.ncbi.nlm.nih.gov

terraevita.edagricole.it/economia-e-politica-agricola/record-storico-per-la-raccolta-cereali-in-spagna-oltre-24-milioni-di-tonnellate/

www.worldfoodwine.com/

## 8.2. References of BUU-KOC

Bento, C., Gonçalves, A. C., Silva, B., & Silva, L. R. (2020). Peach (Prunus persica): Phytochemicals and health benefits. *Food Reviews International*, 1-32.

Courtney, D., Byran, J., Hodgson, J., & Murphy, K. (2015). Definition of the Mediterranean diet: a literature review. *Nutrients,* 7(11), 9139-9153.

Hussain, S. Z., Naseer, B., Qadri, T., Fatima, T., & Bhat, T. A. (2021). Fig (Ficus Carica)—Morphology, Taxonomy, Composition and Health Benefits. In *Fruits Grown in Highland Regions of the Himalayas* (pp. 77-90). Springer, Cham.

Hussain, S. Z., Naseer, B., Qadri, T., Fatima, T., & Bhat, T. A. (2021). Pear (Pyrus Communis)—Morphology, Taxonomy, Composition and Health Benefits. In *Fruits Grown in Highland Regions of the Himalayas* (pp. 35-48). Springer, Cham.

Lin, J. Y., & Tang, C. Y. (2007). Determination of total phenolic and flavonoid contents in selected fruits and vegetables, as well as their stimulatory effects on mouse splenocyte proliferation. *Food chemistry,* 101(1), 140-147.

Mondal, A., Banerjee, S., Bose, S., Das, P. P., Sandberg, E. N., Atanasov, A. G., Bishayee, A. (2021). Cancer preventive and therapeutic potential of banana and its bioactive constituents: a systematic, comprehensive, and mechanistic review. Frontiers in Oncology, 11. (Musa accuminata, Musa balbisiana)

Mora, H., José, J., García-Vigara, A., Sánchez-Sánchez, M.L., García-Pérez, M.A., Tarín, J., & Cano, A. (2020). The Mediterranean diet: A historical perspective on food for health. *Maturitas,* 132, 65-69.

Ni, Z. J., Zhang, Y. G., Chen, S. X., Thakur, K., Wang, S., Zhang, J. G., & Wei, Z. J. (2021). Exploration of walnut components and their association with health effects. *Critical Reviews in Food Science and Nutrition*, 1-17.

Otles, S., & Selek, I. (2012). Phenolic compounds and antioxidant activities of chestnut (C astanea sativa M ill.) fruits. *Quality Assurance and Safety of Crops Foods,* 4(4), 199-205.

Pycia, K., Kapusta, I., Jaworska, G., & Jankowska, A. (2019). Antioxidant properties, profile of polyphenolic compounds and tocopherol content in various walnut (Juglans regia L.) varieties. *European Food Research and Technology,* 245(3), 607-616.

Renna, Massimiliano, Francesco F. Montesano, Francesco Serio, & Maria Gonnella. "The Mediterranean diet between traditional foods and human health through culinary examples." In *Gastronomy and food science*, pp. 75-99. Academic Press, 2021.

Shahidi, F. (2017). Phenolic acids and flavonoids of peanut by-products: Antioxidant capacity and antimicrobial effects. *Food Chemistry,* 237, 538-544.

Singh, B., Singh, J. P., Kaur, A., & Singh, N. (2016). Bioactive compounds in banana and their associated health benefits–A review. *Food Chemistry*, *206*, 1-11.

Singh, J. P., Singh, B., & Kaur, A. (2022). Polyphenols in fig: a review on their characterisation, biochemistry during ripening, antioxidant activity and health benefits. *International Journal of Food Science & Technology*, 57(6), 3333-3342.

Tas, N. G., & Gokmen, V. (2015). Bioactive compounds in different hazelnut varieties and their skins. *Journal of Food Composition and Analysis*, 43, 203-208.

Turturică, M., & Bahrim, G. E. (2021). Carrot–Application in food industry and health benefits–review. *Innovative Romanian Food Biotechnology*, (21), 1-21.

Xi, W., & Lei, Y. (2020). Apricot. In *Nutritional Composition and Antioxidant Properties of Fruits and Vegetables* (pp. 613-629). Academic Press.

Yaqub, S., Farooq, U., Shafi, A., Akram, K., Murtaza, M. A., Kausar, T., & Siddique, F. (2016). Chemistry and functionality of bioactive compounds present in persimmon. *Journal of Chemistry*, *2016*.

### 8.3. References of DELAFRUIT - CNTA

Alam, M. K. (2021). A comprehensive review of sweet potato (Ipomoea batatas [L.] Lam): Revisiting the associated health benefits. Trends in Food Science & Technology, 115, 512–529. doi:10.1016/j.tifs.2021.07.001

Aparicio A & Ortega RM. (2016) Efectos del consumo del beta-glucano de la avena sobre el colresterol sanguíneo: una revisión. Rev Esp Nutr Hum Diet, 20(2):127-139 doi: 10.14306/renhyd.20.2.183

Barreca D, Mohammad S, Sureda A, Rasekhian M, Raciti R, Sanches A, Annunziata G, Arnone A, Carlo G, üntar I, Mandalari G. (2020). Almonds (Prunus Dulcis Mill.D.A.Webb): A Source of Nutrients and Health-Promoting Compounds. Nutrients, 12(3), 672, https://www.mdpi.com/2072-6643/12/3/672

Base de Datos Española de Composición de Alimentos (BEDCA). https://www.bedca.net/bdpub/index.php

Ben Sassi, A., Ascrizzi, R., Chiboub, W., Cheikh Mhamed, A., ElAyeb, A., Skhiri, F., Tounsi Saidani, M., Mastouri, M., & Flamini, G. (2021). Volatiles, phenolic compounds, antioxidant and antibacterial properties of kohlrabi leaves. Natural Product Research, 0(0), 1–6. https://doi.org/10.1080/14786419.2021.1940177

Chauhan A & Chauhan V. (2020) Beneficial Effects of Walnuts on Cognition and Brain Health. Nutrients, 12(2):550. doi: 10.3390/nu12020550

Delgado-Pelayo, R., Gallardo-Guerrero, L., & Hornero-Méndez, D. (2016). Carotenoid composition of strawberry tree (Arbutus unedo L.) fruits. Food Chemistry, 199, 165–175.

Di Nunzio M. (2019) Hazelnuts as Source of Bioactive Compounds and health value underestimated food. Nunzio, Curr. Res. Nutr Food Sci Jour. 7(1), 17-28. https://www.foodandnutritionjournal.org/volume7number1/hazelnuts-as-source-of-bioactive-compounds-and-a-health-value-underestimated-food/

El-Sayed, S. M. (2020). Use of spinach powder as functional ingredient in the manufacture of UF-Soft cheese. Heliyon, 6(1), e03278. https://doi.org/10.1016/j.heliyon.2020.e03278

Etemandi F, Hashemi M, Barker A, Rezea O & Liu Xiaobing. (2019) Agronomy, Nutritional Value, and Medicinal Application of Faba Bean (Vicia faba L.) Horticultural Plant Journal, 5:170-182, https://doi.org/10.1016/j.hpj.2019.04.004

Gabilondo, J., Corbino, G., Chludil, H. and Malec, L. (2022). Bioactive compounds of two orange-fleshed sweet potato cultivars (Ipomoea batatas (L.) Lam.) in fresh, stored and processed root. Applied Food Reseach 2 (22022). https://doi.org/10.1016/j.afres.2022.100061

Giuseppa Di Bella, Giovanna Lo Vecchio, Ambrogina Albergamo, Vincenzo Nava, Giovanni Bartolomeo, Antonio Macrì, Loretta Bacchetta, Vincenzo Lo Turco, Angela Giorgia Potortì. Chemical characterization of Sicilian dried nopal [Opuntia ficus-indica (L.) Mill.], Journal of Food Composition and Analysis, Volume 106, 2022, 104307, ISSN 0889-1575, https://doi.org/10.1016/j.jfca.2021.104307.

Journal of Food Composition and Analysis, Volume 106, 2022, 104307, ISSN 0889-1575, https://doi.org/10.1016/j.jfca.2021.104307.

Khalil, M., Bazzi, A., Zeineddine, D., Jomaa, W., Daher, A., & Awada, R. (2021). Repressive effect of Rhus coriaria L. fruit extracts on microglial cells-mediated inflammatory and oxidative stress responses. Journal of Ethnopharmacology, 269, 113748. https://doi.org/10.1016/j.jep.2020.113748

Kulczyński, Bartosz; Gramza-Michałowska, Anna (2019). The Profile of Secondary Metabolites and Other Bioactive Compounds in Cucurbita pepo L. and Cucurbita moschata Pumpkin Cultivars. Molecules, 24(16), 2945–. doi:10.3390/molecules24162945

Igual, M., García-Martínez, E., Camacho, M. M., & Martínez-Navarrete, N. (2011). Changes in flavonoid content of grapefruit juice caused by thermal treatment and storage. Innovative Food Science and Emerging Technologies, 12(2), 153–162. https://doi.org/10.1016/j.ifset.2010.12.010

Igual, M., García-Martínez, E., Camacho, M. M., & Martínez-Navarrete, N. (2010). Effect of thermal treatment and storage on the stability of organic acids and the functional value of grapefruit juice. Food Chemistry, 118(2), 291–299. https://doi.org/10.1016/j.foodchem.2009.04.118

Jahanban-Esfahlan A, Ostadrahimi A, Tabibiazar M & Amarowicz R. (2019) A Comprehensive review on the chemical constituents and functional uses of walnut (Juglans spp.) Husk. Int.J.Mol.Sci, 20,3920. https://doi.org/10.3390/ijms20163920

Lee J,Kim YS, Lee J, Chul S, Lae K, Choi SW & Kim Y. (2016) Walnut phenolic Extract and its Bioactive Compounds Suppress Colon Cancer Cell Growth by Regulating Colon Cancer Stemness. Nutrients, 8(7):439. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4963915/#:~:text=It%20has%20been%20reported%20that,compounds%20we%20analyzed%20%5B45%5D.

Manzoor, M. F., Xu, B., Khan, S., Shukat, R., Ahmad, N., Imran, M., Rehman, A., Karrar, E., Aadil, R. M., & Korma, S. A. (2021). Impact of high-intensity thermosonication treatment on spinach juice: Bioactive compounds, rheological, microbial, and enzymatic activities. Ultrasonics Sonochemistry, 78, 105740. https://doi.org/10.1016/j.ultsonch.2021.105740

Mattila P, Pihlava J & Hellström J. (2005) Contents of Phenolic acids, Alkyl- and Alkenylresorcinols, and Avenanthramides in Commercial Grain Products. J. Agric. Food Chem., 53, 21, 8290-8295.

Millar KA, Gallagher E, Burke R, McCarthy S & Barry-ryan C. (2019) Proximate composition and anti-nutritional factors of fava-bean (Vicia faba), green-pea and yellow-pea (Pisum sativum) flour. Journal of Food Composition and Analysis, 82, 103233. https://doi.org/10.1016/j.jfca.2019.103233

Mzoughi, Z., Chahdoura, H., Chakroun, Y., Cámara, M., Fernández-Ruiz, V., Morales, P., Mosbah, H., Flamini, G., Snoussi, M., & Majdoub, H. (2019). Wild edible Swiss chard leaves (Beta vulgaris L. var. cicla): Nutritional, phytochemical composition and biological activities. Food Research International, 119, 612–621. https://doi.org/10.1016/j.foodres.2018.10.039

Oliveira I, Meyer AS, Afonso S, Aires A, Goufo P, Trindade H & Gonçalves B. (2019). Phenolic and fatty acid prfiles, a-tocopherol and sucrose contents, and antioxidant capacities of understudied Portuguese almond cultivars. J Food Biochem, 43(7):e12887. https://pubmed.ncbi.nlm.nih.gov/31353720/

Orús A. (2022) Volúmenes de producción de avena en las distintas comunidades autónomas españolas en 2019 (en toneladas). Statista. https://es.statista.com/estadisticas/501790/produccion-de-avena-en-comunidades-autonomas-de-espana/

Perna S, Giacosa A, Bonitta G, Bologna C, Isu A, Guido D & Rondanelli M. (2016) Effects of Hazelnut consumption on blood lipids and body weight: a systematic review and bayesian meta-anaylisis. Nutrients, 8(12):747. doi: 10.3390/nu8120747.

Paudel D, Dhungana B, Caffe M & Krishnan P. (2021) A review of Health-Beneficial properties of oats. Foods, 10(11), 2591. https://doi.org/10.3390/foods10112591

Pereira, C., López-Corrales, M., Serradilla, M. J., Villalobos, M. del C., Ruiz-Moyano, S., & Martín, A. (2017). Influence of ripening stage on bioactive compounds and antioxidant activity in nine fig (Ficus carica L.) varieties grown in Extremadura, Spain. Journal of Food Composition and Analysis, 64, 203–212. https://doi.org/10.1016/j.jfca.2017.09.006

Perović, J., Tumbas Šaponjac, V., Kojić, J., Krulj, J., Moreno, D. A., García-Viguera, C., Bodroža-Solarov, M., & Ilić, N. (2021). Chicory (Cichorium intybus L.) as a food ingredient – Nutritional composition, bioactivity, safety, and health claims: A review. Food Chemistry, 336, 127676. https://doi.org/10.1016/j.foodchem.2020.127676

Rasane P, Jha A, Sabikhi L, Kumar A & Unnikrishnan VS. (2013) Nutritional advantages of oats and opportunities for its processing as value added food - a review. J Food Sci Technol, 52(2):662-675. doi: 10.1007/s13197-013-1072-1

Romano R, Aiello A, Meca G, De Luca L, Pizzolongo F & Masi P. (2021) Recovery of bioactive compounds from walnut (Juglans regia L.) green husk by supercritical carbon dioxide extraction. Ifst, 56, 4658-4668, https://doi.org/10.1111/ijfs.15161

Sakhr, K., & El Khatib, S. (2020). Physiochemical properties and medicinal, nutritional and industrial applications of Lebanese Sumac (Syrian Sumac - Rhus coriaria): A review. Heliyon, 6(1), e03207. https://doi.org/10.1016/j.heliyon.2020.e03207

Salem, I. Ben, Ouesleti, S., Mabrouk, Y., Landolsi, A., Saidi, M., & Boulilla, A. (2018). Exploring the nutraceutical potential and biological activities of Arbutus unedo L. (Ericaceae) fruits. Industrial Crops and Products, 122, 726–731. https://doi.org/10.1016/j.indcrop.2018.06.024

Salisu-Suleiman, M., Eniola-Olajide,J., Audu-Omale, J., Abbah, O.C., and Ocholi-Ejembi, D.; Proximate composition, mineral and some vitamin contents of tigernut (Cyperus esculentus); 2018. Clinical Investigation; Open access journals: https://www.openaccessjournals.com/

Superficies y producciones anuales de cultivos. Ministerio de Agricultura, Pesca y Alimentación (MAPA). 2021. https://www.mapa.gob.es/es/estadistica/temas/estadisticas-agrarias/agricultura/superficies-producciones-anuales-cultivos/

Turco I, Ferretti G & Baccheti T. (2016). Review of the health benefits of Faba bean (Vicia faba L.) polyphenols. J. Food Nutr. Res., 55(4):283–93.

Wallace T, Murray T & Zelman K. (2016) The Nutritional value and healht benefits of chockepas and hummus. Nutrients, 8(12), 766. https://doi.org/10.3390/nu8120766

Wang J, Li Y, Li A, Hai R, Gao X, Li D, Kou X & Xue Z. (2021) Nutritional constituent and health benefits of chickpea (Cicer arietinum L.): A review. Food Res Int, 150(Pt A):110790. doi: 10.1016/j.foodres.2021.110790.

Yu, Y., Lu, X., Zhang, T., Zhao, C., Guan, S., Pu, Y., & Gao, F. (2022). Tiger Nut (Cyperus esculentus L.): Nutrition, Processing, Function and Applications. Foods (Basel, Switzerland), 11(4), 601. https://doi.org/10.3390/foods11040601

Zołnierczyk, A. K., Ciałek, S., Styczynska, M., & Oziembłowski, M. (2021). Functional Properties of Fruits of Common Medlar (Mespilus germanica L.) Extract. Applied Sciences3, 11(7528).

### 8.4. References of UMP - CHOCO

Arvaniti, O. S., Samaras, Y., Gatidou, G., Thomaidis, N. S., & Stasinakis, A. S. (2019). Review on fresh and dried figs: Chemical analysis and occurrence of phytochemical compounds, antioxidant capacity and health effects. Food Research International, 119, 244-267.

Ayaz, F.A., Torun, H., Ayaz, S., Correia, P.J., Alaiz, M., Sanz, C., Gruz, J., Strnad, M., 2007.Determination of chemical composition of anatolian carob pod (Ceratonia siliquaL.): sugars, amino and organic acids, minerals and phenolic compounds. J. Food Quality 30, 1040–1055.

Baliga, M. S., Baliga, B. R. V., Kandathil, S. M., Bhat, H. P., & Vayalil, P. K. (2011). A review of the chemistry and pharmacology of the date fruits (Phoenix dactylifera L.). Food research international, 44(7), 1812-1822.

Bonku, R., & Yu, J. (2020). Health aspects of peanuts as an outcome of its chemical composition. Food Science and Human Wellness, 9(1), 21-30.

Borges, C. V., de Oliveira Amorim, V. B., Ramlov, F., da Silva Ledo, C. A., Donato, M., Maraschin, M., & Amorim, E. P. (2014). Characterisation of metabolic profile of banana genotypes, aiming at biofortified Musa spp. cultivars. Food chemistry, 145, 496-504.

Boyer, J., & Liu, R. H. (2004). Apple phytochemicals and their health benefits. Nutrition journal, 3(1), 1-15.

Boz, H. (2015). Phenolic amides (avenanthramides) in oats-a review. Czech Journal of Food Sciences, 33(5), 399-404.

Campbell, O. E., & Padilla-Zakour, O. I. (2013). Phenolic and carotenoid composition of canned peaches (Prunus persica) and apricots (Prunus armeniaca) as affected by variety and peeling. Food research international, 54(1), 448-455.

Cebadera, L., Dias, M. I., Barros, L., Fernández-Ruiz, V., Cámara, R. M., Del Pino, Á., ... & Cámara, M. (2020). Characterization of extra early spanish clementine varieties (Citrus clementina Hort ex Tan) as a relevant source of bioactive compounds with antioxidant activity. Foods, 9(5), 642.

Chinnici, F., Bendini, A., Gaiani, A., & Riponi, C. (2004). Radical scavenging activities of peels and pulps from cv. Golden Delicious apples as related to their phenolic composition. Journal of Agricultural and food chemistry, 52(15), 4684-4689.

D. Barreca, S. M. Nabavi, A. Sureda, M. Rasekhian, R. Raciti, and A. S. Silva, "Almonds (Prunus dulcis Mill. DA Webb): a source of nutrients and health-promoting compounds," Nutrients, vol. 12, p. 672, 2020.

Dahmani S, Errachidil F , Bour A , Berrada W , El Ghardraoui L , Chabir R. Pomological and biochemical characterization of some Moroccan citrus varieties. International Journal of Scientific & Engineering Research Volume 9, Issue 3, March-2018 59. ISSN 2229-5518

Fatima, T., Bashir, O., Gani, G., Bhat, T., & Jan, N. (2018). Nutritional and health benefits of apricots. International Journal of Unani and Integrative Medicine, 2(2), 5-9.

García-Closas, R., Berenguer, A., Tormo, M. J., Sánchez, M. J., Quiros, J. R., Navarro, C., ... & Gonzalez, C. A. (2004). Dietary sources of vitamin C, vitamin E and specific carotenoids in Spain. British Journal of Nutrition, 91(6), 1005-1011.

H. El Batal, A. Hasib, A. Ouatmane, F. Dehbi, A. Jaouad, A. Boulli, Sugar composition and yield of syrup production from the pulp of Moroccan carob pods (Ceratonia siliqua L.), Arabian Journal of Chemistry, Volume 9, Supplement 2, 2016, Pages S955-S959,

Hacıseferoğulları, H., Gezer, I., Özcan, M. M., & MuratAsma, B. (2007). Post-harvest chemical and physical–mechanical properties of some apricot varieties cultivated in Turkey. Journal of Food Engineering, 79(1), 364-373.

Housali C, Idrissi O, Nasrellah Nasserelhaq N. Chickpea genetic improvement in Morocco: State of the art,progress and prospects. 2020. Mor. J. Agri. Sci. 1 (1): 5-8, January.

Hu, X. Z., Zheng, J. M., Li, X. P., Xu, C., & Zhao, Q. (2014). Chemical composition and sensory characteristics of oat flakes: A comparative study of naked oat flakes from China and hulled oat flakes from western countries. Journal of cereal science, 60(2), 297-301.

K. Sebei, A. Gnouma, W. Herchi, et al., Lipids, proteins, phenolic composition,antioxidant and antibacterial activities of seeds of peanuts (Arachis hypogaea l) cultivated in Tunisia, J. Biol. Res. 46 (2013) 257–263.

Melhaoui, R., Kodad, S., Houmy, N., Belhaj, K., Mansouri, F., Abid, M., ... & Elamrani, A. (2021). Characterization of sweet almond Oil content of four European cultivars (Ferragnes, Ferraduel, Fournat, and Marcona) recently introduced in Morocco. Scientifica, 2021.

Moreno, J. P., Johnston, C. A., El-Mubasher, A. A., Papaioannou, M. A., Tyler, C., Gee, M., & Foreyt, J. P. (2013). Peanut consumption in adolescents is associated with improved weight status. Nutrition Research, 33(7), 552-556.

Munzuroglu, O., Karatas, F., & Geckil, H. (2003). The vitamin and selenium contents of apricot fruit of different varieties cultivated in different geographical regions. Food Chemistry, 83(2), 205-212.

Musa, Ö. M. (2010). Some nutritional characteristics of kernel and oil of peanut (Arachis hypogaea L.). Journal of oleo science, 59(1), 1-5.

Noordraven, L. E., Kim, H. J., Hoogland, H., Grauwet, T., & Van Loey, A. M. (2021). Potential of Chickpea Flours with Different Microstructures as Multifunctional Ingredient in an Instant Soup Application. Foods, 10(11), 2622.

Özcan, M. M., Matthäus, B., Aljuhaimi, F., Mohamed Ahmed, I. A., Ghafoor, K., Babiker, E. E., ... & Alqah, H. A. (2020). Effect of almond genotypes on fatty acid composition, tocopherols and mineral contents and bioactive properties of sweet almond (Prunus amygdalus Batsch spp. dulce) kernel and oils. Journal of Food Science and Technology, 57(11), 4182-4192.

Panche, A.N.; Diwan, A.D.; Chandra, S.R. Flavonoids: An overview. J. Nutr. Sci. 2016, 5, e47

Qamar, S., & Shaikh, A. (2018). Therapeutic potentials and compositional changes of valuable compounds from banana-A review. Trends in Food Science & Technology, 79, 1-9.

Rachwa-Rosiak, D., Nebesny, E., & Budryn, G. (2015). Chickpeas—composition, nutritional value, health benefits, application to bread and snacks: a review. Critical Reviews in Food Science and Nutrition, 55(8), 1137-1145.

Singh, B., Singh, J. P., Kaur, A., & Singh, N. (2016). Bioactive compounds in banana and their associated health benefits–A review. Food Chemistry, 206, 1-11.

Skinner, R. C., Gigliotti, J. C., Ku, K. M., & Tou, J. C. (2018). A comprehensive analysis of the composition, health benefits, and safety of apple pomace. Nutrition Reviews, 76(12), 893-909.

Stavrou, I. J., Christou, A., & Kapnissi-Christodoulou, C. P. (2018). Polyphenols in carobs: A review on their composition, antioxidant capacity and cytotoxic effects, and health impact. Food chemistry, 269, 355-374.

Tang, Y., Yerke, A., & Sang, S. (2019). Oats. Whole Grains and their Bioactives: Composition and Health, 45-61.

Tang, Z. X., Shi, L. E., & Aleid, S. M. (2013). Date fruit: chemical composition, nutritional and medicinal values, products. Journal of the Science of Food and Agriculture, 93(10), 2351-2361.

Yada, S., Lapsley, K., & Huang, G. (2011). A review of composition studies of cultivated almonds: Macronutrients and micronutrients. Journal of Food Composition and Analysis, 24(4-5), 469-480.

Youssef, M. K. E., El-Manfaloty, M. M., & Ali, H. M. (2013). Assessment of proximate chemical composition, nutritional status, fatty acid composition and phenolic compounds of carob (Ceratonia siliqua L.). Food and Public Health, 3(6), 304-308.

**Weblinks**

FAO.org (FAOSTAT)

http://www.babmagazine.ma/la-clementine-brille-linternational

https://knoema.com/atlas/Morocco/topics/Agriculture/Crops-Production-Quantity-tonnes/Bananas-production

https://knoema.com/FAOPRDSC2020/production-statistics-crops-crops-processed?tsId=1225560

https://om.ciheam.org/article.php?IDPDF=6886

https://univela-morocco.com/products/citrus/navel-orange/

https://www.agri-mag.com/2017/06/19/arboriculture-bananier-au-gharb/

https://www.ceicdata.com/en/morocco/agricultural-production-volume/agricultural-production-volume-fruits-citrus-navels

https://www.healthline.com/health/5-best-things-about-carob

https://www.inra.org.ma/fr/content/status-chickpea-production-and-research-morocco

https://www.onicl.org.ma/portail/situation-du-march%C3%A9/statistiques

https://www.selinawamucii.com/insights/market/morocco/apricots/

https://www.selinawamucii.com/insights/market/morocco/dates/

https://www.selinawamucii.com/produce/nuts-and-oil-seeds/morocco-almond-nuts/