

COMENIUS

ISS DIET

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Chapitre 1

Introduction





Considering that the definition of diet is the types of food a person usually eats we expect to find out significant differences when comparing Mediterranean diet and the astronauts' diet.

Food provides us nutrients. The matter and the energy that our body needs is provided by nutrients. The only way to ensure that our nutritional requirements are satisfied by our diet is by means of a complete and balanced one. The connection between diet and health is so evident that it has to be considered when making dietary choices.

Nutrients allow us to build and repair tissues, they supply energy to move our muscles, and our bodies can function thanks to micronutrients such as vitamins and minerals. Our requirements vary depending on, among other factors, our physical activity and environmental conditions.

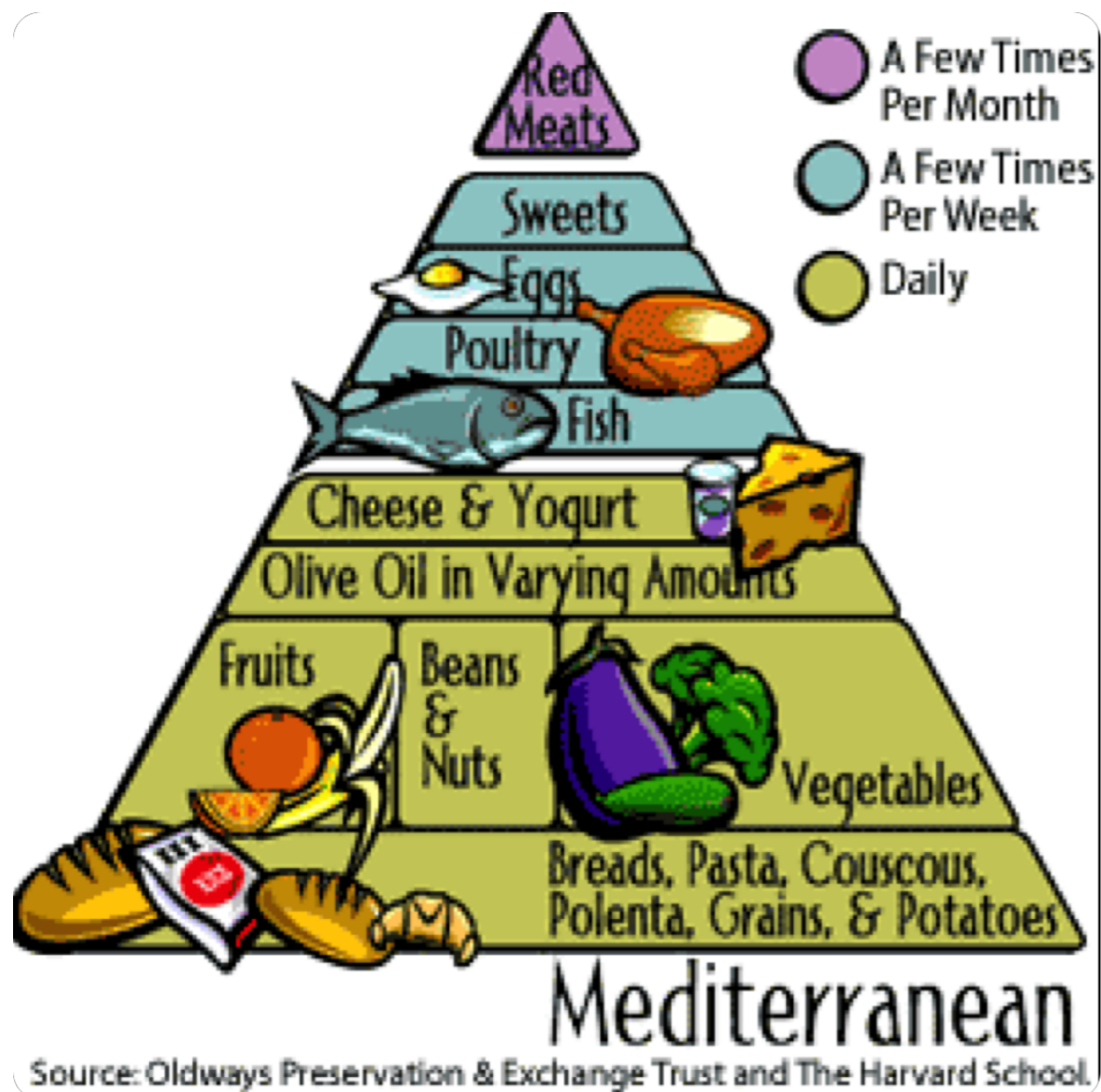
The social and cultural aspects of our diet also have to be considered.



Chapitre 2

Mediterranean diet





The mediterranean diet is a collection of eating habits traditionally followed by at least 16 countries bordering the Mediterranean Sea in which despite their differences, due to its culture, ethnic background and religion they share several characteristics:

- A high consumption of fruits, vegetables, potatoes, beans, nuts, seeds, bread and other cereals
- Olive oil is used for cooking and as a dressing
- Moderate amounts of fish but little meat
- Low to moderate amounts of full fat cheese and yogurt
- Moderate consumption of wine, usually with meals
- Reliance on local, seasonal and fresh products

Adding an active lifestyle to this dietary habits seems to have important health benefits. Scientific evidence shows that it can help us:

- Protect people from suffering heart diseases and high blood pressure
- Fight certain cancers and chronic diseases
- Reduce asthma
- Avoid diabetes
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Why? Lets analyze the properties of the main ingredients:

-Olive oil is a rich source of monounsaturated fat (which protects against heart disease) and antioxidants including vitamin E.

- Fresh fruit and vegetables contain antioxidants, such as lycopene in tomatoes, which protect against heart disease and cancer

-Fish, and particularly oily fish such as sardines, are a source of omega-3 polyunsaturated fats, which seem to contribute to a healthy heart because of their anti-inflammatory and vasodilatory properties, facilitating the blood flow.

-Wine, specially red wine, drunk in moderation (two glasses per day for men and one glass per day for women) with meals is a source of phytonutrients such as polyphenols-antioxidants- and vasodilators and inhibitors of platelet aggregation.

But none of them alone can explain the benefits of the Mediterranean Diet, it seems to be the combination of all the different ingredients, and even we should broaden the Mediterranean Diet concept including other factors such as habits of preparation, consumption, hospitality... into the Mediterranean Lifestyle.

Information from: www.eufic.org and www.oldwayspt.org

MEDITERRANEAN DIET VIDEO ACTIVITIES

First Activity. Find out which are the missing words in the video transcription.

Result of the Millennium history of acquisitions, exchanges and adaptations across a (1)..... territory. The Mediterranean (2)....., rooted in the Greek word "díaita", lifestyle, is the set of skills, knowledge, practices and traditions that concern obtaining food from the landscape to the table, in the Mediterranean basement. The (3), the presentation, preparation and consumption.

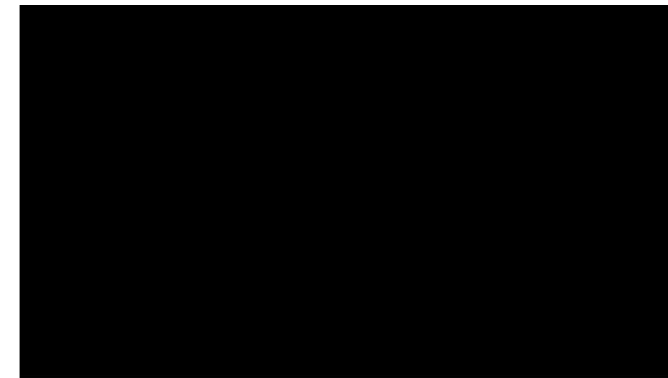
In this transnational territory with extraordinary synchronism and similarities, despite the distances, crops, (4)....., gathering, fishing, conservation, processing, preparation, (5), and especially consumption, as well as the celebrations they're associated with, become gestures of mutual recognition, (6)....., dialog, and solidarity, in context of experience and transmission of this set of knowledge.

Through wisdom, markets, social events, health, the kitchen or the table, words play a major role in telling, (7), appreciating, presenting, or (8)..... The involvement of institutions, universities, associations, schools and the family, nurture the present, and ensures the transmission and future of

this heritage.

These experiences with their roots as much in simple as daily gestures as in solemnity and festive exuberance bring together in the communities of Agros, Chefchaouen, Cilento, Coron, Hvar, Brac, Soria and Tavira, and among all the Mediterranean peoples a sense of (9)....., belonging, and continuity. To recognize this as an essential part of their shared and common cultural (10).....

Vidéo 2.1 Mediterranean Diet



Second Activity. How many ingredients of the Mediterranean Diet have you been able to identify? Please make a list of up to ten.

ANSWERS MEDITERRANEAN DIET VIDEO ACTIVITIES

First Activity

1. transnational
2. diet
3. processing
4. harvests
5. cooking
6. hospitality
7. transmitting
8. sharing
9. identify
10. heritage

Second Activity

Fish, cereals, seafood, spices, bread, pasta, mushrooms, almonds, grapes, oranges, peppers, tomatoes, artichokes, cheese, olive oil, olives, etc.



Chapitre 3

ISS Diet



ISS DIET

A complete and balanced diet is even more important on the ISS than on Earth despite all the limitations that astronauts suffer. Security, hygiene and nutritional quality of food are necessary but also the social component and the organoleptic properties have to be considered.

Lets check the particularities of the diet in space:

1. Due to physiological effects of weightlessness in astronauts.

-Astronauts need a supply of vitamin D because they are not exposed to U.V. radiation. On Earth, vitamin D₃ is produced in the skin by reaction of 7-dehydrocholesterol and U.V.-B radiation.

-The requirements of iron decrease because of the reduction of erythrocytes. Haemoglobin contains iron and is the protein in charge of transporting oxygen in erythrocytes.

-Because of the activation of sodium retaining hormones produced by the ingravity the astronauts' sodium intake has to be regularly monitored.

- Because of the lack of pressure gradient the blood pressure in the head will increase leading to the “puffy-face syndrome”. The swollen blood vessels in the nose will affect the sense of smell, decreasing astronauts' ability to detect flavours in food. Since

food will be perceived more tasteless than on Earth, astronauts often prefer spicy food.

2. Due to limitation of food preservation techniques:

- No fresh food onboard where the temperature is 21°C because they don't have a fridge.

-Dehydration. The lower weight of food is a positive side effect.

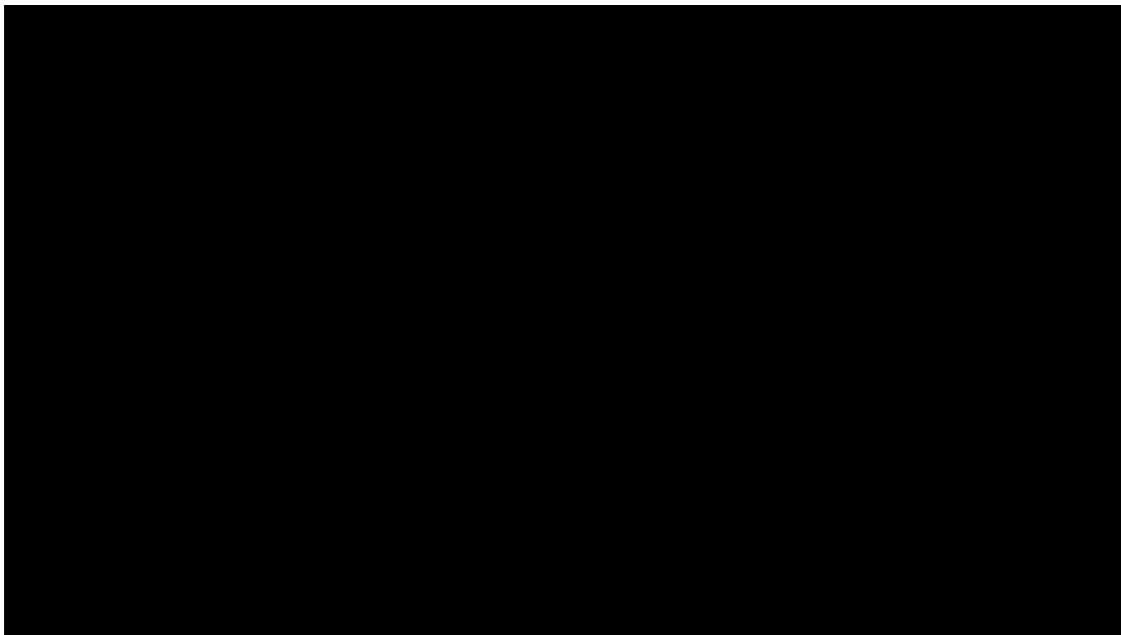
-Sterilization: It reduces dramatically the vitamin content and organoleptic properties can change.

-Ionization: unwanted effects of this method are that it accelerates oxidation reactions in food and it decreases its vitamin content. Sometimes food's color and taste change.

3. Due to cultural diversity

Crews are multicultural and diet has a strong cultural component. Ingredients, spices, textures, etc. vary from one continent to another. What can taste delicious to a Japanese isn't necessarily palatable to an American astronaut.

Vidéo 3.2 Dinning on the ISS



DIET ACTIVITIES

After watching this video, please answer the following questions:

1. Which kind of containers do they use to store their food?
2. What will be Commander Scott Kelly's menu?
3. How do they rehydrate food?
4. Where do they get their water from?
5. Describe the difficulties they face while eating.

6. Why do they separate wet and dry garbage?

ISS DIET ANSWERS

1. Metal food containers and bags.

2. Beef stew with green beans and mushrooms, and candy coated peanuts for dessert.

3. By putting water into the food container or bag from a potable water dispenser, and letting it rehydrate for 5 to 10 min.

4. From the water that the resupply vehicles bring up, the one the shuttle makes as a function of how it produces electricity, and the one that they make on-board from their urine and the condensate that is produced in the air from the humidity.

5. Food can float away and isn't found for days, as well as that it tries to escape from the packages when they try to eat it, but

mostly dealing with the garbage, as they have to store it for months.

6. Because wet garbage tends to smell bad so they have to take special care of it, by putting it in waterproof bags.



What astronauts eat today



After watching this video, please answer the following questions:

Vidéo 4.1 Space food: What astronauts eat today



1. Which problems do the astronauts face while eating?
2. How is freeze-dried food prepared?
3. Which type of food came in a bowl with a zipper on the top?
4. Which is one of the favorite choices among the 74 different dishes prepared at the space food system's laboratory in Houston?
5. Which is the purpose of radiating the packages?

ANSWERS of SPACE FOOD: WHAT ASTRONAUTS EAT TODAY VIDEO ACTIVITIES

1. Pieces can float away when not managed and these little bits can mess up the equipment and even be inhaled accidentally and cause choking.
2. Food is cooked, packaged and quickly frozen and dried.
3. Rehydrated food.
4. Shrimp cocktail.
5. Killing the bacteria and making food last long enough.



Chapitre 5

Mediterranean diet versus ISS diet



MEDITERRANEAN DIET VERSUS ISS DIET

Comparing both diets we can highlight:

- Freshness of ingredients and dishes in the Mediterranean Diet versus dehydrated, ionized, sterilized dishes in the ISS Diet.
- High variety of products and dishes in the Mediterranean Diet versus a short number of choices in the ISS Diet.
- Well based on cultural background in the Mediterranean Diet and not in the ISS Diet.
- Mediterranean Diet provides all vitamins and minerals required by our organism and in the ISS Diet supplements are required.

It is well known that astronauts often complain about their diet, specially european and japanese ones. Mainly, dishes are produced according to American and Russian dietary preferences. Recently we can find different attempts to introduce Mediterranean Diet based menus, such as Barcelona menu from Spain or Mediet from Italy.

In spite of the improvement in quality and diversity reached along the space exploration history, nowadays we are facing a new challenge: to provide astronauts with food obtained from their own crops in long term space missions. According to this purpose, a project from esa, MELiSSA (Micro-Ecological Life Support System Alternative) , is currently being developed.