BERNICA
Building Educational and Research Capacities in Nutrition and Dietetics in Central Asia

Co-funded by the Erasmus+ Programme of the European Union

Old Products – New Components

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Osh, 2024

Learning outcomes

After this lecture you will be able to

- Know main food product components
- Know factors, affecting food product components
- Explain the health concerns related to residues
- Prevent Negative consequences of residues

WHAT ARE MAIN FOOD COMPONENTS?

- We enjoy eating food because of its taste, its smell, and the pleasure and comfort it gives us. However, we rarely stop to think about what our food actually contains.

The six groups of nutrients found in foods are: ■ Carbohydrates ■ Lipids (including fats and oils) ■ Proteins ■ Vitamins ■ Minerals ■ Water

MACRONUTRIENTS

- Carbohydrates, lipids, and proteins are the only nutrients in foods that provide energy.

The Science of Nutrition: Linking Food, Function, and Health. P. 8

Carbohydrates (rice, wheat, and other grains, as well as vegetables and fruits, Fiber)

- Are a Primary Fuel Source, particularly for neurologic functioning and physical exercise
- **Web The Dietary Guidelines For Americans Recommend That Carbohydrates Make Up 45% To 65% Of Total Daily Calories. Wel in general, the recommended daily intake of carbohydrates is around 225 to 325 g**

Lipids are another important source of energy for the body

In foods, they are found in solid fats and liquid oils. Lipids include triglycerides, phospholipids, and sterols.

Recommended Daily Intake of Lipids

about 44 grams to 77 grams of fat per day

Proteins

Protein is an essential nutrient that plays a vital role in the growth, repair, and maintenance of tissues and organs in the human body. It is composed of amino acids, which are the building blocks necessary for the production of enzymes, hormones, antibodies, and various other molecules.

Recommended Daily Intake of Protein

Adult Men: 56–91 grams per day

Adult Women: 46–75 grams per day

MICRONUTRIENTS

Vitamins and minerals are referred to as micronutrients. That's because we need relatively small amounts of these nutrients to support normal health and body functions

They are also critical in building and maintaining healthy bone, blood, and muscle; in supporting our immune system so we can fight illness and disease; and in ensuring healthy vision

Overview of Vitamins

Type	Names	Distinguishing Features
Fat soluble	A, D, E, K	Soluble in fat Stored in the human body Toxicity can occur from consuming excess amounts, which accumulate in the body
Water soluble	C, B-vitamins (thiamin, riboflavin, niacin, vitamin B6 , vitamin B12, pantothenic acid, biotin, folate)	Soluble in water Not stored to any extent in the human body Excess excreted in urine Toxicity generally only occurs as a result of vitamin supplementation

Minerals

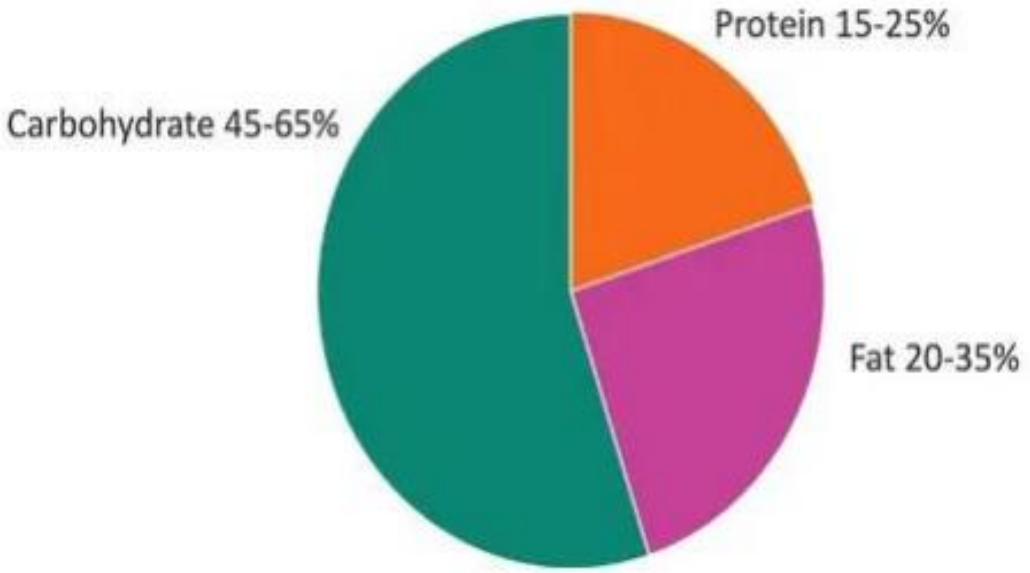
- Minerals include sodium, calcium, iron, and over a dozen more.
- Minerals have many important physiologic functions. They assist in fluid regulation and energy production, are essential to the health of our bones and blood, and help rid the body of harmful by-products of metabolism.

Overview of Minerals

Type	Names	Distinguishing Features
Major minerals	Calcium, phosphorus, sodium, potassium, chloride, magnesium, sulfur	Needed in amounts greater than 100 mg/day in our diet Amount present in the human body is greater than 5 g (5,000 mg)
Trace minerals	Iron, zinc, copper, manganese, fluoride, chromium, molybdenum, selenium, iodine	Needed in amounts less than 100 mg/day in our diet Amount present in the human body is less than 5 g (5,000 mg)

Macronutrient Distribution Range (AMDR)

jpshealthandfitness.com.au



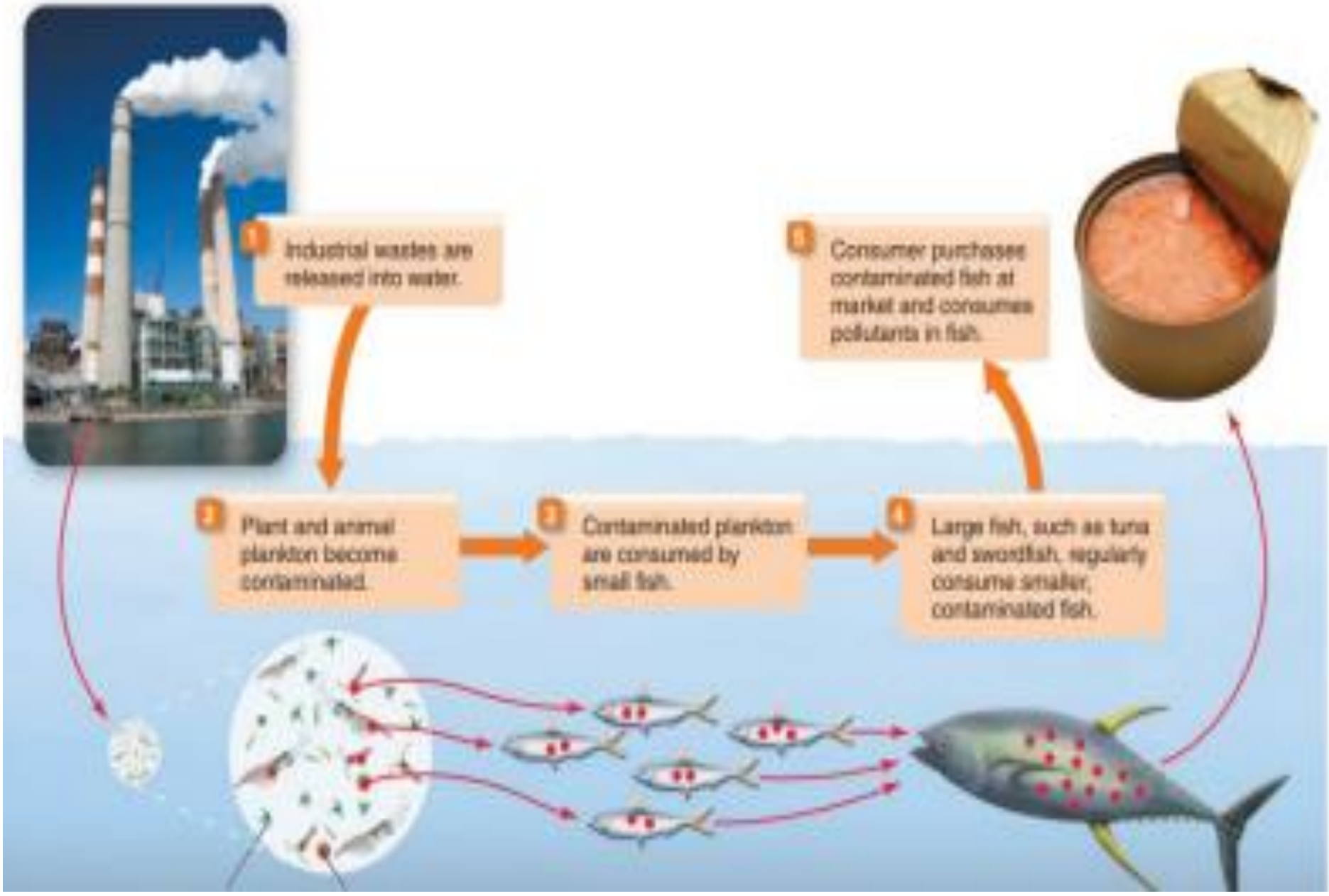
What are Food residues?

- Food residues are chemicals that remain in foods despite cleaning and processing. Residues of global concern include persistent organic pollutants, pesticides, and the hormones and antibiotics used in animals. The health concerns related to residues include nerve damage, disorders of the reproductive system, cancer, and the development of antibiotic-resistant pathogenic bacteria.

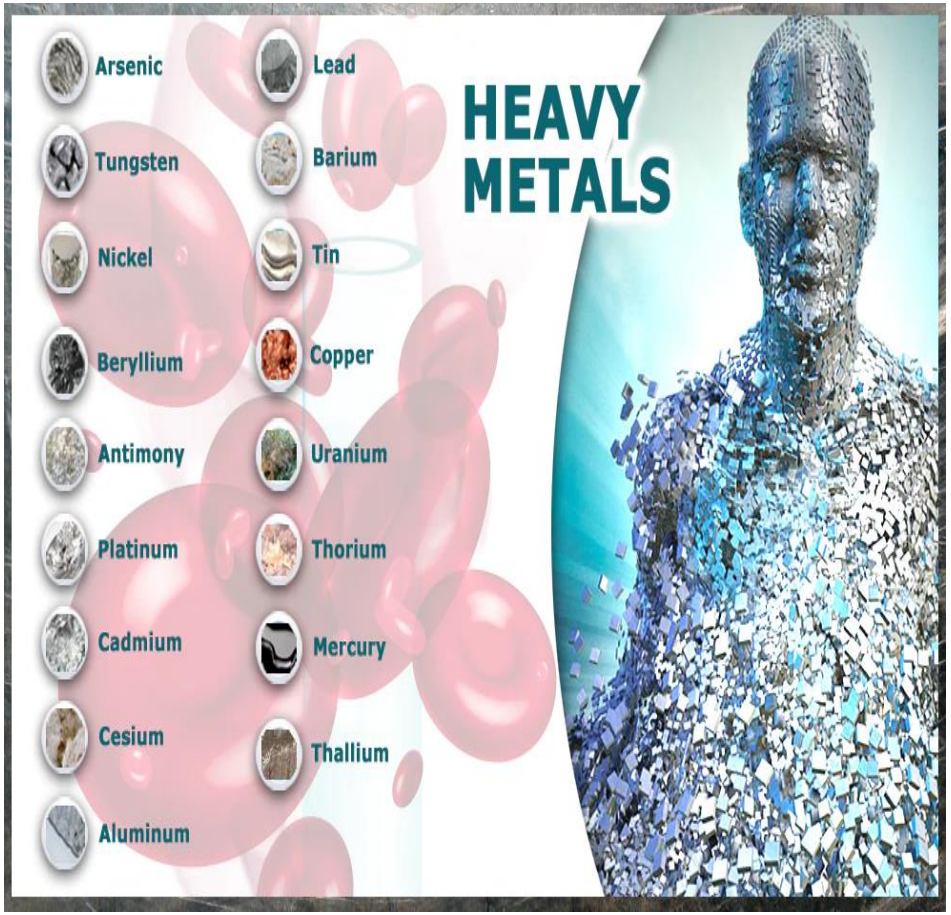
Persistent Organic Pollutants Can Cause Illness

- Some chemicals released into the atmosphere as a result of industry, agriculture, automobile emissions, and improper waste disposal can persist in soil or water for years or even decades

- These chemicals, collectively referred to as persistent organic pollutants (POPs), can travel thousands of miles in gases or as airborne particles, in rain, snow, rivers, and oceans, eventually entering the food supply through the soil or water


1 Industrial wastes are released into water.
2 Plant and animal plankton become contaminated.
3 Contaminated plankton are consumed by small fish.
4 Large fish, such as tuna and swordfish, regularly consume smaller, contaminated fish.
5 Consumer purchases contaminated fish at market and consumes pollutants in fish.

Heavy Metals



Mercury, a naturally occurring heavy metal element, is found in soil, rocks, and water. It is also released into the air by pulp and paper processing and the burning of garbage and fossil fuels. As mercury falls from the air, it finds its way to streams, rivers, lakes, and the ocean, where it accumulates.

Heavy Metals

Fish absorb mercury as they feed on aquatic organisms, and this mercury is passed on to us when we consume the fish. As mercury accumulates in the body, it has a toxic effect on the nervous system, prompting memory loss and mood swings, as well as impaired vision, hearing, speech, and movement. **Large predatory fish, such as swordfish, shark, king mackerel, and tilefish, tend to contain the highest levels of mercury**

Lead

- Lead is another heavy metal of concern. It can be found naturally in the soil, water, and air, but also occurs as industrial waste from leaded gasoline, lead-based paints, and lead-soldered cans, now outlawed but decomposing in landfills.

Pesticides

- pesticides made from petroleum-based products can persist in the environment, polluting soils, water, plants, and animals

- 2014 update of the Agricultural Health Study, a joint effort of the National Cancer Institute, EPA, and other federal agencies, found a link between certain pesticides and an increased risk for an aggressive form of prostate cancer.

Various types of food-packaging materials are utilized, with plastic being the most versatile. However, there are certain concerns with regards to the usage of plastic packaging because of unreacted monomers' potential migration from the polymer packaging to the food.

Recommendation

- Wash and scrub all fresh fruits and vegetables thoroughly under running water.
- Peel fruits and vegetables whenever possible, and discard the outer leaves of leaf vegetables, such as cabbage and lettuce.
- Trim the excess fat from meat and remove the skin from poultry and fish because some pesticide residues collect in the fat..

- Eat a variety of foods from various sources, as this can reduce the risk of exposure to a single pesticide. You can also reduce your exposure to pesticides by choosing organic foods, as discussed shortly

Food-packaging materials

Various types of food-packaging materials are utilized, with plastic being the most versatile. However, there are certain concerns with regards to the usage of plastic packaging because of unreacted monomers' potential migration from the polymer packaging to the food.

Factors of monomer migration

The magnitude of monomer migration depends on numerous aspects, including the

- monomer chemistry
- type of plastic packaging
- physical–chemical parameters such as

the temperature and pH, and food chemistry

Plastic Facts

- All plastic starts out as petroleum.
- Plastic bottles will take over 500 years to decompose.
- Australians are consuming around 3.4 million tonnes of plastic each year. Currently, only 9% of this plastic is recycled.

- Each plastic-type is different from the others. Some are reusable, the others produce hazardous materials after several uses.

Types of Plastic

- Do you know the seven types of plastic? Plastic has different types with different materials and grades.

Plastic Resin Identification Codes

1 PETE	2 HDPE	3 PVC	4 LDPE	5 PP	6 PS	7 OTHER
Polyethylene Terephthalate	**High-Density Polyethylene**	**Polyvinyl Chloride**	**Low-Density Polyethylene**	**Polypropylene**	**Polystyrene**	**Other**
Common products: soda & water bottles; cups, jars, trays, clamshells	Common products: milk jugs, detergent & shampoo bottles, flower pots, grocery bags	Common products: cleaning supply jugs, pool liners, twine, sheeting, automotive product bottles, sheeting	Common products: bread bags, paper towels & tissue overwrap, squeeze bottles, trash bags, six-pack rings	Common products: yogurt tubs, cups, juice bottles, straws, hangers, sand & shipping bags	Common products: to-go containers & flatware, hot cups, razors, CD cases, shipping cushion, cartons, trays	Common types & products: polycarbonate, nylon, ABS, acrylic, PLA; bottles, safety glasses, CDs, headlight lenses
Recycled products: clothing, carpet, clamshells, soda & water bottles	Recycled products: detergent bottles, flower pots, crates, pipe, decking	Recycled products: pipe, wall siding, binders, carpet backing, flooring	Recycled products: trash bags, plastic lumber, furniture, shipping envelopes, compost bins	Recycled products: paint cans, speed bumps, auto parts, food containers, hangers, plant pots, razor handles	Recycled products: picture frames, crown molding, rulers, flower pots, hangers, toys, tape dispensers	Recycled products: electronic housings, auto parts,
						


Coca-Cola
zero
zero
AQUA
Fanta

1 PLASTIC: POLYETHYLENE TEREPHTHALATE -

- is most frequently used in water and beverages bottles, food jars and containers, salad dressing and oil bottles, clothes fiber, mouthwash bottles. Plastic #1 is usually clear in color and it is not intended for multiple uses.

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PET plastic safety

- You can only use PETE plastic one time. It has got a porous structure so you need strong cleaning products. These products will cause carcinogens leach.
- Never heat PETE 1 plastic as this causes antimony leach which is a toxic chemical.

#2 PLASTIC: HIGH-DENSITY POLYETHYLENE

Plastic 2 is one of the safest sorts of plastic

#3 PLASTIC: POLYVINYL CHLORIDE

- Plastic 3 is not going to be among safe recycling codes. Known as PVC (polyvinyl chloride), this is very dangerous and one of the least recyclable plastic. Still, plastic number 3 is as widely spread as PET plastic. PVC recycle number means that the item is strong and elastic due to softening chemicals, – phthalates. They cause great problems with the hormonal system. Some other highly toxic chemicals like DEHA can be produced during the whole plastic #3 lifecycle. They affect the children's development, immune and endocrine system. These harmful chemicals also cause cancer.

- Number 3 plastic can be found in shower curtains, cleaner bottles, pipes, cooking oil bottles, window and door frames, floors, clear food wrap.

#4 PLASTIC: LOW-DENSITY POLYETHYLENE

- Пластик 4 или LDPE (полиэтилен низкой плотности) представляет собой термопласт и один из старейших сортов полиэтилена. Считается, что ПЭВД 4 достаточно безопасен в использовании, однако он не является экологически чистым, поскольку лишь небольшой процент пластика ПЭВД 4 перерабатывается. Некоторые заводы принимают пластик номер 4, но их действительно мало. ПВД можно потом заменить в пиломатериалах и напольной плитке

#5 PLASTIC: POLYPROPYLENE

- Being light, heat resistant and sturdy, PP is applied to various packaging. Today plastic 5 is commonly used in:

- Yogurt containers
- Liner in cereals boxes
- Disposable diapers
- Plastic bottles tops
- Kitchenware
- Disposable plates, cups, cutlery

plastic #5

- As far as plastic #5 is frequently used in food packaging, people often wonder about PP interaction with human bodies. Is polypropylene safe? Is PP 5 plastic microwave safe as it is usually mentioned? Well, recycle number 5 is considered to be the microwave-safe symbol but it just means that the heated product will not be deformed in the microwave. Some studies prove that even microwavable safe plastic can cause asthma and hormone disruption so it is better to substitute plastic containers with glass.

#6 PLASTIC: POLYSTYRENE

- This is one of the plastic recycling codes that must be avoided or, at least, reused as it is hard to recycle 6 plastic.

6 plastic is cheap to produce, lightweight and it can be easily formed. We meet it in the form of rigid polystyrene and formed styrofoam. Plastic #6 is widely applied to packaging and insulation.

So PS 6 plastic can be found in:

- Disposable drinking cups
- CD, DVD cases
- Egg cartons
- Food containers to-go and disposable cutlery
- Insulation, including building insulation

#7 PLASTIC: OTHER

- This recycling logo also stands for polycarbonate (PC) which contains highly dangerous BPA **(Bisphenol A).** Try to avoid products with the PC label.

Safe Plastic Numbers

LET*S SEE LOCAL PLASTIC MATERIALS!


InGreen
www.ingreen.ru
5
PP

Adarsh G
Today, 16:52


D160
2L


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ОсОО «Инга»

- Exogenous (non-natural) substances known as endocrine-disrupting compounds (EDCs) imitate the effects of natural hormones, preventing their production, release, transport, metabolism, binding, and elimination, which are essential for maintaining homeostasis, reproduction, and the developmental and behavioral processes in the human body, consequently causing adverse health effects

ALL IN ALL ABOUT PLASTICS PREVENTION MEASUREMENTS

Some studies prove that even microwavable safe plastic can cause asthma and hormone disruption so it is better to substitute plastic containers with glass.

References for further study

1. Janice L. ThompsonThe Science of Nutrition: Linking Food, Function, and Health. Pearson Education. 2017
2. Celia Muzeza The Mechanisms of Plastic Food-Packaging Monomers' Migration into Food Matrix and the Implications on Human Health
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THANK YOU!