Dietary food technology and Food Supplements

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Nutritional Goals

Ensure nutrients are provided in **adequate amounts**.

Avoid deficiencies, especially in **essential nutrients**.

Supply energy nutrients → maintain **optimal weight**.

Balance quantity & quality of nutrient intake.

Nutritional goals focus on ensuring that the body gets enough essential nutrients, like amino acids, vitamins, and minerals. Too little causes deficiencies, while too much leads to excess storage and health risks. Energy intake should match expenditure to maintain an optimal weight and avoid obesity or undernutrition.

Food Integration & Supplements Use

"Galaxy of integration": supplements & functional foods.

1 in 2 Italians use supplements/functional foods.

Main categories:

- Supplements (vitamins, minerals, herbs).
- Functional foods (enhanced foods for specific benefits).

Half of Italian consumers regularly use food supplements or functional foods. This shows the growing role of dietary technology in health. Supplements often come as pills or capsules, while functional foods are everyday foods enriched with added nutrients or bioactive substances.

Types of Supplements

- Vitamins & minerals.
- Coenzyme Q10.
- Herbal extracts: ginseng, ginkgo, hypericum.
- Plant-based antioxidants & phytonutrients.

Supplements are diverse. Some are basic, like vitamins and minerals, while others are more specialized, such as coenzyme Q10 for energy metabolism or plant extracts for mental and physical performance. These products are concentrated and designed to complement, not replace, a healthy diet.

Functional Foods

Foods enriched with health-promoting ingredients:

- Prebiotics (improve gut flora).
- Omega-3 in milk (heart protection).
- Functionalized yogurt (probiotics).

Aim: improve health beyond basic nutrition.

Functional foods are normal foods fortified to provide extra benefits. Examples include prebiotic fibers that feed healthy gut bacteria, omega-3 fatty acids added to milk to reduce cardiovascular risk, and yogurts enriched with probiotic bacteria that improve digestion and immunity.

Emerging Markets in Food Technology

Beauty supplements.

Fortified foods (e.g., cereals with vitamins).

Functional animal foods.

Expansion into Eastern European markets.

Increasing attention to:

- **Safety profiles**.
- **Efficacy profiles**.

The food supplement and functional food industry is rapidly evolving. Products now include beauty-focused supplements (for skin, hair, nails), fortified animal feed, and innovative fortified foods. Companies must ensure both **safety** (no harmful side effects) and **efficacy** (real benefits proven by research).

Energy Need of the Body

Energy = sum of 3 components:

- **Basal metabolism**.
- **Energy for physical activity**.
- **Thermal effect of food** (postprandial thermogenesis).

The body requires energy to stay alive, move, and digest food. Basal metabolism covers essential life functions like breathing and heartbeat. Physical activity accounts for energy burned in daily movements. Finally, thermogenesis is the energy used to digest and metabolize food.

Energy Expenditure

Basal metabolism → **~70%**.

Diet-induced thermogenesis → **~7%**.

Physical activity → **~18%**.

Optional thermogenesis → heat production in cold.

Changes in heat = possible abnormalities.

Most energy goes to basal metabolism. A smaller part is used to digest food, and a significant portion goes to physical activity. Optional thermogenesis is activated in response to cold, producing extra heat. Abnormal changes in energy expenditure may signal metabolic disorders.

Factors Affecting Basal Metabolic Rate (BMR)

Body size → larger body = higher BMR.

Gender → men > women (more muscle, less fat).

Age → BMR decreases with age.

Pregnancy & breastfeeding → higher BMR for fetal growth & milk production.

Basal metabolic rate varies widely. Bigger bodies and muscle tissue need more energy. Men usually have a higher BMR than women because of body composition. Children have high BMR due to growth demands. During pregnancy and breastfeeding, metabolism increases to support both mother and child.

Definition of Food Supplements

Defined as: “Food products intended to supplement the diet.”

Provide **concentrated nutrients** (vitamins, minerals, amino acids, EFAs).

Can also contain **fibers, plant extracts, probiotics**.

Marketed in **pre-dosed forms**: capsules, powders, tablets, liquids.

Food supplements are regulated products designed to add nutrients to the normal diet. They are not substitutes for food but ensure adequate intake when diet alone is insufficient. They come in pre-dosed forms for easy use and controlled intake.

Summary & Takeaways

Nutrition must ensure adequacy & balance.

Supplements & functional foods are widely used.

Energy needs depend on metabolism, activity, and diet.

BMR influenced by size, age, gender, pregnancy.

Supplements support health but must be safe & effective.

In summary, dietary food technology plays a growing role in modern nutrition. Supplements and functional foods help meet nutritional goals and address deficiencies, while energy balance is essential for health. Students should remember that supplements are only beneficial when used correctly, alongside a balanced diet and healthy lifestyle.