Lecture.

Nutrition as a factor of health.
Biosafety in food hygiene.

Hygiene of nutrition is the section of hygiene studying influence on an organism of the person factors, connected to nutrition and developing recommendations for a balanced diet. The part of hygiene of nutrition Nutriciology is a science about nutrients (food substances).

That is why the regular medical control of the nutrition validity and safety of both individuals and organized collectives is necessary.

The following methods of such control may be used:

- the nutritional status research and assessment of people under control;
- the abovementioned alimentary diseases detection;
- the energy consumption and nutrient requirements determination or calculation;
- the factual nutrition assessment by questioning, budget, gravimetric, laboratory methods, food establishment sanitary inspection methods, and calculative methods of the daily intake energetic and nutritional content assessment.

Organism nutritional status and method of its assessment

The nutritional status is the physiological state of the organism depending on nutrition. The nutritional status is determined by: the body weight correlated with age, gender, human constitution, metabolism biochemical indices, presence of the alimentary and alimentary caused disorders and disease symptoms.

The study of the nutritional status of the individual or organized collective with similar physical load, emotional stress and general nutrition allows the objective nutrition assessment and timely detection of the alimentary caused health disorders and diseases (energy-protein, vitamin, macro-, microelement deficiency and etc.). The nutritional status assessment together with the energy consumption and 24/7 intake validity is one of the first and basic control methods of different sex and age, social and professional groups of people.

Nutrition estimation criteria

- Constancy of the weight of adults and regular weight addition in children.
- Maintenance of the optimum work ability.
- Absence of alimentary diseases.

Classification of alimentary status

- Optimum (physiological indices and body weight correspond to height, age, gender and intensity of labor).
- Superfluous (may be determined by congenital predisposition, overeating, poor physical loading) that is characterized with increased body weight (obesity).
- Insufficient, or hypotrophy when weight is lower than standard (could be determined by malnutrition, vigorous physical work, psycho-emotional stress, etc).

Obesity

I — adipopexis exceeds normal weight by 15-20%,
II — adipopexis exceeds normal weight by 30-49 %,
III— adipopexis exceeds normal weight by 50-99 %,
IV — adipopexis exceeds normal weight by 100 % and more.

Categories of insufficient alimentary status

- pre-morbid — determined by the physiological disruptions or dietary irrelevance,
- morbid — weight reducing determined by the disease or starvation .

Daily energy expenditure of organism consists of:

- basal metabolism which depends on the age, gender, height, body weight, physiological constitution (asthenic, normo- and hypersthenic);
- energy expenditure by gastrointestinal digestion (specific-and-dynamic effect of food) which is approximately 10% from the basal metabolism;
- energy expenditure due to physical loads and emotional stresses during the day, in other words on physical activity and rest according to the individual or collective daily routine;
- energy expenditure depends also on the local climate and weather conditions, workplace microclimate, clothes type and quality, work habits and skills (ability).

Methods of determination of the organism energy expenditure

- method of direct calorimetry (the heat release from the organism into special calorimetric chamber); Snellen direct calorimetry chamber, University of Ottawa
- method of indirect calorimetry, consisting in the gas exchange (respiratory metabolism) (quantity of the inspired oxygen and expired carbonic acid per hour) determination during the rest and physical activity. The expired air is accumulated in the special Douglas's rucksack for further analyses of O_2 and CO_2 content; direct calorimetry metabolic cart measuring oxygen uptake and CO_2 production of a spontaneously breathing subject (dilution method with canopy hood).
- methods of pulsometry. The special device – pulsotachometer is used for measuring the pulse rate and its filling during performance of the different types of activity and other stresses, results of which are converted in kilojoules in the device automatically;
- method of alimentary energometry is a laboratory determination of the caloric value of the daily intake including the undigested part of food;
- calculative methods: the basal metabolism is determined separately using special tables by Harris and Benedict for sex and body weight (first number) and sex, age and height (second number). The sum of these numbers is the basal metabolism. The energy expenditure for specific-dynamic effect of food which is 10% of the basal metabolism and for all types of activity which person performs during active part of the day (physical and mental work, rest, food intake etc.) is added to the basal metabolism. This energy expenditure is calculated using special tables. The energy (in calories) for different types of activity per hour is based on the daily time-keeping (monitoring). The daily monitoring is the number of hours or minutes which the person spends on each type of activity during the day.

Specialists of World Health Organization (WHO) have worked out the new method of energy expenditure determination recently (1986). Following this method, the basal metabolism (BM) and specific-dynamic effect of food are calculated using the special equations according to the age, sex, height, body weight. The energy expenditure is calculated as a multiplication of the BM by the physical activity coefficient (PhAC) values of which are worked out for each different type of activity.

The rational nutrition is physiologically full, balanced for all nutrients, qualitative

and safe nutrition of the healthy human, which allow taking care and building up its health, raising the working capacity and longevity, preventing the alimentary (primary and secondary), alimentary caused, transalimentary and food intolerance diseases.

Balanced diet is one, which will meet a person's caloric need and contain all nutrients, particularly proteins, and vitamins. In addition, the food should satisfy the taste and desire of a person and should have enough roughage to promote the peristalsis. Balanced diet should have 50-60 % carbohydrates 30-35 % fats and 10-15 % proteins with necessary vitamins and minerals. A balanced diet should correspond to:

1. Conformity of entering energy to energy losses. In norm it is necessary the certain balance, or equilibrium.
2. Conformity of chemical structure of alimentary substances to physiological needs of an organism.
3. The maximal variety of a ration.
4. Keeping of an optimum regimen of nutrition.

Rational nutrition and its main principles

Rational nutrition is full in quantity and balanced in quality nutrition pattern for normal height, physical and psychophysiological organism development, its high work capacity, active longevity and adverse environmental natural, man-caused, social environment factors resistance.

The rational nutrition has to follow such basic principles:

1. To be full in quantity. The dietary intake food calorific value must correspond to the organism energy consumption including the undigested part of the dietary intake.
2. To supply the dietary intake quality (balance) which means that all nutrients, proteins, fats (including animal), carbohydrates (including polysaccharides, celluloses, dietary fibers), vitamins, macro- and microelements, flavoring substances must be contained in optimal quantities and ratios.
3. The rational dietary pattern must be followed: food intake hours must correspond to the organism biological rhythms: adults must have 3-4 meals a day and children of different ages - 5-6 meals a day. Intervals between food intakes must be 5-6 hours for adults and 3-4 hours for children. The daily intake distribution must correspond to the organism physiological needs: the breakfast and dinner (the organism physical activity period) must contain 30-35% and 45-50% of the daily intake, the supper (after finishing the active daily period) – 20-25%.
4. Food must be cooked in accordance to the digestive system enzymic abilities. The perfect taste, good nutrition value, easy gastrointestinal digestion and high level of food absorbency must be reached during the food preparation.
5. Food must not be toxic. Products and ready meals must not contain the toxic substances in harmful to the human organism concentrations.
6. Food must be harmless in epidemiological aspect. Products and ready meals must not contain the etiological agents of infectious foodborne diseases - bacteria, viruses, fungi, protozoa, geo-and biohelminth embryos.

VALUE VARIOUS NUTRIENTS IN A NUTRITION. ROLE PROTEINS, FATS and CARBOHYDRATES IN ORGANISM.

STRUCTURE of FOODSTUFF:

1) Nutrients are proteins, fats, carbohydrates, vitamins, mineral substances and water.
2) Not alimentary substances are the substances giving to products organoleptic property (colour, smell etc.)

3) Antialimentary substances are antitrypsin (protein of wet eggs), antivitamins (ascorbinase, tiaminase), antimineral substances (phytates, oxalates).
4) Toxic substances:
a) Inherent in products is toxins of poisonous mushrooms, solanin in a potato etc.
b) Casually got pollutants from environment are pesticides, heavy metals, dioxines etc.

Balanced Diets: we must have the above items in the correct proportions.

BALANCE of nutrients. The diet should contain all necessary nutrients: proteins, fats, carbohydrates, vitamins, and mineral substances in an optimum ratio. It provides the best absorb and high-grade use of food substances. Examples of balance:
Ratio proteins: fats: carbohydrates (P:F:C) = 1:1:4 (the adult person),
1:1:5 (heavy physical work), 1:0,8:3 (older persons), 1:1:3 (children).
Ratio between proteins: animals 60 %, vegetative 40 %,
Ratio between fats: animals 70-80 %, vegetative 20-30 %
Ratio between carbohydrates: the unprotected 10-15 %, protected 85-90 %.
Ratio Ca: P= 1:1,5 etc.

Proteins

Proteins are very large molecules, so they cannot get directly into our blood; they must be turned into amino-acids by the digestive system. There are over 20 different amino-acids. Our bodies can turn the amino-acids back into protein. When our cells do this they have to put the amino-acids together in the correct order.

Proteins are needed by the body:

For growth and development: They furnish the building material, i.e. the amino acids from which the body proteins are synthesized.
For repair of body tissues and their maintenance: It has been shown that the body proteins are constantly being broken down; they have to be replaced for which fresh protein intake is required.
For synthesis of antibodies, enzymes and hormones: Antibodies, enzymes and hormones contain protein. The body requires protein to produce them.
Proteins can also furnish energy to the body, but generally the body depends for its energy on carbohydrates and fats rather than proteins.

Sources:

There are two main dietary sources of protein: -
Animal sources: milk, eggs, meat, fish, etc.
Plant sources: Pulses, cereals, nuts, etc.
A mixed diet containing both animal and vegetable proteins meets with the needs of essential amino acids required by the body. Each 1 g of protein on oxidation yields 4.1 calories of heat.
Protein rich foods are milk, lean meat, fish, poultry, eggs, nuts, legumes, beans and pulses.

Protein requirements

It is customary to express protein requirements in terms of body weight. Doctors recommended 1,0 g. protein/kg body weight for an adult.

Effects of protein deficiency:

The effects of protein deficiency may summarize as below.
During pregnancy: Still birth, low birth weight, anemia
Infancy and early childhood: marasmus, kwashiorkor, mental retardation, stunted growth and development.

Adults: Loss of weight, underweight, poor musculature, anemia, increased susceptibility to infection, frequent loose stools, general lethargy, incapacity to sustained work, delay in wound healing, cirrhosis of liver, edema, ascitis, etc.

ROLE FATS in a NUTRITION

Structure of food fats is: neutral fats (ether glycerine and fat acids), fat-like substances such as phosphatides, mineral substances, fat-soluble vitamins (in some fats).

Functions of fats in nutrition are: power (30-32 % daily caloricity, 1g fat makes 9 Kcal), regulatory, plastic, protective (from mechanical and temperature influences) and flavouring.

The characteristic fat acids.

Fat acids share on saturated, nonsaturated and polynonsaturated under the contents free (double) connections in formula.

1) Saturated fat acids (SFA) are stearin, palmytin acids in animal fats, oil and kapron acids in vegetative ones. Nonreactive is acquired worse others carry out basically power function. They contain in the beef, mutton fat. At the superfluous use promote development atherosclerosis due to a plenty cholesterol and absence antisclerous factors.

2) Monononsaturated fat acids (MNFA) are oleic acids (contain 1 free connection in formula) better soaked up, basically they have power function. They are in vegetative fats.

3) Polynonsaturated (PNSA) are linolev, arachidon acids (family omega-6), linolenov acid etc. (omega-3). They have some free connections in formula. They are most biologically active and valuable among fat acids:

- regulative function – they adjust exchange of cholesterol (the antisclerotic factor), reduce coagulability of blood and permeability of vessels.
- Protective function – they raise resistance organism to infections, toxicants, to surplus ultra-violet rays (antioxidizers).
- Plastic – they are part of walls of vessels and Mielyn environments of nerves.

Suppliers of PNSA are: PNSA family omega-6 contain in not refined vegetable oils, PNSA omega - 3 contain in fat of sea fishes (they are most biologically active).

Value phosphatides.

Fat-like substances: 1 fat acid is replaced with a phosphoric acid and the nitrogenous basis. Representatives are lecithin, kefalin. They participate in synthesis nucleic acids, in exchange cholesterol (the antisclerous factor). A plastic role: they enter into protoplasm of cells, especially nervous system and a liver. Suppliers are liver, brain, egg yolk, butter, lard and not refined vegetable oils etc.

Sterines. Share, on phytosterines and zoosterines (Cholesterol). Despite of ordinary opinion on its harm, cholesterol is very important for an organism. Plastic function: it contains in protoplasm of cells, creates elasticity of fabrics as hydrophyl colloid due to keeping water. Regulative function is synthesis vitamin D, bilious acids, sexual and steroid hormones. Protective function: it inactives haemolytic poisons.

On modern representations, development atherosclerosis has multifactorial aethiology. There are infringements of a fatty exchange and increased endogenic synthesis cholesterol in a basis. Surplus alimentary cholesterol plays rather small value. This is alimentary risk as factor of atherosclerosis.

Carbohydrates

Carbohydrates are the most important source of energy.

Functions of carbohydrates are: power function (56 % caloric content of a diet per day), regulatory (cellular tissue stimulates a motility and secretion of intestines), plastic (they enter in structure of protoplasm and cellular membranes), protective (they connect with heavy metals, cholesterol; glucose inactive cyanide poisons), flavouring (sweet taste).

1. Classification of carbohydrates.

Chemistry classification is on mono-, di-, polysaccharides.

In hygiene they share on a degree of digestingting:

1) The unprotected (refined) carbohydrates.
2) Protected
3) Superprotected: a) cellular tissue, b) pectinaceous substances.

We obtain most of our carbohydrate in the form of starch. This is found in potato, rice, spaghetti, yams, bread and cereals. Our digestive system turns all this starch into another carbohydrate called glucose. Glucose is carried around the body in the blood and is used by our tissues as a source of energy. A glucose in our food is absorbed without the need for digestion. We also get some of our carbohydrate in the form of sucrose; this is the sugar which we put in our tea and coffee. Both sucrose and glucose are sugars, but sucrose molecules are too big to get into the blood, so the digestive system turns it into glucose.

Vitamins

Vitamins are only required in very small quantities. There is no chemical similarity between these chemicals; the similarity between them is entirely biological.

Vitamin A: good for your eyes.
Vitamin B: about 12 different chemicals.
Vitamin C: needed for your body to repair itself.
Vitamin D: can be made in your skin, needed for absorption of Calcium.
Vitamin E: the nice one - reproduction?

Mineral Salts

These are also needed in small quantities, but we need more of these than we need of vitamins.

Iron: required to make haemoglobin.
Calcium: required for healthy teeth, bones and muscles.
Sodium: all cells need this, especially nerve cells.
Iodine: used to make a hormone called thyroxin.

Fiber

We do not can digest cellulose. This is a carbohydrate used by plants to make their cell walls. It is also called roughage. If you do not eat foods materials which contain fiber you might end up with problems of the colon and rectum. The muscles of you digestive system mix food with the digestive juices and push food along the intestines by peristalsis; if there is no fiber in your diet these movements cannot work properly.

VALUE VITAMINS AND MINERAL SUBSTANCES IN A NUTRITION

VALUE VITAMINS IN A NUTRITION

Vitamins are low-molecular organic substances, what are biologically active in very small amounts.

Functions of vitamins: a) regulatory (they form enzymes and adjust in metabolism), b) protective (they raise resistance an organism to the adverse climatic factors, harmful physical and chemical influences, infections etc. (vitamin C - antioxidizer).

CLASSIFICATION VITAMINS:

a) Water-soluble - C, group B, PP, etc.
b) Fat-soluble - A, D, E, K
c) vitamine-like substances such as: inozit B_8, cholin B_4, orotovic acid B_{13}, pangamic acid B_{15}, etc.

Vitamins are formed basically in plants, and also collect in an organism of animals. The person receives water-soluble vitamins with vegetative food, fat-soluble vitamins with animal and vegetative food.

Some vitamins can be synthesised in an organism of the person:

a) Vitamins group B, it is especial B_{12}, are formed in intestines at activity of microflora,
b) Calciferoles (vitamin D_3 - cholecalciferol) are formed in a skin at ultra-violet irradiation from provitamin - dehydrocholesterol.
c) Vitamin A (retynol) is formed from betta-carotines of vegetative food in very insignificant degree (1/6 part of requirement for vitamin A).

Kinds of vitamin status of an organism and methods its diagnostics.

State of an organism allocates on a level of vitamins:

1 .Avitaminosis is full absence of vitamin in a nutrition for a long time.
2.Hypovitaminosis is insufficient receipt of vitamin in an organism (about 50 % of requirement)
3.Subhypovitaminosis is a boundary condition between hypovitaminosis and normal vitamin state.
4. Normal state of vitamins in an organism.
5. Hypervitaminosis is superfluous receipt of vitamins (on vitamins A and D).

The avitaminosis and hypovitaminosis can be exogenic and endogenic (secondary - the caused infringement of absorbing of vitamins).

Methods of diagnostics the vitamin status:

a) On clinic violations, characteristic for each avitaminosis on concrete vitamin (a scurvy, etc.).
b) Biochemical methods (contain of vitamins in blood or urine).
c) Functional tests (skin haemorrhages at vitamin-C hypovitaminosis).

The factors influencing at vitamins requirement of an organism:

Exogenic:

- A psycho-emotional and physical overstrain
- Work at high and low temperature
- Work in mines, on Far North
- At contact to industrial poisons, at reception medicines (antibiotics)
- At work with radiation, noise, vibration,
- Smoking
- Seasonal fluctuations - there are not enough vitamins in a diet in the winter and in the spring.

Endogenic:

- Age,
- Pregnancy and lactation
- Infectious diseases
- Endocrine diseases - huperthireosis – it is strengthening metabolism in an organism
- Intestinal diseases-infringement absorption vitamins

Value of separate vitamins.

Vitamin C is ascorbic acid. It is necessary 75-100 mg per day for the adult

person. Functions:
- Participates in oxidation-reduction processes,
- Strengthens a vascular wall - preventive haemorragia (scurvy),
- Stimulation immunity - resistance to infections,
- Regulation exchange proteins and carbohydrates,
- Raises resistance to toxic substances as antioxidizer,
- Influences contents Ca (at a scurvy at children - changes in bones);

It is very unstable vitamin because ascorbic acid is easily oxidised.

Destroying vitamin C factors are temperature, access of oxygen, catalysts (salts of iron and cuprum - knifes, utensils), alkalosis, enzyme ascorbinaza (activated at cutting vegetables and fruit; inactivators of ascorbinaza are salt, sugar, vinegar).

Vitamin D is complex calciferoles.

It is distinguished ergocalciferol (vitamin D_2) (it is formed in plants) and cholecalciferol (vitamin D_3) (it is formed in a skin at action of ultra-violet rays from dehydrocholesterol). Biological activity has the products of their oxidation formed in a liver and kidneys. At lack of vitamin D at children it is rickets, at adults it is rarefaction bonesIt is especially important for children.

The reasons of D-hypovitaminosis are lack of a solar irradiation (Far North, pollution of the atmosphere, insufficient stay on fresh air, work in mines, etc.), at nutrition only vegetative food.

Prevention and treatment of a rickets at children are introduction vitamin D_3 - 500 International Units per day, preventive artificial UV irradiation (1/6 - 1/8 part of biodoze, at rickets - 1 - biodoze).

At taking very big doses of vitamin D - D-hypervitaminosis -heavy infringements of calcium exchange there are calcinosis vessels of heart, kidneys etc. Calcinosis of coronary vessels in the childhood at taking big doses of vitamin D is predisposition to a heart attack of a myocardium.

Vitamin A is retynol. It is necessary for sight, growth, stimulation of immune system. The avitaminosis is more often at children of pre-school age, is displayed haemeralopia (night blindness) and kserophtalmya (degeneration conjunctive and corneas eyes). "Vitamin of prosperity" contains basically in expensive animal products such as cod-liver oil and a liver and in plants - betta- carotines. Daily need is 1,5 - 2 mg per day.

Attributes of A-hypervitaminosis are a headache, grow bald, infringements in a bone fabric and in a liver. At pregnant there are spontaneous abortions and uglinesses of a fruit. The reason is taking big doses of vitamin-A drugs. Seldom it is consumption of a liver of a polar bear, this is a fatal retinol poisoning.

VALUE OF MINERAL SUBSTANCES IN A NUTRITION

It is known about 50 elements, which are present in an organism, 26 of them are necessary, thus 12 of them are macroelements, 14 are microelements.

Classification is under the contents in fabrics more than 10 mg / kg (1mg%):
- Macroelements are Ca (calcium), Na (sodium), K (potassium), Mg (magnesium), P (phosphorus), sulphur, chlorine etc.,
- Microelements are iodine, iron, zinc, copper, cobalt, manganese etc.

Functions are regulatory (in themselves and in structure of enzymes), protective (Ca), plastic (Ca, phosphorus etc.).

The characteristic of separate MACROELEMENTS

Calcium. Daily need is 0,8 g per day, daily need is 2g for pregnant and at a

lactation. It is especially important at children's age in amount 1 - 1,5 g per day.

Functions are: plastic is in structure of bones, teeth (give it hardness), regulatory is strengthening vascular wall, participation in coagulability of blood, transfer pulses in nervous system, maintenance normal nervous-muscular excitability, it is part of buffer systems, protective is raises resistibility to infections, renders desensibilization of action (antibiotics).

Conditions of Ca digesting.

1) An optimum ratio with phosphorus is: Ca: P = 1:1:5. It is in milk and dairy products (cheese, cottage cheese).
2) There is presence vitamin D what improves absorption Ca.
3) There is optimum ratio with magnesium Ca : Mg = 2 : 1 (for children 9:1). Magnesium is a lot in cereals. It is antagonist Ca.
4) Enough proteins in nutrition is better digesting.
5) There is absence plenty fats and sorrel acid what are formed insoluble substances with Ca.

Phosphorus. Daily need for adult is 1,6g per day, daily need for children is 3g, daily need for pregnant is 3,8g. Functions are plastic is part of a bone fabric (elasticity), a nervous fabric regulatory, formation phosphatides and nucleinic acids, formation buffer systems of an organism.

Conditions of digesting: Ratio Ca: P = 1 : 1,5. Enough of fats is in food. Products – sources are dairy products, yolk of eggs, a fish, leguminous, meat.

MICROELEMENTS.

The mineral substances contained in fabrics of an organism less than 1 mg %, they are necessary for an organism in minute quantities, but they have very important regulation role.

The diseases connected to infringement of microelement structure of nutrition are named MICROELEMENTHOSIS.

The reason of occurrence is biogeochemical provinces (V.I.Vernadsky). there are territories with the abnormal contents (increased or lowered) microelements. These provinces may be natural (they are caused by features of geological formation of an earth's crust) and anthropogenic (they are connected to activity of the person (heavy metals, fluorine etc.). People receive insufficient or superfluous amount of microelements with food and water in these areas, so there are arise ENDEMIC DISEASES (they are characteristic for the certain district).

CLASSIFICATION MICROELEMENTHOSIS. HYPOMICROELEMENTHOSIS

1. Mono-hypo-microelementhosis are disease of insufficiency of separate microelements:

Caries is disease of insufficiency of fluorine, endemic craw is disease of insufficiency of iodine, and iron-deficit anaemia is disease of insufficiency of iron.

2. Poly-hypo-microelementhosis are diseases of insufficiency of complex of microelements:

There may be anaemia of insufficiency of iron, copper, manganese and zinc in complex.

HYPERMICROELEMENTOSIS:

1. Natural mono-hyper-microelementosis is disease of superfluous receipt of separate microelements:

Fluorosis is disease of superfluous receipt of fluorine, thyreotoxicosis is disease of superfluous receipt of iodine, and endemic gout is disease of superfluous receipt of

molybdenum.

2. Natural poly-hyper-microelementhosis is disease of superfluous receipt of complex of microelements:

Urov illness (Kashin-Bec) is disease of superfluous receipt of strontium, manganese and fluorine.

3. Antriropogenous mono-and polyhypermicroelementhosis:

Surplus fluorine in ground and water near to superphosphate factories leads to development of fluorosis at the population. This is surplus lead, cadmium, mercury, arsenic, pesticides etc.

VALUE OF SEPARATE MICROELEMENTS

Fluorine. Daily requirement is 2,5-3 mg. It adjusts exchange Ca and P, takes part in formation dentine, dental enamel and bones. At lack there is caries, at surplus is fluorosis (5 % territory of Ukraine). This is damage of teeth, bones, and infringements intellectual development at children.

Iodine. Daily requirement is 0,1-0,2 mg (100-200 mcg). It participates in synthesis of hormone of a thyroid gland thyroxin, adjusts function of this gland. At lack there is hypothyreosis (endemic craw or mixedema). At surplus it is hyperthyreosis (Basedov illness).

Iron. Daily need to men is 10 mg per day, to women daily need is 18 mg. It takes part in synthesis of haemoglobin (60 % of all iron in an organism), is part some oxidising enzymes such as peroxidasa, citochromes, necessary part of cytoplasm and a nucleus of cells. Conditions of digesting are present of hydrochloric acid, vitamin C.