Table 2

The ^{35}Cl-NQR frequiencies and the energies of ESCA levels calculated by (5) and (6) equations as well as the ClKα shifts obtained from X-Ray fluorescence spectra for $SnCl_4L_2$ complexes

L	ν_{Cl}^{exp} [MHz]	$ECl2p_{3/2}$ [eV]	$ESn3d_{5/2}$ [eV]	$\Delta(Sn3d_{5/2}-Cl2p_{3/2})$ [eV]	$-\Delta ClK\alpha$ [eV]
$(Me_2N)_3PO$	17.91	205.32	493.61	288.29	0.215
Bz_2S	18.33	205.37	493.70	288.33	0.155
$(CH_2)_4O$	19.02	205.47	493.84	288.37	0.141
Me_2NCOH	17.71	205.27	493.59	288.32	0.162
$O(CH_2)_4O$	19.46	205.51	493.96	288.45	0.079
Py	17.73	205.27	493.59	288.32	0.165
Me_2SO	18.32	205.35	493.72	288.37	0.119
MeOH	18.89	205.43	493.84	288.41	0.108
MeCN	20.12	205.60	494.10	288.50	0.075
PhCN	19.79	205.55	494.03	288.48	0.062

Table 3

The ^{35}Cl-NQR frequencies and the energies of the photoelectron levels as well as the ClKα shifts obtained from X-Ray fluorescence spectra for $SbCl_5L$ complexes

L	$\nu^{35}Cl$ [MHz]	$\Delta E(Sb3d_{5/2}-Cl2p_{3/2})$ [eV]	$-\Delta ClK\alpha$ [eV]
$(Me_2N)_3PO$	24.54	323.10	0.189
Py	25.30	322.78	0.148
Me_2NCOH	24.90	322.95	0.156
$O(CH_2)_4)O$	25.65	322.63	0.133
MeCN	25.93	322.51	0.140
PhCN	26.21	322.39	0.136
$PhNO_2$	26.68	322.19	0.110

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V.P. Gladysev*, S.V. Kovaleva*, E.V. Kolesnikova*

CONCEPT OF TECHOGENESIS DEPENDENT FOOD CHAINS

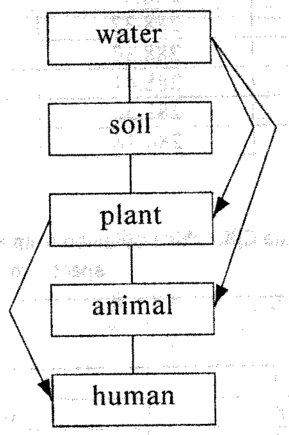
*Tomsk State Pedagogical University
**Institute of Chemical Ecology of International Academy of Creative Endeavors

At the normal conditions of life activity, the organism of a human being needs 22 biogenous elements which source is water and food of vegetal and animal origin. A state of environment is a major factor of human existence, since it is environment that determines the quality of nutritive [1].

The content of chemical elements in alive organisms is not a direct function of their abundance in nature [2]. At the same time it is known that the passage of chemical elements along a food chain can lead to both their dissipation and their accumulation, biological concentration [3].

Food chain is understood as a transport of food energy from its source, autotrophs (plants), through a series of organisms happening by a way of eating of one organism by another organism [3]. As the mediums of plant existence are water systems and soils, the structure of a human food chain should be viewed starting from these objects of biosphere.

The generalized structure of a human food chain can be represented as follows:



Beginning from water systems and soils, all sequent links of this chain can be considered as depositing and emitting mediums in respect to the toxic elements and compounds in which there is a dynamic balance realized in the system «absorption ↔ excretion» or «absorption ↔ accumulation ↔ excretion». This equilibrium is in accordance with the mechanisms of substance assimilation by the living organisms at the conditions of shortage, normal content, and excess of these substances both in an organism itself and in the objects of surrounding medium.

If living organism can be described from a position of biochemistry by the processes of assimilation, transpiration and excretion, the depositing mediums of non-livingin organic nature (water, bottom, deposits, soils, peat, etc.) should be considered from a position of physical chemistry through the processes of absorption, concentration, evaporation, emission, condensation or deposition at exceeding of equilibrium concentrations.

Unlike the animals, even highly organized forms, a human diet determines the necessity of food procurement and preparation. Food procurement is characteristic of many animal species: collective insects (bees, ants, termites), rodents (squirrels, mice, beavers, etc.), and even predators (bears).

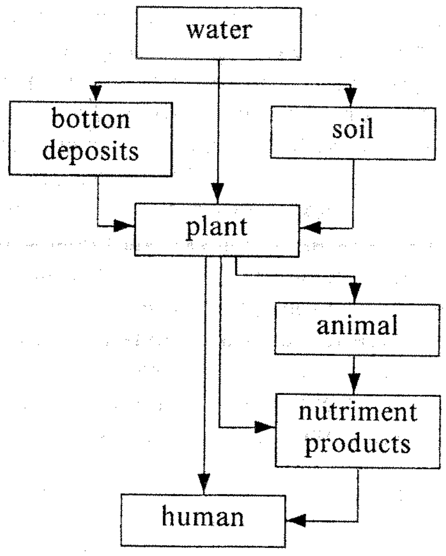
In distinction from the animal world, mankind uses for food procurement both the processes of the thermal processing of the products of vegetal or animal origin (freezing, drying, smoking, boiling and heating up at conservation) and the processes applying the effect of chemical elements on the natural products (salting, pickling, fermentation, conservation – introduction of antioxidants or exclusion of oxygen action (sealing).

At preparation of both hot and cold human food, the main methods of food processing are a thermal processing (boiling, frying, baking) and an introduction of the chemical substances that change the taste (flavuor) and nutritive qualities of food (sodium chloride, sodium bicarbonate, acetic acid and other organic acids, ethanol, composite ethers, oils). It is necessary to note that all the operations related to the preparation of food from the vegetal and animal raw material are carried out at obligate contact with technological equipment and kitchenware made of different materials (wood, ceramics, glass, metals, plastics). Depending on their physico-chemical properties, the materials used in the process of food preparation can give out at contact with food more or less quantities of chemical elements or substances contained in them or absorb some impurities (pasting a raw wine with benthonic clays).

In some cases, production of food involves the process of deposition of sparingly soluble substances, for example, deposition of iron as ferrocyanide, deposition of calcium as oxalate in vinification technology, removal of sulfuric acid in the reaction of calcium sulphate formation in the sugar production technology.

In the sugar production technology as well as in the technology of production of flour, grain products and starch, the raw material and the end products, being in solutions and dry form, come in contact with large surfaces made of metal, enamel, wood and due to friction become inevitably polluted by heavy metals. It is easy to understand even without detailed examination of these technologies that their realization inevitably leads to the pollution of the end products, food, by the heavy metals from the chemical reactants and the constructional materials of the production equipment in use.

Thus, the human food chain contains a link involving a natural product processing, the technologies of food preparation, that together with the other links of the food chain undergoes technogenesis pressure resulting in the penetration of the components of the technological equipment and kitchenware into the food consumed by human. The scale of the component of the techogenesis pressure is not so powerful, perhaps, but in some cases very effective causing human intoxication by heavy metals or substances of an organic origin (components and products of plastic decomposition). The stated above indicates that there is a good reason for consideration of an extended human food chain: water – soil – plant – animal – food – human. This food chain can be presented as a generalized scheme which includes both the natural transformations and the transformations caused by the food preparation:



Thus, the technology or technology cycle of food preparation in the closed volumes determined by the equipment or the kitchenware contains the processing products of a vegetable or animal origin, the intermediates and the end products that are to a certain extent the depositing mediums in respect to the impurities, especially heavy metals. The final contents of heavy metals (toxic metals – TM) in food depends on the prehistory of their accumulation along the natural food chain and the level of ecological safety of the food preparation technology. In other words, the contents of TM in food is an integral value that is determined by the natural processes of substance transformation in the objects of biosphere and the level of techogenesis pressure both on the natural links of the food chain and on the processes of food preparation. All the stated above makes it reasonable to suggest a new ecological concept **techogenesis dependent food chain** that takes into account change of the contents of the toxic substances (including heave metals, carcinogens, poisons of a natural and artificial origin) both in the natural mediums and at the stage of preparation of nutriment products and food.

Since nutriment products used by human as food are a set of ingredients represented by plants, products of processing of the vegetable and animal raw materials, and some chemical substances including water, it is necessary to consider the behavior of TM not in the food chains, which very often depend on each other, but in the food webs (similar to trophic webs) . However, this is beyond the scope of the problem of the ecological food preparation. The concept of techogenesis dependent food chain is seemed to be acceptable and sufficient in discussion of the questions of the ecological food production. At the same time these questions should be considered in view of chemical mechanisms of the surrounding medium, which determine behavior of both organic and inorganic substances in the biosphere, in view of techogenesis pressure on the regions where raw materials of a vegetable or animal origin are produced or procured.

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М.Б. Хаскельберг, С.С. Крамор***

ИССЛЕДОВАНИЕ ПЕРВОЙ СТАДИИ ЭЛЕКТРИЧЕСКОЙ ФОРМОВКИ ТОНКОПЛЕНОЧНЫХ СИСТЕМ МЕТАЛЛ-ДИЭЛЕКТРИК-МЕТАЛЛ

*Томский государственный педагогический университет
**Schwab Capitel Markets L.P., USA

Под формовкой тонкопленочных систем металл-диэлектрик-металл (МДМ) (нижний электрод базовый массивный, верхний электрод имеет толщину 10–120 нм, рабочий диэлектрик с толщиной в диапазоне 20–1200 нм) принято считать процесс образования локальных высокопроводящих областей, являющихся центрами эмиссии электронов и называемых «формованными каналами» или «каналами повышенной проводимости». Этот процесс является следствием помещения обозначенных структур в откачную вакуумную систему и приложения к ним напряжения с амплитудой 5–15 В в течение некоторого времени. Процесс формовки делится на две стадии [1]. Во время первой, называемой основной, создаются дефекты со структурой, сходной с той, которую имеют каналы пробоя. Во время второй стадии, называемой адсорбционностимулирован-