

ALKALOIDI KAO BIOLOSKI AKTIVNI SPOJEVI U HRANI

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Danas ljudi sve više konzumiraju hranu računajući na njene aktivne sastojke koji se nalaze u malim količinama a koji mogu imati povoljan, a ponekad i štetan uticaj na zdravlje. Alkaloidi su predstavnici takve grupe.

Alkaloidi su prirodni organski spojevi sa atomom azota koji često imaju jak farmakološki učinak koji se manifestira u veoma malim, miligramskim i manjim dozama. Naziv alkaloid je složenica koju grade arapska riječ „al kali“-lužina, baza i grčka riječ „eidos“-sličan, pa su to spojevi baznog karaktera.

Alkaloidi su prisutni u različitim izvorima namirnica, a najčešće se nalaze u voću, povrću, začinskom i aromatičnom bilju, a često se koriste iz ljekovitih biljaka. Mogu se svrstati u tri skupine: protoalkaloidi (biogeni amini, efedrin), pseudoalkaloidi (steroidni i diterpenski alkaloidi) i pravi alkaloidi.

Iz grupe protoalkaloida često su prisutni u malim količinama biogeni amini kao što je histamin u pivu i ribama. Iz grupe pseudoalkaloida su steroidni i diterpenski alkaloidi koji se također mogu naći u različitim vrstama voća i povrća, najčešće u kutikuli, te služe biljkama kao zaštita ali su često i vrlo biološki aktivni. U svakodnevnoj ishrani najviše se koriste kofein, teobromin, teofilin, tein, guaranin, kapsaicin, piperin i drugi.

Osim nutritivnog uticaja na probavu i organizam alkaloidi imaju farmakološko dejstvo. Nemaju energetske vrijednosti, a metaboliziraju se slično lijekovima. Od alkaloida koji su svoju svakodnevnu upotrebu nasli u ishrani jesu najčešće predstavnici derivata ksantina, kapsaicin, piperin i ostali alkaloidi koji su u namirnicama prisutni u malim količinama.

Derivati ksantina u hrani. Ksantin (3,7-dihidro-purine-2,6-dion) je purinska baza koja se nalazi u tjelesnim tkivima i tekućinama. U prehrani su značajni metilirani derivati ksantina gdje spadaju kofein, teofilin, teobromin i paraksantin. Ovi alkaloidi vezani su uglavnom za taninske spojeve u obliku tanoida. Poseban značaj kafe i čaja je što ljudi svakodnevno konzumiraju u obliku toplih i hladnih napitaka.

Metilirani derivati ksantina imaju sličnu hemijsku strukturu. Razlikuju se samo po zastupljenosti CH_3 grupe.

Ksantini su prisutni uglavnom u osušenim i fermentiranim prirodnim proizvodima kao što su uživala: kafa, čaj, kakao, mate, guaranin. Isto tako mogu se naći i u industrijskim prehrambenim proizvodima kao što su osvježavajuća pića kola, energetske napitke, raznovrsni konditorski proizvodi (kakao proizvodi, neki keksi i vafli, bombone, komprimati, žvakaće gume sa guaraninom) i mnogi drugi.

Kofein. Kofein je najpoznatiji po tome što je zastupljen u kafi. Kofein se nalazi u mnogim dugim proizvodima kao što su čokolada, nekim lijekovima protiv bolova, preparati za slabljenje simptoma prehlade, preparati za kontrolisanje tjelesne težine i kozmetičkim preparatima.

Teofilin. Teofilin u čaju je mnogo manje zastupljen nego kofein, a prisutan je samo u tragovima.

Teobromin. Teobromin je poznat pod nazivom ksanteozol. To je goraki alkaloid iz kakaovca (*Theobroma cacao*). Ima ga u svim kakaovskim proizvodima.

Kapsaicin. Najvažniji farmakološki aktivni sastojci paprike su kapsaicinoidi. To su amidni alkaloidi. Pripadaju grupi protoalkaloida jer se atom azota nalazi van ciklusa i nema bazne osobine. Kapsaicin je prirodni alkaloid, tvar zbog kojeg paprika ima karakterističan ljuti okus. Osjećaj ljutine koju stvaraju kapsaicinoidi nije okus, nego osjećaj toplote koje izazivaju te supstance.

Kapsaicinoidi djeluju na završetke nerava u koži i izazivaju osjećaj toplote, sekundarno izazivaju hiperemiju kože. Djeluju kao kontaktni iritansi i rubefacijensi. Ekstrakti paprike ili rastvor kapsaicina se koriste eksterno, za ublažavanje bolova kod reumatizma i lumbaga. Zbog svog ljutitog okusa preparati paprike se koriste za poboljšanje apetita i varenje hrane.

ALKALOIDS AS BIOLOGICALLY ACTIVE COMPOUNDS IN FOOD

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Today, people are increasingly consuming food counting on its active ingredients found in small amounts that may be beneficial and sometimes harmful effects on health.

Alkaloids are the representatives of such groups. Alkaloids are natural organic compounds with nitrogen atoms, which often have a strong pharmacological effect which manifests itself in a very

small, and small milligram doses. Name of alkaloid compound that build the Arabic word "al kali"-bases, and the Greek word "eidos"-like, so alkaloids are a combination of base character.

Alkaloids are present in different sources of food, and most commonly found in fruits, vegetables, spices and herbs, and are often used in medicinal plants. They can be classified into three groups: protoalkaloids (biogenic amines, ephedrine), pseudoalkaloids (steroidal alkaloids and diterpensi) and real-alkaloids.

From the group protoalkaloids are often present in small amounts biogenic amines such as histamine in beer and fish. Within the group of the steroid and pseudoalkaloids diterpensi alkaloids that can also be found in different types of fruits and vegetables, usually in the cuticle and serve as a plant protection but are often very biologically active. The daily diet are mostly used caffeine, theobromine, theophylline, weight, guaranin, kapsaicin, piperin and others.

Besides the nutritional impact on digestion and the body alkaloids have pharmacological effects. They have no energy value, and are similarly metabolized drugs. From alkaloids to their everyday use found in the diet are usually representatives of xanthine derivatives, kapsaicin, piperin and other alkaloids that are present in foods in small quantities.

Xanthine derivatives in food. Xanthine (3,7-dihydro-purine-2,6-dione) is purin base, which is located in body tissues and fluids. The diet are important methylated xanthine derivatives, which include caffeine, theophylline, theobromine and paraksantin. These alkaloids are related mainly to tannic compounds in the form of tanoids. The special significance of coffee and tea is what people consume on a daily basis in the form of hot and cold beverages.

Methylated xanthine derivatives have similar chemical structure. The only difference is the presence of CH₃ groups. Xanthine are present mainly in dried and fermented with natural products such as enjoyed: coffee, tea, cocoa, mate, guaranin. Also can be found in industrial food products, such as refreshing drinks cart, energy drinks, a variety of confectionery products (cocoa products, some biscuits and wafers, sweets, comprimates, chewing gum with guaraninom) and many others.

Caffeine. Caffeine is best known for what is present in coffee. Caffeine is in many long products such as chocolate, some painkillers, preparations for the decline of symptoms of colds, preparations for controlling weight and cosmetology. Theophylline. Theophylline in tea is much less frequent than caffeine, and is present only in trace.

Theobromine. Theobromine is known as ksanteoza. It is a bitter alkaloid of the cocoa tree (*Theobroma cacao*). It is found in all cocoa products.

Capsaicinoids. The most important of the pharmacologically active ingredients are peppers capsaicinoids. These are the amide alkaloids. They belong to the group of protoalkaloids because the nitrogen atom is out of the cycle and there is no basic properties. Capsaicin is a natural alkaloid, a substance for which green pepper has a distinctive bitter taste. The feeling of anger generated by capsaicini no flavor, but the feeling of heat caused by these substances. Capsaicinoids acting on nerve endings in the skin and cause a sensation of heat, secondary causes hyperemia of the skin. Act as a contact irritant and rubefaciens. Extracts of paprika or solution kapsaicina used externally, to ease the pain of rheumatism and lumbago. Because of his angry taste pepper's preparations are used to improve appetite and digestion of food.