

29.39 - Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives.

- Alkaloids of opium and their derivatives; salts thereof :

2939.11 - - Concentrates of poppy straw; buprenorphine (INN), codeine, dihydrocodeine (INN), ethylmorphine, etorphine (INN), heroin, hydrocodone (INN), hydromorphone (INN), morphine, nicomorphine (INN), oxycodone (INN), oxymorphone (INN), pholcodine (INN), thebacon (INN) and thebaine; salts thereof

2939.19 - - Other

2939.20 - Alkaloids of cinchona and their derivatives; salts thereof

2939.30 - Caffeine and its salts

- Ephedrines and their salts :

2939.41 - - Ephedrine and its salts

2939.42 - - Pseudoephedrine (INN) and its salts

2939.43 - - Cathine (INN) and its salts

2939.44 - - Norephedrine and its salts

2939.49 - - Other

- Theophylline and aminophylline (theophylline-ethylenediamine) and their derivatives; salts thereof :

2939.51 - - Fenetylline (INN) and its salts

2939.59 - - Other

- Alkaloids of rye ergot and their derivatives; salts thereof :

2939.61 - - Ergometrine (INN) and its salts

2939.62 - - Ergotamine (INN) and its salts

2939.63 - - Lysergic acid and its salts

2939.69 - - Other

- Other :

2939.91 - - Cocaine, ecgonine, levometamfetamine, metamfetamine (INN), metamfetamine racemate; salts, esters and other derivatives thereof

2939.99 - - Other

These alkaloids are complex organic bases produced by plants; they have a strong physiological action. Some are obtained by synthesis. They are all more or less poisonous.

29.39

This heading covers **unmixed** alkaloids and **natural mixtures** of alkaloids (e.g., **veratrine** or the total alkaloids of opium); but deliberate intermixtures or preparations are **excluded**. The heading also **excludes** saps and vegetable extracts, such as dried saps of opium (**heading 13.02**).

This heading includes hydrogenated, dehydrogenated, oxygenated and deoxygenated alkaloid derivatives and, in general, any alkaloid derivative the structure of which is to a large extent the same as that of the natural alkaloid from which it is obtained.

(A) ALKALOIDS OF OPIUM AND THEIR DERIVATIVES; SALTS THEREOF

- (1) **Morphine**, present in opium; colourless crystals; a powerful narcotic; very poisonous.
- (2) **Dihydromorphine**, **desomorphine** (INN) (dihydrodeoxymorphine), **hydromorphone** (INN) (dihydromorphinone) and **metopon** (INN) (5-methyldihydromorphinone).
- (3) **Diacetylmorphine** (heroin), crystalline white powder; used as a sedative in place of codeine and morphine.
- (4) **Ethylmorphine**, crystalline white powder, odourless; used internally as a hypnotic and analgesic, externally as a local anaesthetic.
- (5) **Codeine** (methylmorphine, monomethyl ether of morphine). Present in opium together with morphine. Crystals; used as a sedative in replacement of morphine.
- (6) **Dihydrocodeine** (INN), **hydrocodone** (INN) (dihydrocodeinone), **oxycodone** (INN) (dihydrohydroxycodeinone).
- (7) **Narceine**, secondary alkaloid in opium; crystals; a hypnotic and an analgesic.
- (8) **Noscapine** (INN) (narcotine), secondary alkaloid in opium; crystals; less potent than morphine and only slightly toxic.
- (9) **Cotarnine and hydrocotarnine**, derived from narcotine.
- (10) **Papaverine**, secondary alkaloid in opium; crystals; narcotic and sedative action, but less intense than that of morphine.
- (11) **Ethaverine hydrochloride** (INNM)(1-(3,4-diethoxybenzyl)-6,7-diethoxyisoquinoline hydrochloride).
- (12) **Thebaine**, secondary alkaloid in opium; crystals; odourless; toxic.
- (13) **Concentrates of poppy straw**. A natural mixture of alkaloids obtained from parts of the poppy plant (*Papaver somniferum*) by extraction, followed by purification, and containing not less than 50 % by weight of alkaloids.

Derivatives of the alkaloids of opium are classified in this heading provided they retain the epoxy-bridged morphine structure, whether or not hydrogenated.

**(B) ALKALOIDS OF CINCHONA AND THEIR DERIVATIVES;
SALTS THEREOF**

- (1) **Quinine**, present in the bark of various plants of the *Cinchona* genus, particularly *Cinchona officinalis*, *Cinchona calisaya* and *Cinchona succirubra*. Crystalline white powder. Quinine and its salts have a paralysing effect on the protoplasm of protozoa present in the blood, so they are used as febrifuges (antipyretics) and antimalarials.
- (2) **Quinidine**. Contained in the bark of plants of the *Cinchona* genus. Crystals; may be extracted from the mother-liquors of quinine sulphate.
- (3) **Cinchonine**, ranks second in importance to quinine among the alkaloids contained in *Cinchona* bark; crystals.
- (4) **Cinchonidine**, found in *Cinchona* bark; crystals.
- (5) **Quinine tannate**.

(C) CAFFEINE AND ITS SALTS

Caffeine, extracted from coffee beans, tea and cola nuts; or obtained by synthesis. Silky crystals; used in medicine.

(D) EPHEDRINES AND THEIR SALTS

- (1) **Ephedrine**, contained in *Ephedra vulgaris* and also obtained synthetically; colourless crystals; used in medicine.
- (2) **Methylephedrine**.
- (3) **Etafedrine (INN)**.
- (4) **Norephedrine**.
- (5) **Pseudoephedrine (INN)**.

**(E) THEOPHYLLINE AND AMINOPHYLLINE
(THEOPHYLLINE-ETHYLENEDIAMINE) AND THEIR DERIVATIVES;
SALTS THEREOF**

Theophylline, present in tea, but is also obtained synthetically. Crystals, often used as a diuretic, as is also aminophylline (theophylline-ethylenediamine).

29.39

(F) ALKALOIDS OF RYE ERGOT AND THEIR DERIVATIVES; SALTS THEREOF

- (1) **Ergometrine** (INN) (9,10-didehydro-N-[(S)-2-hydroxy-1-methylethyl]-6-methylergoline-8 β -carboxamide) (ergonovine). Tetrahedral or fine needle crystals. Used as an oxytocic and as a precursor in the production of lysergide (INN) (see the list of precursors at the end of Chapter 29). An important derivative is ergometrine maleate; this is also known as ergonovine maleate.
- (2) **Ergotamine** (INN) (12'-hydroxy-2'-methyl-5' α -(phenylmethyl) ergotaman-3',6',18-trione). Used as a vasoconstrictor and as a precursor in the production of lysergide (INN) (see the list of precursors at the end of Chapter 29). Its principal derivatives include ergotamine succinate and ergotamine tartrate.
- (3) **Lysergic acid** (9,10-didehydro-6-methylergoline-8-carboxylic acid). Prepared from the alkaline hydrolysis of ergot alkaloids. Also produced from *Claviceps paspali*. Crystals are in the form of hexagonal plates or scales. Used as a psychomimetic and as a precursor in the production of lysergide (INN) (see list of precursors at the end of Chapter 29).
- (4) Other **ergot alkaloids**, e.g., ergosine, ergocristine, ergocryptine, ergocornine and methylergometrine.

(G) NICOTINE AND ITS SALTS

Nicotine, alkaloid present in tobacco leaves; can also be obtained by synthesis. Colourless liquid which turns brown when exposed to air; has a characteristic, penetrating odour. A strong base, toxic, forms crystalline salts; used as a fungicide and insecticide for plants.

(H) OTHER VEGETABLE ALKALOIDS AND THEIR DERIVATIVES AND SALTS

- (1) **Arecoline**, alkaloid present in betel-nut (areca-nut).
- (2) **Aconitine**, one of the most violent poisons known; extracted from the dried roots of *Aconitus napellus*. Used in medicine as a powerful sedative.
- (3) **Physostigmine** (eserine). Occurs in Calabar-beans; colourless crystals which turn reddish-yellow when exposed to air; used in medicine.
- (4) **Pilocarpine**, principal alkaloid in *Pilocarpus jaborandi*; colourless mass which turns brown when exposed to air. Pilocarpine and its salts are used in medicine (to provoke perspiration) and by oculists; also used in the preparation of hair-growing lotions.
- (5) **Sparteine**, alkaloid present in broom; colourless liquid. Sparteine sulphate is used as a heart stimulant.
- (6) **Atropine**, obtained chiefly from *Datura stramonium*; also obtained synthetically; crystals; a violent poison which dilates the pupil of the eye.
- (7) **Homatropine**, colourless crystals; it has the same chemical and physiological action as atropine.

- (8) **Hyoscyamine**, the principal alkaloid present in *Atropa belladonna* and in numerous plants of the *Hyoscyamus* genus. Colourless crystals; highly toxic. Its salts (e.g., the sulphate and hydrobromide) are used in medicine.
- (9) **Scopolamine** (hyoscine), present in many plants of the *Datura* genus; colourless syrupy liquid or colourless crystals. Its salts (e.g., the hydrobromide and the sulphate) are crystalline; used in medicine.
- (10) **Colchicine**, found in the plant *Colchicum autumnale*. Gummy mass, yellow powder, crystals or flakes; used in medicine; very toxic.
- (11) **Veratrine**, a natural mixture of alkaloids extracted from sabadilla seeds; amorphous white powder; hygroscopic, irritant and highly sternutatory; toxic; used in medicine.
- (12) **Cevadine**, corresponds to crystallised veratrine.
- (13) **Cocaine**, crystals; extracted from the leaves of several varieties of coca, especially *Erythroxylum coca*; also obtained synthetically. The crude cocaine on the market is never pure, but contains from 80 % to 94 % of cocaine; in that form, it remains classified here. The aqueous solution of cocaine gives an alkaline reaction; it forms numerous salts; a powerful anaesthetic.
- (14) **Emetine**, present in the roots of *Uragoga ipecacuanha*. Amorphous white powder which turns yellow when exposed to light; used as an expectorant and as an emetic; its salts are used against amoebic dysentery.
- (15) **Strychnine**, extracted from various plants of the *Strychnos* genus (nux vomica, St. Ignatius' beans). Silky crystals; a violent poison. Forms crystalline salts, used in medicine.
- (16) **Theobromine**, extracted from cocoa and also obtained synthetically. Crystalline white powder, used in medicine as a diuretic and heart stimulant.
- (17) **Piperine**, extracted from the *Piper nigrum*; crystals.
- (18) **Coniine**, present in the conium (hemlock), and also obtained synthetically. Colourless oily liquid with a penetrating odour; violent poison; used in medicine.
- (19) **Curarine**, extracted from curare; used in medicine.
- (20) **Porphyrine** (alkaloid).
- (21) **Tomatine**.
- (22) **Alkaloid tannates** (chelidonine tannate, colchicine tannate, pelletierine tannate, etc.).
- (23) **Hydrastine**.
- (24) **Hydrastinine**.
- (25) **Hydrohydrastinine**.
- (26) **Oxohydrastinine**.
- (27) **Tropine** (tropan-3-ol).

29.39

(28) **Tropinone.**

(29) **Cephaeline.**

(30) **Metamfetamine** (INN) (methamphetamine, N-methylamphetamine, deoxyephedrine, 2-methylamino-1-phenylpropane).

* * *

Certain substances of this heading, which are regarded as narcotic drugs or as psychotropic substances under international instruments, are indicated in the list appearing at the end of Chapter 29.
