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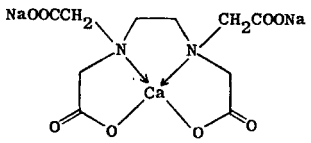
vulgaris Schrader (watermelon), *Cucumis melo* L. (cantaloupe), and *Cucumis sativus* L., *Cucurbitaceae* (cucumber). Isoln from *Cucurbita pepo:* Vickery *et al., Biochem. Prepn.* **2,** 5 (1952). Extraction from hemp seed, prepn of crystalline form and x-ray data: J. Drenth, E. W. Wiebenga, *Rec. Trav. Chim.* **74,** 813 (1955). The amino acid compositions of these globulins are slightly different from hemp seed globulin and from each other: Smith *et al., J. Biol. Chem.* **164,** 159 (1946); Smith, Greene, *ibid.* **167,** 833 (1947); **172,** 111 (1948). Structure studies: Hall, *ibid.* **185,** 45 (1959); Cleemann, Kratky, *Z. Naturforsch.* **15b,** 526 (1960); Dlouhá *et al., Coll. Czech. Chem. Commun.* **28,** 2779 (1963); **29,** 1835 (1964). Electron microscopy and optical diffraction: A. M. H. Schepman *et al., Biochim. Biophys. Acta* **271,** 279 (1972). Electron spin resonance studies: L. J. Dimmey, W. Gordy, *Proc. Nat. Acad. Sci. USA* **77,** 343 (1980).

Octahedral crystals. Completely sol to a clear soln in 10% salt soln. Sol in dil mineral acids. Forms a water-soluble hydrochloride.

3480. Edetate Calcium Disodium. *[[N,N'-1,2-Ethanediylbis[N-(carboxymethyl)glycinato]](4—)-N,N',O,O',O^{N},O^{N}]calciate(2—)disodium; [(ethylenedinitrilo)tetraacetato]-calciate(2—) disodium;* ethylenediaminetetraacetic acid calcium disodium chelate; calcium disodium (ethylenedinitrilo)-tetraacetate; calcium disodium ethylenediaminetetraacetate; EDTA calcium; edathamil calcium disodium; calcium disodium edetate; edetic acid calcium disodium salt; sodium calciumedetate; Calcitetracemate Disodium; Calcium Disodium Versenate; Ledclair; Mosatil; Antallin; Sormetal; Versene CA. $C_{10}H_{12}CaN_2Na_2O_8$; mol wt 374.28. C 32.09%, H 3.23%, Ca 10.71%, N 7.49%, Na 12.29%, O 34.20%. Prepn: Astakhov, Kiseleva, *Zh. Obshch. Khim.* **20,** 1780 (1950), *C.A.* **45,** 2409 (1951).



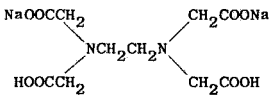
Tetrahydrate, powder. Sol in water: at 30° a 0.1*M* soln can be prepd (pH ~7). Practically insol in organic solvents. Exchanges its calcium for lead or other heavy metal ions forming water-sol complexes of the heavy metals.

USE: Color retention agent in foods, flavoring agent.

THERAP CAT: Chelating agent (metal).

THERAP CAT (VET): Chelating agent in lead poisoning.

3481. Edetate Disodium. *N,N'-1,2-Ethanediylbis[N-(carboxymethyl)glycine] disodium salt; (ethylenedinitrilo)-tetraacetic acid disodium salt;* ethylenediaminetetraacetic acid disodium salt; ethylenebis(iminodiacetic acid) disodium salt; edetic acid disodium salt; edathamil disodium; disodium edathamil; EDTA disodium; tetracemate disodium; disodium ethylenediaminetetraacetate; disodium edetate; Cheladrate; Chelaplex III; Endrate disodium; Sequestrene NA 2; Sodium Versenate; Titriplex III; Versene disodium salt. $C_{10}H_{14}N_2Na_2O_8$; mol wt 336.21. C 35.72%, H 4.20%, N 8.33%, Na 13.68%, O 38.07%. Prepn: Bersworth, U.S. pat. **2,407,645** (1946 to Martin Dennis); Bersworth, U.S. pat. **2,461,519** (1949). Toxicity: J. E. Wynn *et al., Toxicol. Appl. Pharmacol.* **16,** 807 (1970). *Review:* Biermans, Henrard, *Ind. Chim.* **39,** 6 (1952).



Dihydrate, crystals, mp 252° (dec). pH about 5.3. Sol in water. Has characteristics of weak acid, displacing CO_2 from carbonates and reacting with metals to form hydrogen. LD_{50} orally in rats: 2 g/kg (Wynn).

USE: Sequestering agent. Pharmaceutic aid (chelating agent).

THERAP CAT: Chelating agent (metal).

THERAP CAT (VET): Anticoagulant.

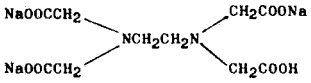
3482. Edetate Sodium. *N,N'-1,2-Ethanediylbis[N-(carboxymethyl)glycine] tetrasodium salt; (ethylenedinitrilo)tetraacetic acid tetrasodium salt;* ethylenediaminetetraacetic acid tetrasodium salt; sodium edetate; tetrasodium ethylenediaminetetraacetate; ethylenebis(iminodiacetic acid) tetrasodium salt; tetrasodium ethylenebis(iminodiacetate); EDTA tetrasodium; edetic acid tetrasodium salt; tetracemate tetrasodium; tetrasodium edetate; tetracemin; Endrate Tetrasodium; Questex; Versene; Sequestrene; Tetrine; Kalex; Trilon B; Komplexon; Nullapon; Aquamollin; Complexone; Distol 8; Irgalon; Calsol; Syntes 12a; Tyclarosol; Nervanaid B. $C_{10}H_{12}N_2Na_4O_8$; mol wt 380.20. C 31.59%, H 3.18%, N 7.37%, Na 24.19%, O 33.67%. $(NaOOCCH_2)_2NCH_2CH_2N(CH_2COONa)_2$. Prepn: Bersworth, U.S. pat. **2,407,645** (1946 to Martin Dennis Co.); *idem.*, U.S. pat. **2,461,519** (1949). For bibliography and applications *see "Keys to Chelation"* issued by Dow, Midland, Mich.

Powder, mp >300°. Apparent density: 6.9 lb/gallon. Very sol in water (about 103 g/100 ml). pH of 1% soln 11.3. Reacts with most divalent and trivalent metallic ions forming sol metal chelates. Less sol in alcohol than the potassium salt.

USE: Sequestering agent: one gram complexes 215 mg $CaCO_3$. Usually added to pharmaceuticals in the form of the calcium disodium salt to prevent calcium-depleting action in the body.

THERAP CAT: Chelating agent.

3483. Edetate Trisodium. *N,N'-1,2-Ethanediylbis[N-(carboxymethyl)glycine] trisodium salt; (ethylenedinitrilo)tetraacetic acid trisodium salt;* EDTA trisodium; ethylenediaminetetraacetic acid trisodium salt; trisodium ethylenediaminetetraacetate; trisodium edetate; edetic acid trisodium salt; Limclair; Versene-9; Sequestrene NA 3. $C_{10}H_{13}N_2Na_3O_8$; mol wt 358.20. C 33.53%, H 3.66%, N 7.82%, Na 19.25%, O 35.73%. Prepn: Bersworth, U.S. pat. **2,461,519** (1949). *Review:* Biermans, Henrard, *Ind. Chim.* **39,** 6 (1952).



Monohydrate, crystals from water, mp >300°. More sol in water than the corresp disodium salt or free acid. pH of 1% aq soln 9.3. One gram complexes at least 242 mg $CaCO_3$.

THERAP CAT: Chelating agent.

3484. Edetic Acid. *N,N'-1,2-Ethanediylbis[N-(carboxymethyl)glycine]; (ethylenedinitrilo)tetraacetic acid;* ethylenediaminetetraacetic acid; edathamil; EDTA; Havidote; Versene Acid. $C_{10}H_{16}N_2O_8$; mol wt 292.24. C 41.10%, H 5.52%, N 9.59%, O 43.80%. $(HOOCCH_2)_2NCH_2CH_2N(CH_2COOH)_2$. Prepn: Münz, U.S. pat. **2,130,505** (1938 to General Aniline); Bersworth, U.S. pat. **2,407,645** (1946 to Martin Dennis Co.); Bersworth, U.S. pat. **2,461,519** (1949); Smith *et al., J. Org. Chem.* **14,** 355 (1949). Prepn of α- and β-form of crystals: Le Blanc, Spell, *J. Phys. Chem.* **64,** 949 (1960). *Review:* Biermans, Henrard, *Ind. Chim.* **39,** 6 (1952).

Crystals from water, dec 220°. Soly in water at 25°: 0.50 g/l, Palei, Udal'tsova, *C.A.* **56,** 13620c (1962). The free acid is less stable than its salts, and tends to decarboxylate when heated to temps of 150°. Stable on storage and on boiling in aq soln.

Cobalt salt, ***Kelocyanor.***

Dipotassium salt dihydrate, $C_{10}H_{14}K_2N_2O_8 \cdot 2H_2O$, ***edetate dipotassium, EDTA dipotassium.***

USE: As antioxidant in foods. Pharmaceutic aid (chelating agent).

THERAP CAT (VET): Pharmaceutic aid (chelating agent) in lead and heavy metal poisoning of farm animals.

3485. Edifenphos. *Phosphorodithioic acid O-ethyl S,S-diphenyl ester; O-*ethyl *S,S-*diphenyl phosphorodithioate; EDDP; ediphenphos; Bayer 78418; Hinosan. $C_{14}H_{15}O_2PS_2$; mol wt 310.36. C 54.18%, H 4.87%, O 10.31%, P 9.98%, S