THE MERCK INDEX

AN ENCYCLOPEDIA OF
CHEMICALS, DRUGS, AND BIOLOGICALS

TWELFTH EDITION

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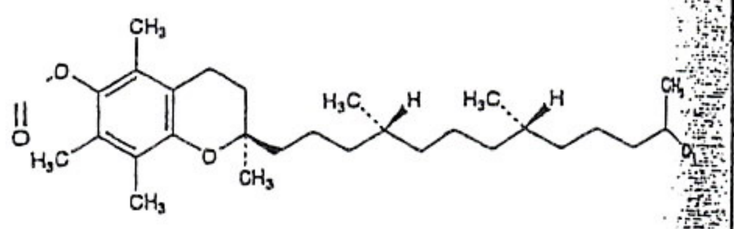
00-220°; n_D^{25} 1.5045. uv max: 294 nm ($E^{1\%}_{1cm}$ 7
ally insol in water. Freely sol in oils, fats, aceto
., chloroform, ether, other fat solvents. Stable to h
calies in the absence of oxygen. Not affected by ac
100°. Slowly oxidized by atm oxygen, rapidly b
and silver salts. Gradually darkens on exposure

As an antioxidant in vegetable oils and shortenin
THERAP CAT: Treatment of vitamin E deficiency.
THERAP CAT (VET): Nutritional factor. Interrelations
elenium. (Prevents muscle degeneration, also enc
laria and exudative diathesis.) Has been used to
fertility.

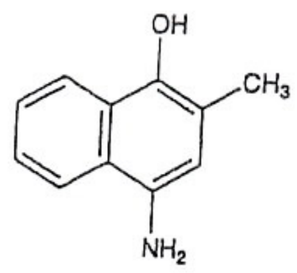
60. Vitamin E Acetate. *[2R*(4R*,8R*)]-3,4-D*
5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-2H-1-
n-6-ol acetate; 2,5,7,8-tetramethyl-2-(4,8,12-trime
yl)-6-chromanol acetate; α-tocopherol acetate;
ryl acetate; $C_{31}H_{52}O_3$; mol wt 472.75. C 78.76
%, O 10.15%. Prepn from *dl*-α-tocopherol and
iride: Surmatis, Weber, U.S. pat. 2,723,278 (19
nann-La Roche). Prepn of *d*- and *l*-forms: Rob
n, *J. Am. Chem. Soc.* 84, 3196 (1962). Stereosele
esis: K.-K. Chan *et al.*, *J. Org. Chem.* 43, 3435 (1
l synthesis of all eight stereoisomers: N. Cohen
Chim. Acta 64, 1158 (1981). Comprehensive de
B. C. Rudy, B. Z. Senkowski, *Anal. Profiles*
3, 111-126 (1974).



l-Form, *Detulin, Ephynal, Eprolin, Epsilan-M, E*
imin, Evion, Juvela, OptoVit-E, Toco 500, Vitagut
ow, viscous liquid: mp −27.5°. $d_4^{21.3}$ 0.9533. $bp_{0.0}$
.025 194°; $bp_{0.3}$ 224°. n_D^{20} 1.4950-1.4972. uv max (
ane): 285.5 nm. Practically insol in water. Freely
tone, chloroform, ether. Less readily sol in alc. Unli
free vitamins, the acetate is practically unaffected by the
dizing influence of air, light, and ultraviolet light.
l-Form. *[2R-[2R*(4R*,8R*)]]-3,4-dihydro-2,5,7,8-tet*
thyl-2-(4,8,12-trimethyltridecyl)-2H-1-benzopyran-6-ol
e, E-Vicotrat, Spondyvit, Tocopherex. Crystals, mp
$^{25}_{D}$ +0.25° (c = 10 in chloroform); $[\alpha]_D^{25}$ +3.2° (in ethanol).
l-Form, crystals, mp 23°. $[\alpha]_D^{25}$ −2.0° (in ethanol).
Note: The international unit of vitamin E is equal to one
g of standard *dl*-α-tocopheryl-acetate. The *d*-form is more
tive: 1 mg = 1.36 I.U. *l*-α-Tocopheryl acetate has 42%
the activity of *d*-α-tocopheryl acetate in the rat hemolysis
st. Based on this activity a potency ratio of 1.4:1.0 for
α-tocopheryl acetate compared to *dl*-α-tocopheryl acetate
as been established.
THERAP CAT: Vitamin.
THERAP CAT (VET): Vitamin.

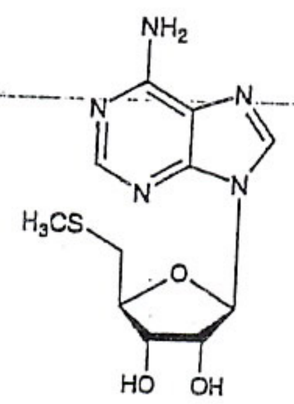
1 . Vitamin K. General term referring to a group of
a oquinone derivatives required for the bioactivation of
roteins involved in hemostasis. The designation "K" was
erived from the German "Koagulationsvitamin." Vitamin
compds are classified into 3 groups: *phylloquinone* (K
.v., found in green plants; *menaquinones* (K_2), *q.v.*, prim
ily produced by intestinal bacteria; and *menadione* (K
.v., and derivatives which are synthetic, lipid soluble com
ounds. Reduced *in vivo* to *dihydrovitamin K* (KH_2) which
erves as a coenzyme in the conversion of glutamic
esidues to γ-carboxyglutamic acid (Gla), *q.v.*, in the po
translational modification of blood coagulation factors
VII, IX and X, *q.q.v.*, and the anticoagulant proteins C
S. Other Gla-containing proteins, such as the bone ma
protein, osteocalcin, *q.v.*, have been identified in a wide
ety of tissues. This γ-carboxylation is accompanied by
oxidation of KH_2 to *vitamin K epoxide* which is then
cled back to vitamin K. Discovery: H. Dam, *Biochem*
215, 475 (1929); 220, 158 (1930); *Nature* 135, 652 (19
Historical survey: H. Dam, *Vit. Horm.* 24, 295-306 (19
Menadione and phylloquinone are metabolized by an
to menaquinone-4: C. Martius, H. O. Esse
331, 1 (1958); H. H. W. Thijssen, M. J. Dri
Brit. J. Nutr. 72, 415 (1994). Comprehensiv
Friedrich in *Vitamins* (de Gruyter, New Y
285-338. Review of metabolism and role in
tion: M. J. Shearer, *Blood Rev.* 6, 92-104
Suttie, *J. Am. Diet. Assoc.* 92, 585-590 (1992);
of action: P. Dowd *et al.*, *Nat. Prod. Rep.*
(1994); of pharmacology and therapeutic use:
et al., *Drugs* 49, 376-387 (1995). Physiologica
J. Shearer, *Lancet* 345, 229-234 (1995).

10162. Vitamin K_5. *4-Amino-2-methyl-1-*
4-amino-2-methyl-1-naphthol; 1-hydroxy-2-met
naphthalene; 2-methyl-4-amino-1-hydroxynap
methyl-4-amino-1-naphthol; 3-methyl-4-hydr
thylamine; Synkamin. $C_{11}H_{11}NO$; mol wt
76.28%, H 6.40%, N 8.09%, O 9.24%. Prepd fr
naphthalene or from menadione: Sah, *Rec. Tr*
458 (1940); 60, 373 (1941); Veldstra, Wiardi,
(1942); 62, 75 (1943). Use as food preserva
Steele, *Food Technol.* 12, 501 (1958).



Hydrochloride, $C_{11}H_{11}NO.HCl$, *Kayvisyn.*
dil HCl, darkens at 262°, dec 280-282°. Turns
violet on exposure to air and light. Freely
Slightly sol in alc. Insol in ether.
N-Acetyl analog, $C_{13}H_{13}NO_2$, *4-acetamido*
naphthol, K-Vitrat. Needles, mp 208-210°.
USE: Food preservative.
THERAP CAT: Vitamin (prothrombogenic).

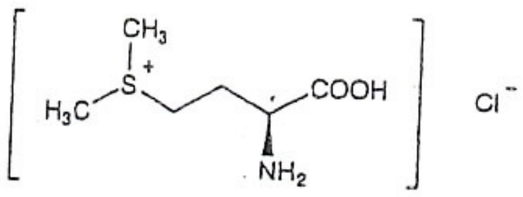
10163. Vitamin(s) L. Factors presumably necessary for lactation. Vitamin L_1: *See o*-Aminobenzoic Acid. Vitamin L_2 was shown to be 7-[tetrahydro-3,4-dihydroxy-5-(methylmercaptomethyl)-2-furyl]adenine: Nakahara *et al.*, *Sci. Papers Inst. Phys. Chem. Research (Tokyo)* 40, 433 (1943), *C.A.* 41, 6317c (1947). Manuf: Sato *et al.*, Japan. pats. 7244('62) and 16,015 ('69), *C.A.* 59, 1746f (1963) and *C.A.* 77, 102146j (1972).



Vitamin L_2

10164. Vitamin T. Tegotin; termitin; torutilin; factor T; vitamin T Goetsch; Goetsch's vitamin; Temina. A complex of growth-promoting substances, originally obtained from termites: Goetsch, *Oesterr. Zool. Z.* 1, 58-85 (1946). Also obtainable from roaches, yeasts and fungi. The isoln procedure has never been described. Isoln of "vitamin T complexes" from yeast: Koch *et al.*, Ger. pat. 1,000,962 (1957 to Aschaffenburger Zellstoffwerke), *C.A.* 54, 18898d (1960). Vitamin T may be a mixture of known vitamins and growth-promoting factors: Koch *et al.*, *Naturwiss.* 38, 339 (1951). Polemic by Barkow, Goetsch, *ibid.* 42, 346 (1955).

10165. Vitamin U. *(S)-(3-Amino-3-carboxypropyl)-dimethyl sulfonium chloride;* methylmethioninesulfonium chloride; MMSC; Cabagin-U; Epadyn-U; Vitas-U. $C_6H_{14}ClNO_2S$; mol wt 199.70. C 36.09%, H 7.07%, Cl 17.75%, N 7.01%, O 16.02%, S 16.06%. The anti-ulcer vitamin reported in cabbage leaves and other green vegetables: G. Cheney, *California Med.* 77, 248 (1952). Activity: V. Z. Szabo, G. Vargha, *Arzneimittel-Forsch.* 10, 23 (1960); K. Seri *et al.*, *ibid.* 29, 1517 (1979). Prepn: Y. Kanai, Y. Kawamura, Japan. pat. 4757('62) (to Nippon Kayaku), *C.A.* 58, 12672e (1963); H. Wagner, Ger. pat. 1,239,697 (1967 to Degussa), *C.A.* 67, 73866e (1967).



Needles, mp 134° (dec). LD_{50} i.v. in mice: 2760 mg/kg, I. V. Zaikonnikova, L. G. Urazaeva, *C.A.* 80, 10388y (1974).
Bromide analog, $C_6H_{14}BrNO_2S$, *methylmethioninesulfonium bromide, Ardésyl.* mp 139° (dec).
THERAP CAT: Treatment of gastric disorders.

10166. Vitride®. *Dihydrobis(2-methoxyethanolato-O,O')aluminate(1−) sodium;* sodium bis(2-methoxyethoxy)-aluminum hydride. $C_6H_{16}AlNaO_4$; mol wt 202.16. C 35.65%, H 7.98%, Al 13.35%, Na 11.37%, O 31.66%. $NaAlH_2(OCH_2CH_2OCH_3)_2$. Prepn: Casensky *et al.*, U.S. pat. 3,507,895 (1970). Properties: Vit, *Eastman Organic Chemical Bulletin* 42(3), 1 (1970).
Highly viscous liquid at room temp. Miscible in a great variety of inert solvents (e.g., aromatic hydrocarbons and ethers). Immiscible in paraffinic hydrocarbons. Thermally stable at 200°C; thermal decomposition starts at 205°C and is vigorous.
USE: Reducing agent.

adhesive glycoprotein found in
in various tissues. Has binding sites for integrin
heparin, complement components, and perfc
Thought to play a regulatory role in hemosta
healing, tissue remodeling and cancer. Synt
hepatocytes as a single chain polypeptide, mol wt
Binds readily to proteoglycans of the extracell
and is deposited in normal loose connective tiss
mal elastin fibers, and in the vascular wall. A
sized by platelets, macrophages and megakaryo
leased by activated platelets in different multim
Promotes cellular attachment, spreading and mig
wide variety of cell types and serves as a matrix
regulator of blood coagulation. Identification: F
J. Cell Biol. 32, 297 (1967). Isoln and compa
fibronectin, *q.v.*: D. Barnes *et al.*, *J. Supramol. St*
(1980). Purification and tissue distribution: E. C
et al., *Proc. Nat. Acad. Sci. USA* 80, 4003 (1983
acid sequence: S. Suzuki *et al.*, *EMBO J.* 4, 25
Identity with S-protein: K. T. Preissner *et al.*,
Biophys. Res. Commun. 134, 951 (1986); B. R. To
F. Mosher, *Blood* 68, 737 (1986). Review of str
biological function in hemostasis: K. T. Preis
Rev. Cell Biol. 7, 275-310 (1991); K. T. Preissner,
Thromb. Haemost. 66, 123-132; 189-194 (1991).
vitronectin receptors and role in cell growth and
tion: B. Felding-Habermann, D. A. Cheresh, C
Cell Biol. 5, 864-868 (1993).

10168. Voacamine. *12-Methoxy-13-[(3α)-17-m*
oxovobasan-3-yl]ibogamine-18-carboxylic acid me
voacanginine. $C_{43}H_{52}N_4O_5$; mol wt 704.91. C 7
7.44%, N 7.95%, O 11.35%. Bisindole alkaloid
Voacanga africana Stapf., *V. thouarsii* R. & Sch.,
(K. Sch.) Pichon and *V. schweinfurthii* Staph., *Ap*
Janot, Goutarel, *Compt. Rend.* 240, 1719 (1955)
Org. Chem. 23, 1455 (1958); Janot, Goutarel,
2,823,204 (1958 to Lab. Gobey). Identity with
nine: LeBarre, Gillo, *Bull. Acad. Roy. Med. Bel*
(1956). Cleaved by acid catalysis to voacangine:
Naturwiss. 48, 694 (1961). Structure: Goutar
Compt. Rend. 243, 1670 (1956); Percheron, *An*
(Paris) 4, 303 (1959); Büchi *et al.*, *J. Am. Chem.*