



Formula: C₄₇H₅₁NO₁₄

MW: 853.92

CAS: 33069-62-4

TNP NUMBER: TNP00117

IUPAC: (1S,2S,4S,9S,10S,15S,7R,12R)-4,12-diacetyloxy-1,9-dihydroxy-10,14,17,17-tetramethyl-11-oxo-2-phenylcarbonyloxy-6-oxatetracyclo[11.3.1.0.0]heptadec-13-en-15-yl (2S,3S)-2-hydroxy-3-phenyl-3-(phenylcarbonylamino)propanoate

Smiles:

O(C(=O)O)[C@]12C3[C@H](OC(=O)c4ccccc4)[C@@]4(O)[C@](C)(C)C([C@H](C([C@]3(C)[C@H](C[C@H]1OC2)O)=O)OC(C)=O)=C([C@H](C4)OC([C@H]([C@@H](NC(=O)c1ccccc1)c1ccccc1)O)=O)C

REFERENCE: Reference Parekh, H., and Simpkins, H., The transport and binding of taxol. Gen. Pharmacol. 29, 167-172, (1997) Jordan, A., et al., Tubulin as a target for anticancer drugs: agents which interact with the mitotic spindle. Med. Res. Rev. 18, 259-296, (1998) Srivastava, R.K., et al., Involvement of microtubules in the regulation of Bcl2 phosphorylation and apoptosis through cyclic AMP-dependent protein kinase. Mol. Cell. Biol. 18, 3509-3517, (1998) Shtil, A.A., et al., Differential regulation of mitogen-activated protein kinases by microtubule-binding agents in human breast cancer cells. Oncogene 18, 377-384, (1999) Wang, T.H., et al., Microtubule dysfunction induced by paclitaxel initiates apoptosis through both c-Jun N-terminal kinase (JNK)-dependent and -independent pathways in ovarian cancer cells. J. Biol. Chem. 274, 8208, (1999) Torres, K., and Horwitz, S.B., Mechanisms of

Taxol-induced cell death are concentration dependent. Cancer Res. 58, 3620-3626, (1998)
Lutz, E.S., et al., Monolithic silica rod liquid chromatography with ultraviolet or fluorescence detection for metabolite analysis of cytochrome P450 marker reactions. J. Chromatogr. B. Analyt. Technol. Biomed. Life Sci. 780, 205-215, (2002) Merck Merck 13,7052 Beilstein Beil. 18,V,622

SOURCE: From *Taxus brevifolia*, 95%

ACCEPTORS: 14

DONORS: 4

ROTATION BONDS: 7

N+O: 15

Chiral Centers: 11

LogP: 6.75

LogS: -7.69

LIPINSKI: 1

Monograph Number: 0007052

Title: Paclitaxel

CAS Registry Number: 33069-62-4

CAS Name: (aR,bS)-b-(Benzoylamino)-a-hydroxybenzenepropanoic acid
(2aR,4S,4aS,6R,9S,11S,12S,12aR,12bS)-6,12b-bis(acetyloxy)-12-(benzoyloxy)-2a,3,4,4a,5,6,9,10,11,12,12a,12b-dodecahydro-4,11-dihydroxy-4a,8,13,13-tetramethyl-5-oxo-7,11-methano-1H-cyclodeca[3,4]benz[1,2-b]oxet-9-yl ester

Additional Names: 5b,20-epoxy-1,2a,4,7b,10b,13a-hexahydroxytax-11-en-9-one 4,10-diacetate 2-benzoate 13-ester with (2R,3S)-N-benzoyl-3-phenylisoserine; taxol A

Manufacturers' Codes: NSC-125973

Trademarks: Anzatax (Faulding); Paxene (Ivax); Taxol (Bristol-Myers Squibb)

Molecular Formula: C₄₇H₅₁NO₁₄

Molecular Weight: 853.91.

Percent Composition: C 66.11%, H 6.02%, N 1.64%, O 26.23%

Literature References: Antiproliferative agent first isolated, as the I-form, from the bark of the Pacific yew tree, *Taxus brevifolia*, Taxaceae; promotes the assembly of microtubules and inhibits the tubulin disassembly process. Isolation and structure: M. C. Wani et al., J. Am. Chem. Soc. 93, 2325 (1971). In vitro promotion of microtubule assembly: P. B. Schiff et al., Nature 277, 665 (1979). Isolation from *Taxus baccata* L. and in vitro inhibition of depolymerization of microtubules into tubulin: G. Chauviere et al., C.R. Seances Acad. Sci. Ser. 2 293, 501 (1981). Total synthesis of taxusin, which contains the entire ring skeleton: R. A. Holton et al., J. Am. Chem. Soc. 110, 6558 (1988). Total stereosynthesis: R. A. Holton et al., ibid. 116, 1597, 1599 (1994); K. C. Nicolaou et al., Nature 367, 630 (1994). Production by *Taxomyces andreanae*, an endophytic fungus associated with *T. brevifolia*: A. Stierle et al., Science 260, 214 (1993). Review of mechanism of action: J. J. Manfredi, S. B. Horwitz, Pharmacol. Ther. 25, 83-125 (1984); S. B. Horwitz et al., Ann. N.Y. Acad. Sci. 466, 733-744 (1986); S. B. Horwitz, Trends Pharmacol. Sci. 13, 134-136 (1992). Symposium on clinical toxicology, pharmacology and efficacy: Semin. Oncol. 20, Suppl. 3, 1-60 (1993). Review of clinical experience in cancer therapy: T. M. Mekhail, M. Markman, Expert. Opin. Pharmacother. 3, 755-766 (2002). Clinical trial in prevention of coronary artery restenosis: G. W. Stone et al., N. Engl. J. Med. 350, 221 (2004).

Properties: Needles from aq methanol, mp 213-216 (dec). $[\alpha]_{D20} -49$ (methanol). uv max (methanol): 227, 273 nm (e 29800, 1700).

Melting point: mp 213-216 (dec)

Optical Rotation: $[\alpha]_{D20} -49$ (methanol)

Absorption maximum: uv max (methanol): 227, 273 nm (e 29800, 1700)

Use: Tool in study of structure and function of microtubules.

Therap-Cat: Antineoplastic; antirestenotic.

