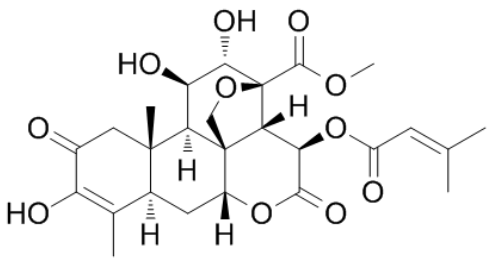
Product Data Sheet

Product Name: Brusatol
Cat. No.: GC34070

Chemical Properties

Cas. No.	14907-98-3		
SMILES	CC([C@](C[C@@](O1)2[H])3[H])=C(O)C(C[C@]3(C)[C@]4([H])[C@]2(CO[C@@]5([C@@H](O)[C@@H]4O)C(OC)=O)[C@@]5([H])[C@@H](OC(/C=C(C)/C)=O)C1=O)=O		
Formula	$C_{26}H_{32}O_{11}$	M.Wt	520.53
Solubility	DMF: 1 mg/ml,DMSO: 1 mg/ml,DMSO:PBS (pH 7.2) (1:1): 0.5 mg/ml	Storage	4°C, protect from light, stored under nitrogen
General tips	For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		
Structure			



Protocol

Cell experiment [1]:

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Cell lines	MCF-7, MDA-MB-231, or MDA-MB-468
Preparation Method	Various BC cells (MCF-7, MDA-MB-231, or MDA-MB-468) (1.0×10^4cells in 100µL DMEM with 10% FBS) were seeded in 96-well plates and cultured in an incubator at 37 °C with 5% CO_2 and 90% relative humidity. Following this, when cell confluence reached about 60 to 70% (36h later), the cells were exposed to gradual concentrations of brusatol (ranging from 0.31 to 10µM) for 24 or 48h. Following this treatment, cell viability was measured using sulforhodamine B (SRB) and MTT(3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide) assays.
Reaction Conditions	0.31 to 10µM; 24 or 48h
Applications	The effect of two low/non-toxic concentrations (19.5 and 78nM) of brusatol did not demonstrate any significant effect on cell viability. Brusatol provoked a significant decrease in BC cell viability; however, this effect was not dose- or time-dependent. The highest cytotoxic effects of brusatol were observed at 24 and 48h of treatment.

Animal experiment [2]:

Animal models	male BALB/c-nude mice

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Preparation Method	T24 cells were injected subcutaneously into mice at a concentration of 1×10^{6} cells per mouse. Three mice were randomly allocated into two groups, consisting of nude mice. The experimental groups were administered intraperitoneal injections of brusatol at a dosage of 2mg/kg every 48h, whereas the control groups were given injections of normal saline. Following a treatment duration of 5 weeks, the mice were administered anesthesia and subsequently euthanized to facilitate additional analysis. Sodium pentobarbital (30mg/kg) was administered as the anesthetic drug.
Dosage form	2mg/kg; every 48h; 5 weeks
Applications	The tumor size of mice treated with brusatol was significantly reduced.

References:

[1]. Bovilla, Venugopal R et al. “Targeted Inhibition of Anti-Inflammatory Regulator Nrf2 Results in Breast Cancer Retardation In Vitro and In Vivo.” *Biomedicines* vol. 9,9 1119. 30 Aug. 2021, doi:10.3390/biomedicines9091119
[2]. Yu, Xi et al. “Brusatol hinders the progression of bladder cancer by Chac1/Nrf2/SLC7A11 pathway.” *Experimental cell research* vol. 438,2 (2024): 114053. doi:10.1016/j.yexcr.2024.114053

Background

Brusatol is an Nrf2 inhibitor isolated from *Brucea javanica* and exhibits significant tumor inhibition in multiple cancers through decreased resistance to cancer oxidative stress injury[1,2,3]. Brusatol is confirmed to inhibit the Nrf2-Notch1 pathway, increse p-P38, LC3, Beclin 1 and p-JNK expression, downregulate BRF2, IGFBP-2, P62 and CD151[3].

In vitro, Brusatol (20, 50, 100, and 200nM; 0, 24, 48, 72, and 96h) treatment at the zygotic stage prevented the early embryo development in Kunming mice embryos[4]. Brusatol (1 and 100nM; 72h) shows an antitumor effect in an acute lymphoblastic leukemia (KOPN-8 cells) model triggered by

reactive oxygen species accumulation[5]. Brusatol (0.31 to 10μM; 24 or 48h) results in breast cancer retardation via Nrf2 inhibition in breast cancer cell lines[6].

In vivo, Brusatol (2mg/kg; every 48h; 5 weeks; i.p.) hinders the progression of bladder cancer by Chac1/Nrf2/SLC7A11 pathway[7]. Brusatol (NSC 172924) sensitizes endometrial hyperplasia and cancer to progestin by suppressing NRF2-TET1-AKR1C1-mediated progestin metabolism in a Brusatol (NSC 172924)-treated (10nmol/l; 3 days) endometrial cancer cell (Ishikawa and ECC1) injected nude mice model[8].

References:
[1] Yu, Xiao-Qi et al. “Brusatol: A potential anti-tumor quassinoid from *Brucea javanica*.” *Chinese herbal medicines* vol. 12,4 359-366. 19 Aug. 2020, doi:10.1016/j.chmed.2020.05.007
[2] Sutiningsih, Dwi et al. “Larvicidal Activity of Brusatol Isolated from *Brucea javanica* (L) Merr on *Culex quinquefasciatus*.” *Iranian journal of public health* vol. 48,4 (2019): 688-696.
[3] Li, Kun-Wei et al. “Brucea javanica: A review on anticancer of its pharmacological properties and clinical researches.” *Phytomedicine : international journal of phytotherapy and phytopharmacology* vol. 86 (2021): 153560. doi:10.1016/j.phymed.2021.153560
[4] Lin, Ying et al. “Nrf2 inhibition affects cell cycle progression during early mouse embryo development.” *The Journal of reproduction and development*vol. 64,1 (2018): 49-55. doi:10.1262/jrd.2017-042
[5] Jorge, Joana et al. “Antitumor Effect of Brusatol in Acute Lymphoblastic Leukemia Models Is Triggered by Reactive Oxygen Species Accumulation.” *Biomedicines* vol. 10,9 2207. 6 Sep. 2022, doi:10.3390/biomedicines10092207
[6] Bovilla, Venugopal R et al. “Targeted Inhibition of Anti-Inflammatory Regulator Nrf2 Results in Breast Cancer Retardation In Vitro and In Vivo.” *Biomedicines* vol. 9,9 1119. 30 Aug. 2021, doi:10.3390/biomedicines9091119
[7] Yu, Xi et al. “Brusatol hinders the progression of bladder cancer by Chac1/Nrf2/SLC7A11 pathway.” *Experimental cell research* vol. 438,2 (2024): 114053. doi:10.1016/j.yexcr.2024.114053
[8] Hu, Meiyan et al. “Brusatol sensitizes endometrial hyperplasia and cancer to progestin by suppressing NRF2-TET1-AKR1C1-mediated progestin metabolism.” *Laboratory investigation; a journal of technical methods and pathology* vol. 102,12 (2022): 1335-1345. doi:10.1038/s41374-022-00816-5