

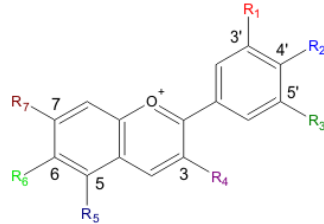
Refošk – Refosco



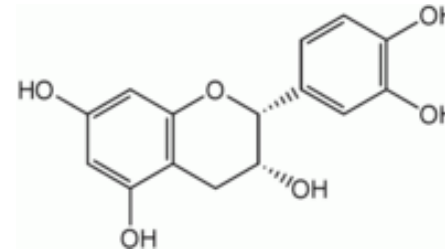
- “autochthonous” grape variety from wine region Slovenska Istra
- **wine description** (general): *The wines this grape yields are quite powerful and tannic, with a deep violet color, noticeable acidity and a slight bitterness. On the palate, there is strong currant, wild berry, and plum. The wine can stand some aging, and after a period of four-to-ten years, it achieves a floral quality as well.*
- **variety description**: *known as variety with very high **polyphenol** concentration (named **RWP** – red wine polyphenols)*

Important RWPs in Refosco

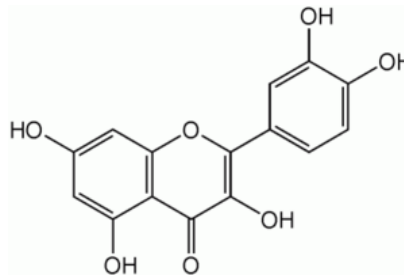
- Anthocyanes



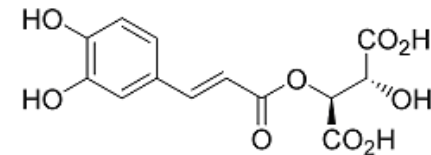
- Catechins & Epicatechins



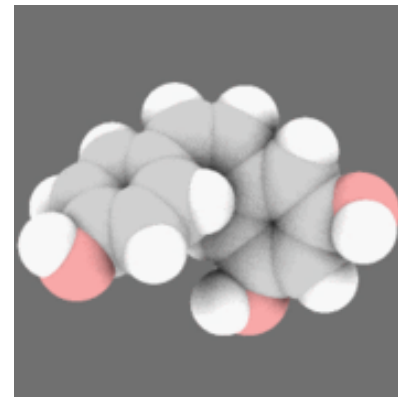
- Quercetin



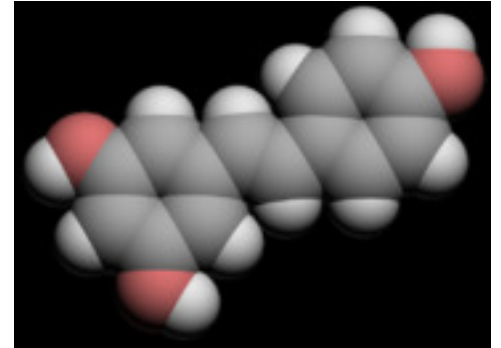
- Hydroxycinnamic acids (caftaric acid)



- Stilbenes (*cis* – resveratrol, *trans* – resveratrol)



Resveratrol



- *3,5,4'-trihydroxystilbene*
- [Phytoalexin](#) → (plant's defensive system)
- **In grapes** → primarily in the skin (also in seeds in some varieties)
- **In food** → peanuts, red grapes, blueberry, cranberry
- **In wine** → concentration varies according to variety, yields, extraction type and time, aging, use of finning agents, UV exposure, spraying schedule

Resveratrol and human health (general)

- Antioxidant properties
- French paradox [Seigneur et al., 1990]; protects against cardiovascular disease
- Reported to be effective against neuronal cell dysfunction and cell death, and may be of use for diseases such as Huntington's disease and Alzheimer's disease.
- Resveratrol significantly extends the lifespan of the yeast *Saccharomyces cerevisiae* [Howitz et al., 2003] → anti-aging drug.
- Resveratrol has also been seen to increase the potency of some antiretroviral drugs against HIV in vitro [Heredia et al., 2000]

Resveratrol and human health (cancer)

- ***Resveratrol interferes with all three stages of carcinogenesis - initiation, promotion and progression***
- Leiro J, Arranz JA, Fraiz N, Sanmartín ML, Quezada E, Orallo F (2005). "Effect of cis-resveratrol on genes involved in nuclear factor kappa B signaling". *Int. Immunopharmacol.* **5** (2): 393–406. [doi:10.1016/j.intimp.2004.10.006](https://doi.org/10.1016/j.intimp.2004.10.006). [PMID 15652768](https://pubmed.ncbi.nlm.nih.gov/15652768/).
- Chun YJ, Kim MY, Guengerich FP (1999). "Resveratrol is a selective human cytochrome P450 1A1 inhibitor". *Biochem. Biophys. Res. Commun.* **262** (1): 20-4. [doi:10.1006/bbrc.1999.1152](https://doi.org/10.1006/bbrc.1999.1152). [PMID 10448061](https://pubmed.ncbi.nlm.nih.gov/10448061/).
- Benitez DA, Pozo-Guisado E, Alvarez-Barrientos A, Fernandez-Salguero PM, Castellon EA (October 18 2006). "Mechanisms involved in resveratrol-induced apoptosis and cell cycle arrest in prostate cancer-derived cell lines". *Journal of Andrology*. [PMID 17050787](https://pubmed.ncbi.nlm.nih.gov/17050787/).
- Faber AC, Chiles TC (Dec 2006). "Resveratrol induces apoptosis in transformed follicular lymphoma OCI-LY8 cells: Evidence for a novel mechanism involving inhibition of BCL6 signaling". *International Journal of Oncology* **29** (6). [PMID 17088997](https://pubmed.ncbi.nlm.nih.gov/17088997/). [^](#)
- Riles WL, Erickson J, Nayyar S, Atten MJ, Attar BM, Holian O (21 Sep 2006). "Resveratrol engages selective apoptotic signals in gastric adenocarcinoma cells". *World Journal of Gastroenterology* **12** (35). [PMID 17007014](https://pubmed.ncbi.nlm.nih.gov/17007014/). [^](#)
- Sareen D, van Ginkel PR, Takach JC, Mohiuddin A, Darjatmoko SR, Albert DM, Polans AS (September 2006). "Mitochondria as the primary target of resveratrol-induced apoptosis in human retinoblastoma cells". *Investigative Ophthalmology & Visual Science* **47** (9). [PMID 16936077](https://pubmed.ncbi.nlm.nih.gov/16936077/).
- Tang HY, Shih A, Cao HJ, Davis FB, Davis PJ, Lin HY (Aug 2006). "Resveratrol-induced cyclooxygenase-2 facilitates p53-dependent apoptosis in human breast cancer cells" **5** (8). [PMID 16928824](https://pubmed.ncbi.nlm.nih.gov/16928824/).
- Aziz MH, Nihal M, Fu VX, Jarrard DF, Ahmad N (May 2006). "Resveratrol-caused apoptosis of human prostate carcinoma LNCaP cells is mediated via modulation of phosphatidylinositol 3'-kinase/Akt pathway and Bcl-2 family proteins". *Molecular Cancer Therapeutics* **5** (5). [PMID 16731767](https://pubmed.ncbi.nlm.nih.gov/16731767/).
- Cao Y, Fu ZD, Wang F, Liu HY, Han R (2005). "Anti-angiogenic activity of resveratrol, a natural compound from medicinal plants". *Journal of Asian natural products research* **7** (3): 205-13. [doi:10.1080/10286020410001690190](https://doi.org/10.1080/10286020410001690190). [PMID 15621628](https://pubmed.ncbi.nlm.nih.gov/15621628/).
- Hung LM, Chen JK, Huang SS, Lee RS, Su MJ (2000). "Cardioprotective effect of resveratrol, a natural antioxidant derived from grapes". *Cardiovasc. Res.* **47** (3): 549-55. [PMID 10963727](https://pubmed.ncbi.nlm.nih.gov/10963727/).

List of SCI publications

Search PubMed for resveratrol cancer Search
History 1: Search resveratrol cancer : 698 Select from History

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- [1: Inhibit effecton of resveratrol on the growth of Hep-2 cell line](#)
Li Y, Xu Y, Huang D, Jiang L, Li K.
Lin Chung Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. 2007 Dec;21(24):1129-31. Chinese.
PMID: 18330262 [PubMed - in process]
- [2: Resveratrol induces the suppression of tumor-derived CD4\(+\)/CD25\(+\) regulatory T cells.](#)
Yang Y, Paik JH, Cho D, Cho JA, Kim CW.
Int Immunopharmacol. 2008 Apr;8(4):542-7. Epub 2008 Jan 16.
PMID: 18328445 [PubMed - in process]
- [3: Global gene expression profiles induced by phytoestrogens in human breast cancer cells.](#)
Dip R, Lenz S, Antignac JP, Le Bizec B, Gmuender H, Naegeli H.
Endocr Relat Cancer. 2008 Mar;15(1):161-173.
PMID: 18310284 [PubMed - as supplied by publisher]
- [4: Anti-cancer effect of resveratrol is associated with induction of apoptosis via a mitochondrial pathway alignment.](#)
Sun W, Wang W, Kim J, Keng P, Yang S, Zhang H, Liu C, Okunieff P, Zhang L.
Adv Exp Med Biol. 2008;614:179-86.
PMID: 18290328 [PubMed - in process]
- [5: Stilbene analogues affect cell cycle progression and apoptosis independently of each other in an MCF-7 array of clones with different growth characteristics.](#)
Bader Y, Madlener S, Strasser S, Maier S, Saiko P, Stark N, Popescu R, Huber D, Gollinger M, Erker T, Handler N, Szakmary A.
Oncol Rep. 2008 Mar;19(3):801-10.
PMID: 18288419 [PubMed - in process]
- [6: Resveratrol and X rays affect gap junction intercellular communications in human glioblastoma cells.](#)
Leone S, Fiore M, Lauro MG, Pino S, Cometta T, Cozzi R.
Mol Carcinog. 2008 Feb 19; [Epub ahead of print]
PMID: 18286482 [PubMed - as supplied by publisher]

Search PubMed for resveratrol Search
History 2: Search resveratrol : 2186 Select from History

Items 1 - 20 of 2186

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- [1: Intake of purple grape juice as a hepatoprotective agent in wistar rats.](#)
Dani C, Oliboni LS, Pasquali MA, Oliveira MR, Umez FM, Salvador M, Moreira JC, Henriques JA.
J Med Food. 2008 Mar;11(1):127-32.
PMID: 18361748 [PubMed - in process]
- [2: Protective effects of purple grape juice on carbon tetrachloride-induced oxidative stress in brains of adult wistar rats.](#)
Dani C, Pasquali MA, Oliveira MR, Umez FM, Salvador M, Henriques JA, Moreira JC.
J Med Food. 2008 Mar;11(1):55-61.
PMID: 18361738 [PubMed - in process]
- [3: Enhanced anti-proliferative effects of combinatorial treatment of delta-tocopherol and resveratrol in human HMC-1 cells.](#)
Reiter E, Azzi A, Zingg JM.
Biofactors. 2007;30(2):67-77.
PMID: 18356579 [PubMed - in process]
- [4: Female Rats Fed a High Fat Diet Were Associated with Vascular Dysfunction and Cardiac Fibrosis in the Absence of Overt Obesity.](#)
Aubin MC, Lajoie C, Clement R, Gosselin H, Calderone A, Perrault LP.
J Pharmacol Exp Ther. 2008 Mar 20; [Epub ahead of print]
PMID: 18356487 [PubMed - as supplied by publisher]
- [5: Probing the Interaction of Trans-resveratrol with Bovine Serum Albumin: A Fluorescence Quenching Study with Tachiy Model.](#)
Xiao JB, Chen XQ, Jiang XY, Hlczar M, Tachiy M.
J Fluoresc. 2008 Mar 20; [Epub ahead of print]
PMID: 18351302 [PubMed - as supplied by publisher]
- [6: Interaction of stilbene compounds with human and rainbow trout estrogen receptors.](#)
Simmons DB, Trudeau VL, Marlatt VL, Moon TW, Sherry JP, Metcalfe CD.
Environ Toxicol Chem. 2008 Feb;27(2):442-51.
PMID: 18348622 [PubMed - in process]

Content of *trans*-resveratrol (worldwide) in red wines (published results)

Region	Variety	<i>trans</i> -resveratrol (mg/L)
Tuscany	presumably mostly sangiovese	0.3 to 2.1 mg/L (Mozzon, 1996)
Portugal (Alentejo)	Trincadeira, Moreto, Tinta Caiada, Aragonez	0.13 to 2.64 mg/L (Ratola et al., 2004)
USA	Cynthiana	mean of 0,373 mg/L (Threllfall et. Al., 1996)
USA	Noble	Mean of 0.09749 mg/L (Threllfall et. Al., 1996)
Hungary	Oporto	1.2 mg/L (Nikfardjam et Al., 2005)
Hungary	Pinot noir	3.2 mg/L (Nikfardjam et Al., 2005)
Hungary	Shiraz	1.1 mg/L (Nikfardjam et Al., 2005)
Hungary	Portugieser	1.4 mg/L (Nikfardjam et Al., 2005)
Greece	<i>unknown</i>	0.3 – 1.5 mg/L
China	<i>unknown</i>	0.3 – 1.6 mg/L

Content of *trans*-resveratrol in Slovenian red wines (unpublished results)

Analyses were made in 2005 and 2007 after method published by Threlfall et al., 1996.

Region	Variety	<i>trans</i> -resveratrol (mg/L)
Goriška brda	Cabernet sauvignon (2003)	1.62
Goriška brda	Merlot (2004)	2.4
Vipava	Cabernet sauvignon (2002)	1,72
Kras	Teran (2004)	1,8
Štajerska Slovenija	Pinot noir (Blauburgunder)	2,01
Štajerska Slovenija	Modra frankinja (Blaifränkisch)	3.32
Štajerska Slovenija	Modra frankinja (Blaifränkisch)	2.77
Posavje (Bizeljsko)	Modra frankinja (Blaifränkisch)	4.67

Content of *trans*-resveratrol in variety Refosco (unpublished results)

Analyses were made in 2005 and 2007 after method published by Threlfall et al., 1996.

Region	Variety /style/vintage	<i>trans</i> -resveratrol (mg/L)
Slovenska Istra	REFOŠK ~ Refosco , unaged, 2004	1.47
Slovenska Istra	REFOŠK ~ Refosco, unaged, 2004	1.73
Macedonia	REFOŠK ~ Refosco, unaged, 2004	2.66
Goriška brda	REFOŠK ~ Refosco, unaged, 2004	4.04
Slovenska Istra SANTOMAS®	REFOŠK ~ Refosco, aged, 1997	4.6
Slovenska Istra SANTOMAS®	REFOŠK ~ Refosco, aged, 1998	5.27
Slovenska Istra SANTOMAS®	REFOŠK ~ Refosco, aged, 1999	4.93
Slovenska Istra SANTOMAS®	REFOŠK ~ Refosco, aged 2000	2.6
Slovenska Istra SANTOMAS®	REFOŠK ~ Refosco, aged, 2001	4.53
Slovenska Istra SANTOMAS®	REFOŠK ~ Refosco, aged, 2003	2.47

Content of *trans*-resveratrol in variety Refosco (unpublished results)

Region	Variety /style/vintage	<i>trans</i> -resveratrol (mg/L)
Slovenska Istra SANTOMAS [®]	REFOŠK ~ Refosco, unaged, 2005	5.46
Slovenska Istra SANTOMAS [®]	REFOŠK ~ Refosco, aged, 2005	3.86
Slovenska Istra SANTOMAS [®]	REFOŠK ~ Refosco, unaged, 2006	3.86
Slovenska Istra SANTOMAS [®]	REFOŠK ~ Refosco, aged 2006 (barrel sample)	3.29

Nature Health Inspiration

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