References on Suma (*Pfaffia paniculata, glomerata*) from Part 3 of *Fighting Cancer with Plants* from the Rainforest by Leslie Taylor

The published research referenced in the book which is shown below will include the initials HS, IVT, IVA, REV, INS, and NEW. HS refers to research conducted in humans; IVT refers to *in vitro* research conducted inside of test tubes; IVA refers to *in vivo* research conducted in animals; REV refers to a review article that evaluated and summarizes multiple studies on the subject; INS refers to *in silico* research (newer computer modeling including molecular docking studies) and NEW refers new biological testing methods which determine genes and signaling pathways, and molecular pathways of actions which were developed during and after the Human Genome Project discussed in chapter 5.

This research below was last updated in May 2025. To view research published after that time, follow these links to the National Institute of Health's National Library of Medicine:
https://pubmed.ncbi.nlm.nih.gov/?term=Pfaffia+paniculata
https://pubmed.ncbi.nlm.nih.gov/?term=Pfaffia+glomerata

Reviews:

Cotrim Ribeiro, S., et al. "A comprehensive review of *Pfaffia glomerata* botany, ethnopharmacology, phytochemistry, biological activities, and biotechnology." *J. Ethnopharmacol.* 2024 Jun; 328: 118003. (**REV**)
Tang, Z., et al. "Anticancer activity of oleanolic acid and its derivatives: Recent advances in evidence, target profiling and mechanisms of action." *Biomed. Pharmacother.* 2022 Jan; 145: 112397. (**REV**)

Test Tube Studies on Multiple Cancer Cell Types:

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Nakai, S., et al. "Pfaffosides. Part 2. Pfaffosides, nortriterpenoid saponins from *Pfaffia paniculata*." *Phytochemistry*. 1984; 23(8): 1703-05. (**IVT**)

Breast Cancer:

Rahamouz-Haghighi, S., et al. "Antiproliferative assay of suma or Brazilian ginseng (*Hebanthe eriantha*) methanolic extract on HCT116 and 4T1 cancer cell lines, *in vitro* toxicity on *Artemia salina* larvae, and antibacterial activity." *Nat. Prod. Res.* 2024 Jun; 38(11): 1850-1854. (**IVT**)
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Nagamine, M., et al. "Cytotoxic effects of butanolic extract from *Pfaffia paniculata* (Brazilian ginseng) on cultured human breast cancer cell line MCF-7." *Exp. Toxicol. Pathol.* 2009 Jan; 61(1): 75-82. (**IVT**)
Pinello, K., et al. "Effects of *Pfaffia paniculata* (Brazilian ginseng) extract on macrophage activity." *Life Sci.* 2006 Feb; 78(12): 1287-92. (**IVA**)
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Lee, B., et al. "Calenduloside E 6'-methyl ester induces apoptosis in CT-26 mouse colon carcinoma cells and inhibits tumor growth in a CT-26 xenograft animal model." *Oncol. Lett.* 2012 Jul; 4(1): 22-28. (**IVA, IVT**)

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Liver Cancer:

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da Silva, T., et al. "Pfaffosidic fraction from *Hebanthe paniculata* induces cell cycle arrest and caspase-3-induced apoptosis in HEPG2 cells." *Evid. Based Complement. Alternat. Med.* 2015; 2015: 835796. (**IVT, NEW**)

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Carneiro, C., et al. "*Pfaffia paniculata* (Brazilian ginseng) methanolic extract reduces angiogenesis in mice." *Exp. Toxicol. Pathol.* 2007 Aug; 58(6): 427-31. (**IVA**)

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Takemoto, T., et al. "Pfaffic acid, a novel nortriterpene from *Pfaffia paniculata* Kuntze." *Tetrahedron Lett.* 1983; 24(10): 1057-60. (**IVT**)

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Patents:
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Auharek, S., et al. “Evaluation of the testis function of mice exposed in utero and during lactation to *Pfaffia glomerata* (Brazilian ginseng). *Andrologia*. 2019 Sep; 51(8): e13328.
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Return to the Rain-Tree Tropical Plant Database File on Suma