Yunnan Paiyao

Westerners first learned of the Chinese herbal mixture, "Yunnan paiyao", meaning "the white medicine of Yunnan", during the Vietnam War. Members of the U.S. military discovered that prisoners from North Vietnam often carried with them a tiny bottle of this product to take in the event that they were injured and bleeding, either internally or externally.[1] Over the ensuing decades, Yunnan paiyao has grown in popularity among complementary medical practitioners, and even in some conventional medicine practices for its hemostatic and thrombolytic properties.

At first glance, the foil packet of Yunnan paiyao capsules may seem puzzling, because an unidentified little red pill lies at one end. Folklore has it that the North Vietnamese soldiers would take this red "hit pill" when seriously wounded, as in receiving a gun shot wound, and this wound staunch the bleeding, and perhaps save their lives. The *Chinese Herbal Patent Formula* guide contains an equally curious recommendation for the hit pill: "In cases of serious wounds or bleeding, take the single red pill that comes with each bottle first, with wine."[2]

The Chinese doctor Qu Huangzhang developed Yunnan paiyao in the Yunnan province of China in the early 1900's. The Yunnan province is known as "the Kingdom of Fauna and Flora" for its vast supply of plants and animals used in Chinese medicinals. Although the mixture's contents remained a manufacturing secret until fairly recently, over time suspicion grew that its main active ingredient consisted of pseudoginseng root, now called *Panax notoginseng*, notoginseng, "tien chi", or "san qi".[3] Notoginseng is a type of ginseng that offers the highest concentration of hemostatic constituents among all seven major ginseng types.[4] Its origin in Yunnan makes sense because the notoginseng grown there outperforms that grown elsewhere in terms of crop yield and quality.[5] Other substances in Yunnan paiyao formulations vary between manufacturers, and may include myrrh, ox bile, Chinese yam, sweet geranium, lesser galangal root, and possibly other antiseptics or astringent substances in a starch base. No contents of the hit pill specifically appear on the Yunnan paiyao label, although it may contain a concentrated dose of notoginseng.

Researchers confirmed the hemostatic properties of notoginseng by comparing the effectiveness of the externally applied Yunnan paiyao product to pure

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[1] Bergner P. *Panax notoginseng Yunnan bai yao)*: A must for the first aid kit. *Medical Herbalism.* 10-31-94 6(3):12.
[2] Fratkin J. *Chinese Herbal Patent Formulas – A Practical Guide.* Santa Fe: Shya Publications, 1986. P. 133.
[3] Fratkin J. *Chinese Herbal Patent Formulas – A Practical Guide.* Santa Fe: Shya Publications, 1986. P. 133.
[4] Zheng YN et al. Comparative analysis of the anti-haemorrhagic principle in ginseng plants. *Acta Agriculturae Universitatis Jilinesis.* 1989;11(1):24-27, 102. [Article in Chinese].
[5] Jin H, Cui XM, Zhu Y, et al. Effects of meteorological conditions on the quality of radix Notoginseng. *Southwest China Journal of Agricultural Sciences.* 2005;18(6):825-828.

notoginseng, as well as to wheat flour as the placebo.[6] Although unbleached wheat flour provides some hemostatic effects, both Yunnan paiyao and notoginseng significantly shortened bleeding times in comparison to the flour. Yunnan paiyao and notoginseng offered statistically similar hemostatic benefits.

The metaphorical Traditional Chinese Medicine description of how Yunnan paiyao works states that the mixture "stops bleeding, disperses stagnant blood, tonifies and invigorates blood, stops pain."[7] Those awaiting a scientific explanation may find themselves frustrated by the scarcity of detailed information on the mechanisms of action. That is, despite the widespread adoption of this product as a hemostatic agent, its mechanisms remain largely a mystery.

Notoginseng contains several pharmacologically active agents, but the total saponins of panax notoginseng (TPNS) appear to be the main active substances.[8] TPNS comprise a mixture of chemicals known as ginsenosides and notoginsenosides. One ginsenoside known as "Rg1" acts as a potent phytoestrogen and activates estrogen receptors at low concentrations.[9] That is, while most phytoestrogens require micromolar concentrations, Rg1 acts in the picomolar range.

Another study showed that notoginseng reduces circulating levels of fibrinogen.[10]

Evidence supporting the use of Yunnan paiyao in veterinary patients is similarly slim. One randomized, controlled trial reported in 2004 studied the effects of Yunnan paiyao, another herbal hemostatic product called "Single Immortal", and placebo on reducing the severity of exercise-induced pulmonary hemorrhage (EIPH) in horses.[11] Although each herbal preparation was administered to horses at widely recommended dosing regimens, neither product affected the severity of EIPH or any other coagulation variables.

The dosage often suggested for medium- to large-sized dogs is one capsule once daily, or twice for more serious bleeding conditions. Some apply the herbal mixture directly to open wounds pouring the powder into the bleeding site and then bandaging the area.

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[6] Fan C, Song J, and White CM. A comparison of the hemostatic effects of notoginseng and Yun Nan Bai Yao to placebo control. *Journal of Herbal Pharmacotherapy.* 2005;5(2):1-5.

[7] Fratkin J. *Chinese Herbal Patent Formulas – A Practical Guide.* Santa Fe: Shya Publications, 1986. P. 133.

[8] Liu Y, Xie M-X, Kang J, et al. Studies on the interaction of total saponins of panax notoginseng and human serum albumin by Fourier transform infrared spectroscopy. *Spectrochimica Acta.* Part A. 2003;59:2747-2758.

[9] Chan RYK, Chen W-F, Dong A, et al. Estrogen-like activity of ginsenoside Rg1 derived from *Panax notoginseng. Journal of Clinical Endocrinology and Metabolism.* 2002;87(8):3691-3695.

[10] Cicero AFG, Vitale G, Savino G, et al. *Panax notoginseng* (Burk.) effects on fibrinogen and lipid plasma level in rats fed on a high-fat diet. *Phytotherapy Reearch.* 2003;17:174-178.

[11] Epp TS, McDonough P, Padilla DJ, et al. The effect of herbal supplementation on the severity of exercise-induced pulmonary haemorrhage. *Equine and Comparative Exercise Physiology.* 2004;2(1):17-25.

Veterinarians and their clients most frequently consider administering yunnan paiyao orally and presurgically to prevent excessive blood loss intraoperatively, or long-term to control bleeding in animals with hemangiosarcoma or adenocarcinoma involving the nasal region.

Additional indications in the future may arise for cancer treatment due to the cytotoxic effects of notoginseng[12] as well as its capacity to specifically sensitize tumor cells to ionizing radiation.[13]

Most references list pregnancy as the only contraindication to yunnan paiyao, and this refers only to ingestion.

As far as potential risks, one study found that high doses of notoginseng have been found to be toxic to bone marrow stem cells.[14] To be certain, the usual drawbacks to Chinese herbal products apply – lack of quality control, manufacturing regulations, and standardization.

The purity, and thus the safety, of Chinese herbs have been questioned in numerous reports. Evidence of contamination with heavy metals, mycotoxins, microbial agents, and pesticide residues has appeared several times in the scientific literature.[15] Intentional adulteration with pharmaceutical agents continues to be of concern. As the demand for Chinese herbs mounts, suppliers in China have moved from harvesting wild herbs to growing their own. Careful, pesticide-free cultivation techniques have given way to widespread reliance on high levels of pesticides.[16] Bans imposed on dangerous pesticides in Western countries do not apply to China. Organochlorine pesticide residues in Chinese herbs remain a "core safety concern", and notoginseng has been found to occasionally contain DDT and its derivatives.[17] At times, the U.S. Food and Drug Administration has screened and then restricted importation of herbs that contain unacceptably high levels of pesticide residues.[18]

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[12] Chung VQ, Tattersall M, and Cheung HTA. Interactions of a herbal combination that inhibits growth of prostate cancer cells. *Cancer Chemotherapy and Pharmcology.* 2004;53:384-390.
[13] Chen FD, Wu MC, Wang HE, et al. Sensitization of a tumor, but not normal tissue, to the cytotoxic effect of ionizing radiation using Panax notoginseng extract. *American Journal of Chinese Medicine.* 2001;29(3/4): 517-524.
[14] Chen FD, Wu MC, Wang HE, et al. Sensitization of a tumor, but not normal tissue, to the cytotoxic effect of ionizing radiation using Panax notoginseng extract. *American Journal of Chinese Medicine.* 2001;29(3/4): 517-524.
[15] Leung KS-Y, Chan K, Chan C-L, et al. Systematic evaluation of organochlorine pesticide residues in Chinese materia medica. *Phytotherapy Research.* 2005;19:514-518.
[16] Leung KS-Y, Chan K, Chan C-L, et al. Systematic evaluation of organochlorine pesticide residues in Chinese materia medica. *Phytotherapy Research.* 2005;19:514-518.
[17] Leung KS-Y, Chan K, Chan C-L, et al. Systematic evaluation of organochlorine pesticide residues in Chinese materia medica. *Phytotherapy Research.* 2005;19:514-518.
[18] Leung KS-Y, Chan K, Chan C-L, et al. Systematic evaluation of organochlorine pesticide residues in Chinese materia medica. *Phytotherapy Research.* 2005;19:514-518.

In summary, as is so often the case for Chinese herbs, while Yunnan paiyao appears to offer demonstrable value, at this time its anecdotal acclaim outweighs the evidence, and unknowns regarding dosage, purity, and long-term benefits or risks persist.