Toxicity and clinical reasonable application of Taoren (Semen Persicae) based on ancient and modern literature research

Shengyan Xi, Linchao Qian, Haiying Tong, Lifeng Yue, Hui Zhao, Dawei Wang, Dawei Lu, Pengcheng Li, Xinrong Wang

Shengyan Xi, Linchao Qian, Dawei Lu, Pengcheng Li, Xinrong Wang, Department of Traditional Chinese Medicine of Medical College of Xiamen University, Xiamen, Fujian 361005, China
Haiying Tong, Lifeng Yue, Beijing University of Chinese Medicine, Beijing 100029, China
Hui Zhao, China Academy of Chinese Medical Sciences, Beijing 100700, China
Dawei Wang, Beijing Tibetan Hospital of China Tibetology Research Center, Beijing 100029, China

Supported by the National Natural Science Foundation of China (No. 81202659); Scientific Research Start Foundation for New Teacher of Xiamen University (ZK1014); Building Project of English Curriculum-Chinese Materia Medica of Xiamen University (X13200)

Correspondence to: Prof. Linchao Qian, Department of Traditional Chinese Medicine of Medical College of Xiamen University, Xiamen, Fujian 361005, China. lcqian@xmu.edu.cn
Telephone: +86-592-2183069
Accepted: September 14, 2012

Abstract

OBJECTIVE: To probe the toxicity and relative application theory of the commonly-used traditional Chinese herbal drug Taoren (Semen Persicae), and set up a correct attitude and principle and method to use Taoren (Semen Persicae) for treating the syndrome of stagnation of blood stasis and others in TCM clinic.

METHODS: In this study, we analyzed and probed the ancient and modern literature research about Taoren (Semen Persicae), and summarized the realization of its toxicity and application contraindications in ancient herbals and the research assertion of its processing, drug-nature, pharmacologic actions, adverse reaction, and clinical reasonable application in modern literature.

RESULTS: We found that some TCM doctors were worried about the effect of Taoren (Semen Persicae)'s disintegrating blood stasis to impair body's healthy Qi and its toxicity, and were not good at using this herb. And some patients were afraid of its toxic and side-effect not to take it. In the ancient and modern literatures some proper hates of Taoren (Semen Persicae) existed, and the toxicity component was also clear-cut, and the applications of Taoren (Semen Persicae) were in many fields especially the gynecological and traumatological diseases. The key root of toxicity generation and unreasonable application of Taoren (Semen Persicae) lies in taking without syndrome differentiation or using with overdosage.

CONCLUSION: Under the precondition of correct processing, treatment based on syndrome differentiation, and taking the dosage stipulated by laws to apply Taoren (Semen Persicae) should be quite safe. The ancient and modern literature records and researches about Taoren (Semen Persicae) provide the determinate reference for understanding Taoren (Semen Persicae)'s efficacy and drug-nature (toxicity) more objectively and also for further correctly clinic recognition and research on Taoren (Semen Persicae).

Key words: Semen Persicae; Drug toxicity; Pharmacologic actions; Blood stasis
INTRODUCTION

Taoren (Semen Persicae), the fruit-kernel of peach, is one of Traditional Chinese Medicines commonly-used to boost blood circulation in terms of TCM. Its medicament portions are the dry mature seeds of the rose Prunus persica (L.) BATSCH or Prunus davidiana (CARR.) Franch. Taoren (Semen Persicae) has the neutral drug-nature and bitter and sweet flavour, pertains to heart, liver and large intestine meridian, and has the effect on activating blood removing stasis and loosening bowel to relieve constipation, and is used for menischesis, dysmenorrhea, uterine and abdominal mass, injury from falling down, dryness of the intestine for dryness of the intestine, which were recorded in Pharmacopoeia of the People’s Republic of China (I) (abbreviated below as Pharmacopoeia). The therapeutic effects on treating many kinds of clinic diseases caused by stagnation of blood stasis with Taoren (Semen Persicae) are fairly certain. For example, 50 Chinese patent medicine preparations in National Essential Drugs: Chinese Patent Medicine, and 47 preparations in Pharmacopoeia of the People’s Republic of China: Clinical Medication Information contain Taoren (Semen Persicae). Furthermore, the literatures of various kinds of pharmaco-researches and clinical applications with Taoren (Semen Persicae) are more than can be listed. The Pharmacopoeia that stipulated by laws does not specify that Taoren (Semen Persicae) has toxicity, but both the planning textbook of national high traditional Chinese Medical Schools Chinese Materia Medica (2nd edition) and the authoritative writings China Herbals well define that Taoren (Semen Persicae) is slightly poisonous. And there was the clinic poisoning case report after taking Taoren (Semen Persicae) orally. So, a certain dispute still exists about whether toxicity exists or not during the long-term application of Taoren (Semen Persicae) in clinical dosage range stipulated by laws. For the past few years, people had much misgiving to the safety of Taoren (Semen Persicae) and its Chinese patent medicine preparations, and were afraid of the toxic and side-effect caused by the Taoren (Semen Persicae)’s active component amygdalin decomposed the poisonous substance Hydrocyanic Acid (HCN) under the multiple enzymes, which hindered the extensive progress on clinical reasonable application of Taoren (Semen Persicae). Unfortunately, the research reports about its reasonable application are not more systematic and insufficient. In view of this, we make some discussion and expounding about the Taoren (Semen Persicae)’s toxicity and clinic application based on the ancient and modern literature, and wish to provide a certain consultation and answer to how to recognize Taoren (Semen Persicae)’s drug-nature and effect correctly.

EXPONDING OF SEMEN PERSICAЕ’S TOXICITY BASED ON ANCIENT LITERATURE

To whether Taoren (Semen Persicae) has the toxicity or not, the overwhelming majority of medical scientist and herbalogists in past dynasties thought it was nonpoisonous. For example, the author of Ming Yi Bie Lu clearly points out that “Taoren (Semen Persicae) has the sweet flavour and no toxic nature, and can relieve cough with dyspnea, remove mass in the epigastrium, eliminate hemorrhage caused by sudden and violent strike, drastically remove obstruction in the intestine and uterine mass, regulates menstruation, relieves pain.” The author of Ben Cao Jing also writes “Taoren (Semen Persicae) receives the earth Qi and celestial Qi to grow, so it has heavy flavour with subtle sweet, calm drug-nature without toxicity.” Moreover, both the authors of Xin Yin Gan Zhu Jing and Qian Jin Shi Zhi point out the drug-nature of Taoren (Semen Persicae) has “bitter-sweet-pungent flavour and cold nature.” And Ben Cao Bian Du records that “Taoren (Semen Persicae) has bitter and sweet flavor and its drug-nature is calm and moistening.” Yao Pin Hua Yi records that “Taoren (Semen Persicae), clears blood-heat by its bitter flavor, and moistens dryness of the intestine by its moist drug-nature. It is used more if leviaged with fruit-kernel peel, which by means of its red color and pertaining to liver meridian, can remove blood-retention and regulate menstruation, relieve all over body pain and numb of limbs, hemiparalysis and pediaigia by its function of relieving rigidity of channels and activating blood, removing blood stasis for promoting tissue regeneration. It is used fewer if pounded with decoctation, and by means of its pure white color and pertaining to large intestine meridian, it can treat constipation for blood exhaustion or dryness by its function of cooling blood and harmonizing blood with its soft moist nature, and resolving mass and stasis.” Shen Nong Ben Cao Jing shows “Taoren (Semen Persicae) has bitter flavor and calm nature and can mainly cure blood stasis, abdominal mass, expel pathogens and intestinal parasites.” The author of Ben Jing Feng Yuan writes “Taoren (Semen Persicae) is the exclusive drug for treating stagnated blood by its bitter nature and generating new blood by its sweet nature.” It is thus clear that there is no literature pointing out that Taoren (Semen Persicae) is toxic in so many ancient herbals. In modern writings, there also exists the viewpoint that Taoren (Semen Persicae) is nonvenomous as in the book New Compilation of Chinese Materia Medica Dictionary, but analogous viewpoint is not many. Nevertheless, Taoren (Semen Persicae) in Shen Nong Ben Cao Jing is classified as a low grade drug, and Shizhen Li, the famous medical expert in Ming Dynasty, the author of Ben Cao Gang Mu, thinks that “Taoren (Semen Persicae) with double kernels is toxic and cannot be eaten.” In Leng Lu Yi Hua it points out that “Taoren (Semen Persicae) is easily resulted in fullness.” Wu Zhong
Yao Xing records that "only the person with deficiency of blood cannot use Taoren (Semen Persicae)." It is emphasized in Ben Cao Zheng that "the patient with amenorrhea due to severe anemia must not be abused." The author of Yi Xue Ru Men: Ben Cao thought that "the person with blood dryness and deficiency should be cautious when using Taoren (Semen Persicae)." Yao Long Xiao Pin records that "if Taoren (Semen Persicae) was used not for stagnant blood syndrome, it may cause the injury of Yin Qi." Yao Xing Qie Yong records that "Taoren (Semen Persicae) pertains to Jue Yin meridian, and can regulate menstruation and drastically remove blood stasis, moisten dryness for smoothing bowl, so the person with diarrhea should avoid using it." In Ben Cao Jing Shu it points out that "Taoren (Semen Persicae) is good at disintegrating blood stasis. If overusing or using without correct methods, it can cause hematoczea without end, and injury of genuine Yin. So menischesis due to blood exhaustion but not stasis, postpartum abdominal pain due to blood-deficiency but not stagnant blood and agglomeration, constipation due to deficiency of body fluid but not blood-dryness, should prohibit using it." Yao Jian records that "a large dosage of Taoren (Semen Persicae) is used for expelling blood stasis to relieve pain; small dosage is for generating new blood to regulate menstruation, which is forbidden to pregnant woman." Ben Cao Bi Yong also has the same viewpoint that "if not use accurately, Taoren (Semen Persicae) will damage Yin blood. Pregnant woman and the person without blood stasis should avoid taking it." And the writing Ben Cao Qiu Zhen explained the reason "Taoren (Semen Persicae) has heavy bitter and subtle sweet flavor, and thin Qi and thick flavor, and the drug-nature of sinking and descending, so its effects are more purgative and less tonic, and dissipating without astringing. It must not be incautious." From the above-mentioned ancient medical books and records, we know that Taoren (Semen Persicae)'s part toxic and side-effects and adverse reactions are observed in ancient clinical practice, and some notable incompatibilities in its clinical application certainly exist. If talking about its toxicity, it may be related to overdosage or application without accurate differentiating zheng. So Taoren (Semen Persicae)'s precautions for use in many modern herbal writings are regarded as "the patients without stasis and the pregnant women are prohibited to use it, taking it with overdose orally may cause poisoning, which manifests the syndromes of dizziness and nausea, spiritlessness, weakness and acratia when poisoned lightly, or even death for respiratory paralysis when poisoned severely." Therefore, on account of safety, since the toxicity of Taoren (Semen Persicae) was little mentioned when expounded its drug-nature by ancient medical experts, but now, about its drug-nature in the high colleges or universities' planning textbook Chinese Materia Medica is noted as "slightly poisonous" and in Materia Medica of Toxic Herbs written by Cangliang Yang is noted as "poisonous", aims at outstandingly emphasize the hazard induced by improper usage. These notions are worthy of affirmation.

EXPOUNDERING OF SEMEN PERSICAE'S APPLICATION AND CONTRAINDICATION BASED ON ANCIENT MEDICAL LITERATURE

Application with differentiation of syndrome

Taoren (Semen Persicae), besides that it has the effects of removing blood stasis and moistening intestine, and for its bitter flavor and purgative and descending nature, can pertain to lung meridian, and "relieve cough with dyspnea"(Ming Yi Bie Lu). So it often combines dissipating phlegm and relieving cough and asthma herbs to treat cough and asthma caused by lung Qi upward reversal. The major indications of Taoren (Semen Persicae) are menischesis, dysmenorrhea, menoxenia, postpartum abdominal pain, abdominal mass and accumulations caused by stagnation of blood stasis, injury from fall, constipation caused by blood-deficiency and depletion of fluid and dryness of the intestine, lung abscess or intestinal abscess caused by stagnant and jarring toxic heat and so on; patients with the modern clinical medicine diagnostic menorrhagia, postpartum abdominal pain, hepatic cirrhosis, acute and chronic sprain, or sore pain for trauma that belong to syndrome of stagnation of blood stasis, constipation that belongs to syndrome of blood-deficiency and depletion of fluid or phlegm-heat accumulated in interior, pneumonia and intestinal obstruction that belong to syndrome of stagnant and jarring dampness toxic heat, or bronchial asthma that belongs to syndrome of lung Qi upward reversal, can choose it based on differentiating Zheng. Ben Cao Gang Mu records that "Taoren (Semen Persicae) has four effects: first, is to treat the syndrome of heat invading blood chamber, second, is to disperse stagnant blood in abdominal cavity, third is to relieve dryness and itching of skin for blood-heat, and fourth is to activate the aggregated blood of skin." The author of Ben Cao Bian Du writes "Taoren (Semen Persicae) pertains exclusively to liver meridian, and also pertains to lung and large intestine meridian in some degree. It can disintegrate blood stasis and moisturize dryness. It can expel intestinal parasites for parasites generating due to blood wrapped, and expel wind for calming endogenous wind under the activating of blood. As for being used for treating the hepatic malaria, pulmonary tuberculosis pain and so on, that is the syndrome of hemodene in liver meridian obviously. It is always levigated with reservation of peel and tip to play dispersing effect and with absicising of peel and tip to play descending effect." So we know that Taoren (Semen Persicae) has an indirect action on dispelling pathogenic wind, destroying parasites and scattering hepatic malaria. Ben Cao Sheng Ya Ban Ji records that "Peach, the fruit effects on lung, the essence is in its kernel; it
can regulate lung Qi and nutrient-blood, and activate the stasis and stay the movement. So, there is the application that Taoren (Semen Persicae) burned to ash and mixed with wine to take can relieve metrorrhagia and metrostaxis in Qian Jin Yao Fang.” It shows that in ancient times, there existed the experience of using Taoren (Semen Persicae) to treat uterine bleeding. With regard to the efficacy characteristics of Taoren (Semen Persicae), there are more detailed records in Wu Zhong Yao Xing, such as "it fits for the syndrome of dryness and itching of skin and blood-heat accumulation, can dissipate blood stasis to promote tissue regeneration for regulating liver Qi, destroy blood-retention caused by heat invading blood chamber, treat the syndrome of blood dryness and blockage for hemonode in large intestine, can remove dying blood or blood swelling caused by injury, and regulate menstruation and relieve cough and bloody flux.” The author of Yi Zong Bi Du writes the same viewpoints that “Taoren (Semen Persicae) drastically removes all meridians’ blood stasis, moisturizes blood dryness in large intestine, eliminates dry-itching and clotting in muscle, clears the heat invading blood chamber, and reduces delirium.” Judging from these viewpoints, Taoren (Semen Persicae) can also be used for treating heat diseases. Ziwen Qin, the famous physician of later Qing Dynasty, thought that Taoren (Semen Persicae) could be used as a channel ushering drug for the excess syndrome of liver and large intestine meridian in the part “Medication knack about channel ushering according to the excess and deficiency, cold and heat” of Ling Long Yi Jian.” But in the actual clinical practice, Taoren (Semen Persicae) is often combined with other herbs as formulas to use, which the more all round summarization in Ben Cao Si Bian Lu is that Taoren (Semen Persicae) is considered as a drug for liver meridian for the kernel mainly treating the stagnated blood syndrome, so there are the formulas Taohechienqiang Tang, Didang Tang and Didang Wan for lower abdomen disease, Biejiajian Wan for costal region disease, Dahuangmudan Tang for large intestine disease, Guizhifuling Wan for abdominal mass and obstruction, and Xiayuxue Tang for navel disease. Taoren (Semen Persicae) is also considered as a fruit for lung meridian for dispersing the stasis in muscular striae, so Dahuanghechong Wan can treat the diseases of squamous and dry skin, Qianjinweijing Tang can treat the diseases of blood stasis in thorax cavity, and Guizhihonghua Tang plus Haigeqiao (Concha Meretricii) and Taoren (Taoren (Semen Persicae)) can treat the diseases of blood knotted chest of woman, which the application of Taoren (Semen Persicae) is overall.” And today’s clinic of TCM gynecology, Taoren (Semen Persicae) is always combined with Honghua (Flo Carthami) based on mutual promotion, which matches Danggui (Radix Angelicae Sinensis), Chishao (Radix Paeoniae Rubra) and Chuanxiong (Rhizoma Chuanxiong) and so on, to treat the menischesis and menorraghia caused by interior stagnant blood, like the Taohongsiwu Tang in Yi Zong Jin Jian. It is thus evident that the most commonly-used syndrome of Taoren (Semen Persicae) is the syndrome of stagnant blockage of blood for its nature of invading xuefen.

**Application contraindication**
Clinical reasonable application of Taoren (Semen Persicae) should know its contraindication besides following the indications, considering the dosage and avoiding the toxicity. First, it should distinguish whether the patients have the syndrome of Qi deficiency and insufficiency of blood or not, if they have, Taoren (Semen Persicae) must be prohibited. Early in Ben Cao Hui Jian, there is an argument that "Taoren (Semen Persicae) can purge the stasis for its bitter flavor, resolve masses for its pungent flavor and promote regeneration for its sweet flavor. So it is always used for drastically removing blood stasis, because that the blood is the concreteness substance and keeps circumference all over the body, if which is coagulated and stagnant, it may form the hemonode, hematic constipation, blood-dryness, blood stasis, blood-retention, hematic pain, and hematic abdominal mass, etc., which will be unblocked if treated by Taoren (Semen Persicae).” So today’s TCM physicians often summarize it as that contraindication of Taoren (Semen Persicae) is the disadvantage of impairing Qi and consuming blood, and which can not be overused. Therefore, if Taoren (Semen Persicae) isn’t based on syndrome differentiation to apply and is to purge blood too much, it will cause the damaging of Yin blood because it is good at disintegrating and eliminating stasis to activate blood circulation. Just as the discussion in Ben Cao Yue Yan, ”Taoren (Semen Persicae) has more bitter than sweet flavor; its key effect is to disintegrate blood stasis. But if used for treating the syndrome of blood blockage and hemonode, the excess and deficiency should be differentiated. If the syndrome belongs to excess, Taoren (Semen Persicae) may be used suitably. If Taoren (Semen Persicae) is used in the formulas for nourishing and tonifying blood, the trouble of blood blockage and hemonode will be no worry about for its soft moistening nature.” Thus the patients, with body asthenia accompanied Qi and blood deficiency, lack of fluid, and the manifestation of tongue and pulse without the sign of stagnation of Qi and blood stasis, are not suitable to apply Taoren (Semen Persicae). Specifically speaking, patients with hysomenorrhea, amenorrhea or dysmenorrhea due to blood-deficiency, or postpartum abdominal pain, epigastrium and abdomen pain caused by inaccurate postnatal nursing and Qi and blood deficiency, also should be prohibited using this herb. The author of Feng Shi Jin Nang Mi Lu writes "Taoren (Semen Persicae) has the same effect with Xingren (Semen Pruni Armeniacae) on moisturizing large intestine, but Semen Pruni Armeniacae is used for Qi stagnant constipation, Taoren (Semen Persicae) is used for hematic constipation. Although it can remove stasis for its bitter flavor and regenerate
new tissue for sweet flavor, whatever Taoren (Semen Persicae) has the more effect on disintegrating blood stasis and little effect on tonifying blood, and is prone to act on xuefen and has moist drug-nature, and has very good effect on treating fluid-consuming constipation if matched with Maren (Fructus Cannabis) and Danggui (Radix Angelicae Sinensis).” For this reason, patients with constipation and difficulty in defecation due to blood deficiency and depletion of fluid should be cautious to use Taoren (Semen Persicae). Second, it should distinguish whether the patients have the syndrome of spleen deficiency, loose stool and diarrhea or not, if they have, Taoren (Semen Persicae) must be cautious to use. Taoren (Semen Persicae) has the sweet and moist nature and the purgation effect for its bitter flavor, and contains rich fatty oil, and can unblock stasis and dissipate mass, and loosen bowel to relieve constipation. So herbs in past dynasties considered it had the characteristics of “dissipation without astringing and purgation without tonifying” (Ben Cao Jing Shu), the patients with easy diarrhea or loose stool, and frequent poor appetite and abdominal distention due to spleen deficiency and disorder in transportation and transformation, should be cautious to choose this herb. If using, it should be matched with spleen-strengthening and Qi-reinforcing herbs in order to avoid false purgation damaging spleen. Moreover, Taoren (Semen Persicae) is a key herb to activate blood and remove stasis, and fiercely eliminates blood stasis, and has a “bringing the new through the old” function to whatever blood stagnation and hemonode, new or long stagnated blood, so there is a doctrine like “the herb can substitute a knife” for Taoren (Semen Persicae)’s function of drastically removing blood stasis and eliminating accumulations. And accordingly, pregnant woman must not take it for the harm of its probable induced abortion action.

EXPOUNDING OF SEMEN PERSICAE’S APPLICATION BASED ON MODERN BASIS AND CLINIC

Semen Persicae’s processing application
It must be clear-cut that how to apply the different processed Taoren (Semen Persicae) based on syndrome differentiation. During the research of Lü et al.,13 the effects of 5 processed samples of Taoren (Semen Persicae) (recens, stir-frying, steaming, etc.) on anticoagulation blood, anti-thrombus, anti-inflammation, and aperiative action in mice were studied. And the results showed that the pharmacological action of unprocessed Taoren (Semen Persicae) and its cover were stronger than other processed samples. The result provides basis for the reasonable use of the processed samples. Jin et al.14 thought that Taoren (Semen Persicae) should be used as recens samples, and in order to ensure the effect on activating blood and removing stasis, and Taoren (Semen Persicae) was not suitable and not necessary to be processed with heat by different methods. After the research of Taoren (Semen Persicae), Lü et al.15 pointed out that the original intention of Taoren (Semen Persicae)’s processing was in order to profit cleansing and preparation in ancient times; and it seemed to be that ancient people had a psychological response of dysplastic type dread to food according to the viewpoint of “not taking Taoren (Semen Persicae) with double kernels”, which was no scientific evidence. Therefore, we should clear up the above-mentioned argument that “Taoren (Semen Persicae) with double kernels is toxic and cannot be eaten” in Ben Cao Gang Mu, and take the accurate attitude to equitably recognize and apply Taoren (Semen Persicae) with double kernels and Taoren (Semen Persicae) with one kernel.

Semen Persicae’s drug-nature
There is some new discoveries to the modern research of Taoren (Semen Persicae)’s “calm” drug-nature. After the systemic comparison and analysis to the materia medica literatures about the nature and flavor, efficacy and indication of Taoren (Semen Persicae) in past dynasties, Li et al.16 thinks that the drug-nature of Taoren (Semen Persicae) is not warm, cold or calm, but cool. So the record that “Taoren (Semen Persicae) was used for blood clotting and clearing the blood-heat” in Tang Ye Ben Cao is quite reasonable. And another research shows that the calm nature Taoren (Semen Persicae) manifests the action characteristics that is similar to the cold nature Yimucao (Herba Leonuri Japonici) when affects on model rats with syndrome of intermingled blood stasis and heat; and manifests the action characteristics that is similar to the warm nature Chuanxiong (Rhizoma Chanxiong) when affects on model rats with syndrome of blood stasis due to coagulated cold, which preliminarily testifies the calm nature Taoren (Semen Persicae) has bilateral applicable drug-nature. Consequently, it is reasonable that most ancient and modern medical experts speak that the drug-nature of Taoren (Semen Persicae) is calm. It should be used as calm nature herb really.

Clinic observation and application experience of Semen Persicae
We know that medication experience needs to be imparted and inherited. The summary to the characteristic and regularity of applying Taoren (Semen Persicae) is quite urgent. In clinic, doctors use amygdalin injection (the active component of Taoren (Semen Persicae)) to treat the patients with hepatic fibrosis due to blood fluke, and find that the symptom like acratia and indexes of physical strength and weight, hemoglobin, erythrocytes, platelets and serumulins are better or improved, and the size of swelling in left lobe of liver decreases obviously,17 which shows that single-use Taoren (Semen Persicae) has a certain hepatoprotection effect. But Jiang et al.18 thought that Taoren (Semen Persicae) warrants more research.
has a pure drug-nature and is extensively applied in preparations of activating blood circulation to dissipate blood stasis, which matches activating blood herbs will promote blood circulation, matches herbs of drastically removing blood stasis will destroy stasis; if single-used, the efficacy is limited, so it is seldom as a principal drug to apply. As a result, it is known that Taoren (Semen Persicae) always matches Honghua (Flos Carthami), or Dahuang (Radix et Rhizoma Rhei Palmati), or Danggui (Radix Angelicae Sinensis), or Mudanpi (Cortex Moutan Radi̇cs) as "couplet medicines" in clinic. And Taoren (Semen Persicae) or formulas contained Taoren (Semen Persicae) are newly used for treating angioneurotic headache, hypertension, coronary heart disease, nonage ecchymosis, phlegm with blood, etc. About the symptoms of which are cough without smoothing, stethalgia stagnation, and blockage of blood and meridian, symptoms of which are cough without smoothing, stethalgia involving back, and phlegm with blood, etc. About the material basis and mechanism of Taoren (Semen Persicae) treating gastric cancer, some studies show that it can lower blood viscosity, increase blood state, regulation of disbalanced immune system and possibly lied in the improvement of abnormal immune state, then becomes palsy and die.19 The above findings are in line with the theory recognition that "Taoren (Semen Persicae)'s effect focuses on removing stagnated blood and is considered as a drug for liver meridian disease" in Ben Cao Si Bian Lu and "Taoren (Semen Persicae) can disperse stagnated liver Qi" in Ben Cao Chong Yuan. In recent years, other researches show that Taoren (Semen Persicae) could restrain scar's forming through the multistrata target points of improving the microcirculation in cicatrix, controlling correlation factors and eliminating free radicals,21 and lower the excess phosphorylation of tau protein caused by D-galactose that had the effect on protecting Alzheimer disease,22 and certainly protect the brain to avoid injury for focal cerebral ischemia in rat and acute hypoxia in mice,23 and ameliorate renal pathology of unilateral ureteral occlusion model, decrease the tamm-horsfall protein N-acetyl-β-D-glucosaminidase and protect renal tubule function whose mechanism was possibly related with the inhibition to nuclear factor-kappa B (NF-kB) and tumor necrosis factor-α (TNF-α) by it, and then delay the occurrence of renal interstitial fibrosis of obstructive nephropathy.24 So many pharmacologic discoveries not only clarify the multiple mechanisms of Taoren (Semen Persicae), but also provide scientific evidences to help ancient or modern medical experts know it, and meanwhile, expand its clinical application scope.

Semen Persicae's toxicity and adverse reaction

To identify the toxicity components and their deep inducing-poison mechanisms is very important to reasonable application of Taoren (Semen Persicae). Some scholars find by experimental analysis that extracting solution of both Taoren (Semen Persicae) and Kuxingren (Semen Armeniacae Amarum) has a certain toxic effect, the former of which is comparatively slight. There is the serious anaphylaxis with syndrome of dyspnea, hypoxia, and convulsion, or even death at 14th and 21st day in its high dose (3%) group of guinea pig, but there is no toxic effect in safe dose.27 The studies indicate that the generating of toxicity of Taoren (Semen Persicae) is mainly that overdose amygdalin is decomposed with HCN, which makes the tissue not use oxygen and induces cell suffocation; but the central nervous system especially the respiratory center is hypersensitive to cell hypoxia, which changes to the inhibited state from the excited state, then becomes palsy and die.28 However, Peach seeds protein [purified from Taoren (Semen Persicae)] was testified with no acute or long-term toxicity through the single and repetitive dose toxicity test by animal intraperitoneal injection.29 From animal experiments, Liu et al.30 found that Taoren (Semen Persicae) had the teratogenic effect, but its mixtures did not. In a word, if applying Taoren (Semen Persicae) with large dose the adverse reaction exist affirmatively. So we...
should use it in clinical prescriptions with 4.5-9.0 g that stipulated by laws in Pharmacopoeia, and choose correct processing and decoctum methods in order to increase efficiency and decrease toxicity. For activating blood to remove stasis, Taoren (Semen Persicae) can be pounded to pieces and used as recens sample with a long time decoction. For loosening bowel to relieve constipation, it should be decocted as recens sample with a long time decoction. For relieving cough and asthma, it should be decocted in water for oral dose but decocted later in order to avoid destruction to the active component amygdalin and kill emulsin to protect amygdalin. If we choose Taoren (Semen Persicae) frost-like powder in decoctions, it should be decocted in wrapped condition. And it should be used by matching as far as possible other herbs to eliminate untoward reaction.

CONCLUSION

In a word, Taoren (Semen Persicae) as a representative herb for invigorating blood circulation and eliminating stasis, after thousands years’ clinical application and observation, its therapeutic effects are indeed certain, and its pharmaco-activity is positive. It is also made into more than 50 kinds of Chinese patent medicines and preparations with extensive compatibility, which enrich with today’s TCM clinic. The toxic components of Taoren (Semen Persicae) are clear-cut, and its toxicity is related closely with the methods of medication. The toxicity is the most when it is decocted with overdosage for oral taking, and there is commonly no toxicity when used as the other application methods. So it is safe when taken it orally under the condition of accurate syndrome differentiation and reasonable dosage. From the comparison between the ancient and modern literatures, we easily find that clinical studies of Taoren (Semen Persicae) are not enough and the systematic evaluations and reports about it have not yet been seen. Since there are some discoveries in its pharmacologic researches, but there is no clarification of its deep and systematic mechanism, especially the material basis and mechanism on its efficacy of activating blood circulation to dissipate blood stasis, such as what are its molecular mechanisms of anticoagulating blood, inducing platelet aggregation, or improving hemodynamics? Whose substance in Taoren (Semen Persicae) does play the efficacy? This kind of problems still need to be further cleared and the results will have an important theory meaning to clarify the connotations of Taoren (Semen Persicae) treating the syndrome of stagnation of blood stasis. In the future, the research on quality control of Taoren (Semen Persicae) is worth investing, which will benefit to stabilize the efficacy of its materia medica and to grasp its accurate prescription dose in clinic. Only like this, medication of Taoren (Semen Persicae) can be exact and appropriate. And with regard to its drug-nature, there are still some dissensions and is deserved to study and research vigorously. We believe that the drug-nature and mechanisms of Taoren (Semen Persicae) will be interpreted all round with the thorough development of TCM clinic and modernization research of Chinese materia medica and will bring benefit to clinic eventually.

ACKNOWLEDGEMENTS

We would like to thank Prof. Xi Huang of the Institute of Integration of Traditional and Western Medicine of Xiangya Hospital of Central South University for his rigorous and scientific instruction to this article.

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