

Discussion on the Application Value and Chemical Constituents of Hotan Rose: A Medicinal and Edible Plant

Alimujiang Abulizi^{1,2}, R M Khalilov¹, Sh Sh Sagdullaev¹, Nurbolat Aidarhan^{2*}

1. Institute of the Chemistry of Plant Substances, Academy of the Sciences of Republic of Uzbekistan, Tashkent 700170, Uzbekistan; 2. State Key Laboratory of Xinjiang Indigenous Medicinal Plant Resource Utilization, Xinjiang Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Urumqi 830011, China

Abstract Besides its ornamental value, Hotan rose is widely used in medicine, health products, cosmetics, food, essential oil and other fields. It is necessary to conduct in-depth research on its chemical constituents and pharmacological effects. This paper mainly discusses the application value and chemical constituents of Hotan rose, aiming at providing a certain basis for enhancing its application value and expanding its application fields.

Key words Hotan rose, Application value, Chemical constituents, Health care function

1 Introduction

Rose is a plant of the genus *Rosa* L. in the family Rosaceae, which contains more than 200 varieties^[1]. Roses are mainly cultivated in France, China, Uzbekistan, India and Pakistan. In China, it is mainly distributed in Xinjiang, Yunnan, Shandong, Sichuan, Gansu and other regions. Common varieties in China include *Rosa rugosa* Thunb., *R. damascena* Mill., *R. setate*, *R. chinensis* Jacq., *R. platyacantha* Schrenk., *R. xanthina* Lindl., *R. albertii* Rgl., *R. banksiae* Ait., *R. multiflora* Thunb., etc.^[2].

Rose petals are dried petals of Rosaceae plants. They are harvested in spring and early summer and dried in the shade before removing impurities such as receptacle, calyx and decayed petals. This product is slightly obovate or fan-shaped, mostly wrinkled, wide at the top and narrow at the bottom, 0.8 – 2.0 cm long. The bottom end is awned and yellow, and the upper end is wide and light purplish to purplish. Radial textures and horizontal textures extending from bottom to upward can be seen on the surface of the petals. It is light in plant and brittle in texture. The aroma is strong, and the taste is slightly bitter and astringent.

Roses are increasingly widely used in clinic, food and health products. Traditional Chinese medicine uses rose buds as medicinal parts. The parts used for traditional Chinese medicine in Uyghur medicine are fresh rose petals when they are in full bloom. Rose petals are medicinal materials used in Uyghur medicine, and their Uyghur name is "Kizil gul", that is, "Kezilgili", that is, the legendary Hotan rose.

2 Hotan rose resources

Hotan rose is a world-famous naturally optimized variety of Damask rose. The rose producing area is mainly Hotan area, so it is

called Hotan rose. The alias of Hotan rose is rose, wild rose, etc. Hotan rose has good quality, high flavonoid content, strong and long-lasting fragrance, and is one of the precious Chinese herbal medicines. It is included in the *Standard of Uyghur Medicinal Materials in Xinjiang Uyghur Autonomous Region*. Hotan rose is also the raw material of spice and food industry, and it is a traditional cultivated variety in Hotan, Xinjiang.

Hotan rose has high economic value and is widely used in medicine, food, cosmetics, health products, tea, essential oil and other fields. At present, the products that use Hotan roses as raw materials include rose oral liquid, rose sauce, rose tea, rose essential oil, etc., so it is a plant suitable for all ages, and can treat diseases and promote health^[3].

3 Application value of Hotan rose

3.1 Medicinal value In the Hotan area, Hotan roses begin to mature and come on the market in early May every year. Hotan rose is sweet, warm and slightly bitter, fragrant and non-toxic, and has the functions of regulating qi and nourishing blood, beautifying skin, clearing away heat and strengthening heart, relieving depression and moistening skin, promoting blood circulation and removing blood stasis, eliminating fatigue, strengthening stomach and relieving pain. Rose Oral Liquid is a traditional Chinese medicine approved by the State Food and Drug Administration, which is often used to improve symptoms such as palpitation, shortness of breath, fatigue, limb paralysis, stomach pain and vomiting. Rose flower water is mainly used to treat constipation, myocarditis, hepatitis, pale complexion and other symptoms^[4]. Rose sugar paste is also a traditional Chinese medicine approved by the State Food and Drug Administration, which is used to strengthen the stomach and relieve pain, harmonize blood and nourish blood, and regulate female endocrine.

3.2 Edible value Roses are used as flavoring and filling additives in the food industry, and can be used in naan cakes, pastries, rose sauce, rose juice, etc.

3.3 Daily chemical value Roses are widely used in daily

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* Corresponding author. E-mail: bolat@ms.xjb.ac.cn

chemical products, for example, purified rose essential oil is used for making high-grade daily chemical products for daily use, including perfume, cosmetics, soap, *etc.* Rose essential oil is very expensive, and it is used for beauty care, ultraviolet damage, *etc.* Rose essential oil has a strong fragrance, and a small amount of essential oil can be added to make a high-end perfume^[5].

3.4 Health care function Rose eye drops made of Hotan rose have curative effect on corneal and conjunctival inflammation, and have little irritation, which can relieve fatigue, dry eyes and other uncomfortable symptoms. There are also rose essential oil soft capsules, rose tea, *etc.*, which have the functions of regulating mood, beauty and endocrine regulation.

4 Chemical constituents of Hotan rose

Phytochemical studies have shown that Hotan rose is rich in flavonoids, phenolic acids, volatile oils, vitamins, amino acids and other chemical components.

4.1 Flavonoids Rose leaves are rich in flavonoids. At present, the flavonoids found mainly include quercetin, kaempferol, rutin, quercitrin, hyperoside, juglanin, astragalin, avicularin, luteolin, eriodictyol, morin, myricin, chrysin, sakuranetin, apigenin, naringin, prunetin, *etc.*^[6-7].

4.2 Volatile oil components Rose is a plant of Rosaceae with unique aroma and rich volatile oil. Rose volatile oil is also known as rose essential oil. Its volatile oil components mainly include eugenol, 4-methoxypentenol, β -phenylethanol, *etc.*, among which β -phenylethanol is the main component of rose floral fragrance. In addition, there are volatile oil components such as linalool, β -citronellol, and methyl eugenol^[8]. Qian Zonghui *et al.* used GC-MS analysis technology to analyze the fatty acids contained in Hotan rose, and identified 18 fatty acid compounds such as citronellol, aromadendrene, 2-tridecanone and isoeugenol methyl ether^[9].

4.3 Phenolic acids Rose petals are rich in phenolic acids, and known phenolic acid compounds include vanillic acid, gallic acid, ferulic acid, p-coumaric acid, syringic acid, methyl gallate, ascorbic acid, *etc.* Using LC-MS analysis technology, isoferulic acid, trans-sinapic acid, rosmarinic acid, salicylic acid, veratric acid, 3, 4, 5-trimethoxyphenylacetic acid, 2, 3-hydroxybenzoic acid, 3, 4-dimethoxycinnamic acid, *etc.* were identified in rose fruits and leaves^[10-11].

4.4 Vitamins and amino acids Hotan rose is rich in vitamins, such as vitamins A, B, C, E, K, and also contains tannic acid, among which vitamin C has the highest content, which is 8 times that of Chinese kiwifruit; rose residue contains lysine, leucine, isoleucine, methionine, phenylalanine, threonine, tryptophan, valine and other essential amino acids^[12].

5 Pharmacological studies on Hotan rose

5.1 Antioxidant effect Hotan rose contains polyphenols, flavonoids, polysaccharides and essential oils, as well as a high content of vitamin C. As antioxidant substances, polyphenols and fla-

vonoids of Hotan rose can scavenge free radicals and pigmentation, and vitamin C has good antioxidant and free radical scavenging effects. Hotan rose flowers (generally referred to as petals and buds) have strong and good free radical scavenging effects, especially anthers in flower buds, whose antioxidant capacity is significantly higher than that of other parts^[12]. Rose polysaccharide has good antioxidant activity and remarkable efficacy in scavenging superoxide anion and hydroxyl radical^[13].

5.2 Antibacterial effect Rose has a certain antibacterial effect. Studies have shown that 0.25% concentration of rose essential oil can inhibit *Proteus*, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus subtilis*; it has inhibitory activity on *Helicobacter pylori* and *Candida*^[15].

5.3 Anti-tumor effect Studies have shown that polysaccharides have anti-tumor effects in Hotan roses, and roses can improve antioxidant capacity and human immunity.

5.4 Antihyperlipidemic effect He Xi *et al.* found that rose flavonoids can significantly increase the level of high-density lipoprotein cholesterol. Experiments on mice have shown that it can reduce the levels of total cholesterol and triglyceride in rat serum to achieve the effect of lowering blood lipids^[16-17].

5.5 Lipid-lowering effect Feeding fruit flies with different concentrations of rose water extract can obviously prolong the life span of fruit flies, and the life span of fruit flies will be longer with the increase of concentration. The treatment groups with obvious effects are 0.10%, 0.25%, 0.50%, 1.00%, but the treatment group with 5.00% concentration can obviously shorten the life span of fruit flies. The experimental results show that the proper amount of rose water extract has anti-aging effects^[18].

6 Conclusion

The research results show that Hotan rose has the effects of relaxing tendons, promoting blood circulation, tonifying qi, relieving depression and regulating middle energizer, and can be used as a substitute for saffron to treat gynecological diseases, and its root bark can be used as a dye for silk. Therefore, the efficacy of Hotan rose has gradually attracted attention. Taking the active ingredients and biological functions of Hotan rose as the starting point, this paper deeply studies the further application of the active ingredients and curative effects of Hotan rose in the fields of food, health products and medicines. It is believed that new products for treating related diseases will be developed in the future, and it will create certain social and economic value, which is of great significance to the promotion of the value of Hotan rose.

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