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LETTER TO THE EDITOR

Molecules of Cornus Officinalis Bark Extractives

Xiaochen Yue, Huitao Bi, Dongfang Zheng, Yong Zhao, WanXi Peng*
School of Forestry, Henan Agricultural University, Zhengzhou 450002, China
*Email: pengwanxi@163.com (Wanxi Peng)

Cornus officinalis sieb. et Zucc, as a traditional Chinese medicine for nourishing and nourishing, has a long history of application. Its effective ingredients include antibacterial, diuretic, hypotensive, whitening and immunological activities. In recent years, the research on the bioactive components of cornus officinalis has achieved fruitful results, which also shows a good development prospect in the treatment of diabetes and anti-tumor. At present, domestic and foreign scholars have studied and used cornus for its fruit, but few have studied the trunk or bark of cornus. To solve the contradiction of fruit on the market in short supply, this article obtains from the Cornus tree bark, the FT - IR and GC-MS technique to the bark of Cornus officinalis Sieb. Et Zucc was analyzed and the research, further excavate the use and utilization value of Cornus officinalis Sieb. Et Zucc.

I Introduction

Cornus officinalis Sieb. Et Zucc, the original plant as mountain wood belongs to small trees, leaves are mainly distributed in China's Zhejiang, Henan, Shandong, Anhui and other places. Clinically used to remove the ripe fruit of seed medicine, its flavour acid, acerbity, lukewarm, belong to the liver and kidney. Cornus is rich in glycosides and glycosides, tannins, organic acids and volatile substances. Modern pharmacological studies have shown that cornus has a variety of clinical effects including hypoglycemic, anti-bleeding, inhibition of platelet aggregation, anti-inflammation, anti-oxidation, anti-bacteria and anti-tumor. Cornus application of long history, in the early 1980 s, Japanese scholars through the study of eight flavour bolus of the party, found only one Cornus on chain urea with cephalosporins induced have fall blood sugar diabetes animal model in rats. In addition, cornus can kill ascites cancer cells in vitro and is clinically used for radiotherapy, leukopenia after chemotherapy, primary liver cancer, metastatic liver cancer, etc. The oleanolic acid in cornus has a slight cardiac diuretic effect and is also used in clinical treatment of acute viral hepatitis (Chen et al. 2016, Yang et al. 2016).

At present, most studies on cornus focus on the analysis of its fruit directly after application, while few studies on its extraction soluble in organic solvents. In this paper, cornus bark is taken as the research object, which is soluble in organic solvent ethanol and methanol respectively (Xie et al. 2018, Peng et al. 2015). FTIR and GC-MS analysis of the extract are carried out to provide scientific basis for the research on resource utilization of cornus from a new perspective and direction.

II MATERIAL AND METHODS

Cornus officinalis bark was obtained from Nanyang City, Henan Province, Xixia County Forest Farm. Two extracts were established from two solvents: ethanol and methanol, and named B1 and B2.

FT-IR Analysis

The FT-IR spectra of samples were obtained on a FT-IR spectrophotometer (IR100) using KBr discs, containing 1.00% finely ground sample (Camacho et al. 2015, Kosa et al. 2017, Fidan and Sirin 2016, Guner et al. 2016, Uzun

and Donmez 2016).

GC-MS Analysis

GC condition: quartz capillary column is 30mm×0.25mm×0.25 um, starting at 50°C, without retention, and then at a rate of 8°C/min up to 250°C without retention and then at a rate of 5°C/min to 300°C without retention. The temperature of the inlet is 250°C, the column flow is 1.0 ml/min, the split ratio is 20:1, and the carrier gas was high helium.

MS condition: ionization mode is EI, the electron energy is 70 Ev, the temperature of ion source is 230°C, the temperature of the quadrupole is 150°C, scan of the starting point is 30-600, and the wiley7n was used. Standard spectrum and qualitative computer search were utilized (Cui et al. 2017, Lou et al. 2017).

III Results and Discussion

Analysis of FTIR

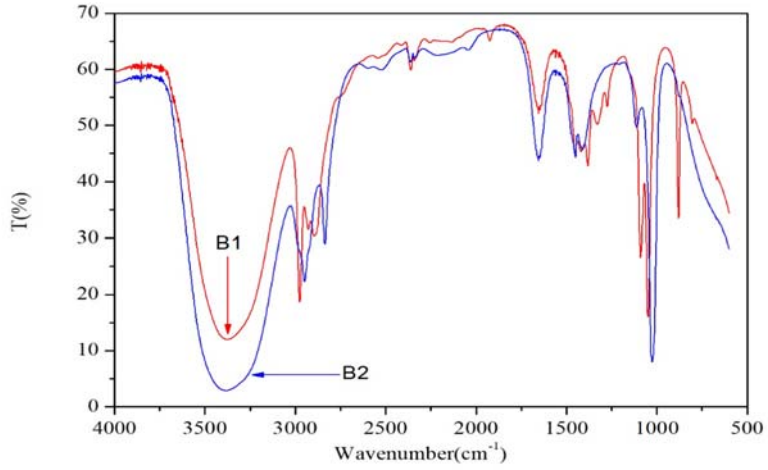

Figure 1 FT-IR spectra of samples B1 and B2.

The infrared spectrum of *Cornus officinalis* bark was analyzed according to the relationship between the infrared spectrum of the organic compound and the functional group. Figure 1 shows the infrared contrast spectra of *Cornus officinalis* bark and the two extracts.

Figure 1 shows the infrared spectrum of two organic solvent extracts. Among them, the infrared absorption peak at 3400 cm^{-1} may be the stretching vibration or anti-stretching vibration formation of free hydroxyl in liquid water. The formation of the absorption peak near 3030cm^{-1} may be caused by the stretching vibration of the -CH bond. The absorption peaks near 2950-2830 cm^{-1} are formed by symmetric stretching of $-CH_2$ and $-CH_3$ bonds respectively. And around 1650 cm^{-1} it may be H20's variable Angle vibration. Near 1450 cm^{-1} and 1375 cm^{-1} may be the peak of CH_3 bond vibration. An obvious peak is formed near 1050 cm^{-1}, which may be the asymmetric stretching of p-o-c bond or NO_3- symmetric stretching. The absorption peak of cellulose (2940 cm^{-1}), hemicellulose (1730 cm^{-1}), lignin (1639 cm^{-1}, 1432 cm^{-1}, 816 cm^{-1}) was slightly weak, indicating the decrease of chemical composition, indicating the hydrolysis of components. As can be seen from Figure 1, the peak value of infrared absorption peak is mainly at the locations of 3500-3200 cm^{-1}, 3050-2820 cm^{-1} and 1100-950 cm^{-1}. The main chemical constituents are phenols, esters, glycosides, tannins, organic acids, hydrocarbons and aromatic compounds. In addition, the decrease of characteristic absorption peak indicates that these chemicals are partially extracted.

Analysis of GC-MS

The total ion chromatograms of two types of extractives analyzed via GC-MS are shown in Figures 2 and 3. The spectrum of each peak was retrieved by using a computer and wiley7n.1 standard spectrum according to the

laws of the mass spectrum cracking.

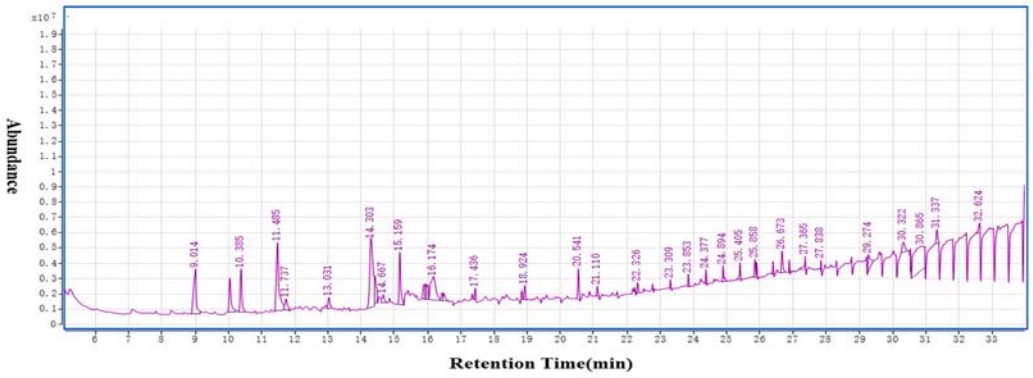

Figure 2 Total ion chromatograms of Cornus officinalis bark ethanol extractives.

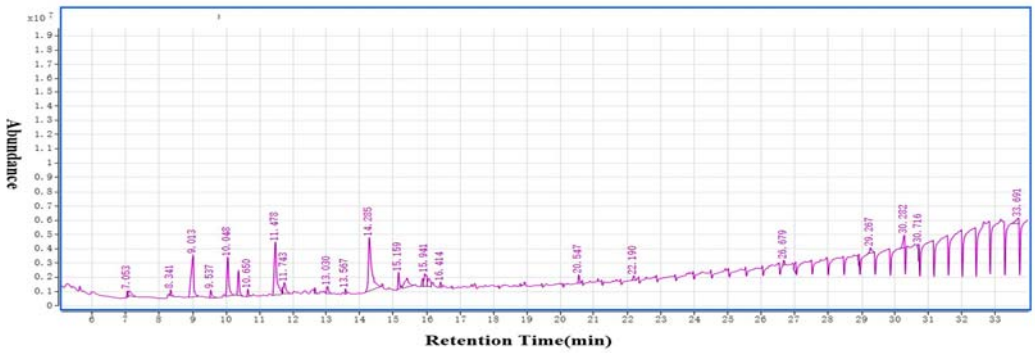

Figure 3Total ion chromatograms of Cornus officinalis bark methanol extractives

According to the results of GC-MS analysis, 40 peaks were detected in B1, and 40 chemical constituents were identified. The results show that the content of more substances are as follows: Maltol (7.14%), 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl- (3.78%), Dehydromevalonic lactone (4.27%), 5-Hydroxymethylfurfural (10.48%), 1,2,3-Benzenetriol (13.15%), trans-Isoeugenol (4.84%), Melezitose(7.12%),1H-Cyclopropa[3,4]benz[1,2-e]azulene-5,7b,9,9a-tetrol,1a,1b,4,4a,5,7a,8,9-octahydro-3-(hydroxymethyl)-1,1,6,8-tetramethyl-,5,9,9a-triacetate,[1aR-(1a.alpha.,1b.beta.,4a.beta.,5.beta.,7a.alpha.,7b.alpha.,8.alpha.,9.beta.,9a.alpha.)]-(2.26%),and1H-Cyclopropa[3,4]benz[1,2-e]azulene-5,7b,9,9a-tetrol, 1a,1b,4,4a,5,7a,8,9-octahydro-3-(hydroxymethyl)-1,1,6,8-tetramethyl-,5,9,9a-triacetate,[1aR-(1a.alpha.,1b.beta.,4a.beta.,5.beta.,7a.alpha.,7b.alpha.,8.alpha.,9.beta.,9a.alpha.)]- (15.75%).

According to the results of GC-MS analysis, 30 peaks were detected in B2, and 30 chemical constituents were identified. The results show that the content of more substances are as follows: Maltol (12.21%) , 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl- (8.43%), Dehydromevalonic lactone (4.27%), 5-Hydroxymethylfurfural (15.17%), Melezitose (3.03%), 1,2,3-Benzenetriol (19.74%), 1,2-Cyclopentanedicarboxylic acid, 4-(1,1-dimethylethyl)-, dimethyl ester, (1.alpha.,2.beta.,4.beta.)- (4.45%),and1H-Cyclopropa[3,4]benz[1,2-e]azulene-5,7b,9,9a-tetrol,1a,1b,4,4a,5,7a,8,9-octahydro-3-(hydroxymethyl)-1,1,6,8-tetramethyl-,5,9,9a-triacetate,[1aR-(1a.alpha.,1b.beta.,4a.beta.,5.beta.,7a.alpha.,7b.alpha.,8.alpha.,9.beta.,9a.alpha.)]- (2.15%).

The identified compounds can be divided into phenols, alcohols, carbohydrates, ketones, iridoids, aldehydes and organic acids (Wang et al. 2018, Oladimeji et al. 2016). Among them, Maltol, which accounts for about 7% of the test content, is a white to slightly yellow needle crystal or crystalline powder, which has a special aroma of coke-like butter cream, and a dilute solution shows a strawberry flavor. In the food industry, it is mainly used to

formulate strawberry, coffee, malt, nuts, vanilla and various fruit flavors. It is also commonly used in daily-use flavor recipes, but the amount is extremely low. It is mainly used for pine needles and roses, and it has sweet and warm effect. It is also used in food flavors, such as pineapple, strawberry, etc., and is generally used as a sweetener. In addition to the food industry, Maltol is also an excellent substance for the smooth coating of photographic film to prevent spots and streaks. The skin care cosmetics formulated therewith have the effect of inhibiting melanin growth and whitening the skin (Zhang et al. 2012, Gasche et al. 2016). The 1,2,3-Benzenetriol, which is approximately 13% in content, is a white, odorless crystal that dissolves in water, ethanol, and ether and is slightly soluble in benzene. It is used in the industry for the preparation of metal colloidal solutions, leather coloring, fur, hair dyeing, etching and the like. At the same time, it can also be used as a film developer, infrared photo thermometer, styrene and polystyrene polymerization inhibitors. Aggregates, intermediates for medicines and dyes, analytical reagents, etc.

IV Conclusion

From the above studies, it can be seen that FTIR experimental studies have shown that the absorption peak of the extract of the bark of Cornus officinalis is mainly concentrated in the 3500-3200 cm^{-1}, 3050-2820 cm^{-1} and 1100-950 cm^{-1} bands. The decrease of the characteristic absorption peak indicates that phenols, esters, ketones, tannins, organic acids, hydrocarbons, and aromatic compounds were partially extracted.

In the GC-MS test, 40 peaks were detected in the *Cornus officinalis* bark ethanol extract and 40 chemical components were identified. 30 peaks were detected in the methanol extract and 30 chemical components were identified. Maltol plays a huge role in the food industry by virtue of its special aroma of coke-like butter cream. At the same time, with its skin care cosmetics, Maltol can inhibit the growth of melanin and has a good effect of whitening the skin. 1,2,3-Benzenetriol also plays an important role in many aspects of industry. Gibberellic acid, which is small but particularly important, is a major discovery in extracts. As a broad-spectrum plant growth regulator, it can increase the yield of three-line hybrid rice seed production, promote seed germination, accelerate growth, increase yield, and at the same time promote flowering and increase fruit yield.

Through the research and analysis of *Cornus officinalis* bark extraction, we can clearly understand the organic substances it contains, provide reference for the development of medical food, and provide fuller and more extensive value for *Cornus officinalis* bark, provides better help.

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