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LETTER TO THE EDITOR

TG and PY-GC-MS Analysis on Rosa Laevigata Biomass

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Rosa Laevigata Michx was used as the research object to extract the active constituents from Rosa laevigata. Three extracting agents – Ag, Fe_3O_4, and Ag+Fe_3O were prepared to arrange the sakura seed nanocatalyst. The extracts of each sakura flower were analyzed using thermogravimetric analysis (TG) and pyrolysis gas chromatography-mass spectrometry (PY-GC-MS). The TG fingerprints of various types of wood and the chemical composition analysis tables of PY-GC-MS were established by statistical methods. Based on the results of the analysis, the three wood components, the functionality, advantages, and disadvantages of the ingredients could all be better understood. Therefore, the information gained from these results can be implemented more scientifically, healthily, and reasonably in future.

I Introduction

Rosa Laevigata Michx, rosaceae wild evergreen trailing shrubs of the genus Rosa fructus rosae laevigatae from the ripe fruit. Cherokee rose has a wealth of wild resources, in our country are mainly distributed in east China, south China, southwest and Henan, Hubei, Hunan, Shanxi, Taiwan, etc. It is commonly refer to as “clam” in that yao region of Guangxi, which is commonly used as yao nationality. It is mainly used for treating spleen-diarrhea, benefiting urine and astringency. It is durable in cold tolerance, nourishing blood and improving essence. It has the pharmacological effects of antioxidant, immune regulation, lowering sugar and lipids, and protecting kidney. Modern medical studies have also found that the cherry seeds can be used for the treatment of skin tumors, burns and burns, neurasthenia, hypertension, neurological headaches, chronic nephritis, and so on.

II Experimental materials and methods

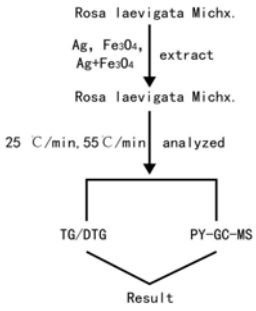

***Figure* 1:** chemical route of *Rosa Laevigata Michx.*

Materials

Rosa Laevigata Michx samples were taken from Central South University of Forestry and Technology, Changsha, Hunan. The chemical reagent used is methanol/benzene (85ºC).

Experimental Methods

TG analysis. Each sample was analyzed using less than 10 mg of powder. The TG spectrum was measured from room temperature on a TG 20 thermogravimetric analyzer (209-F1 TG, Netzsch, Germany) using a carrier gas (N 2) speed of 40 mL/min and a heating rate of 25 ºC/min, 55 ºC/min (Figure 1).

PY-GC-MS analysis. HP5973/6890TM gas chromatography-mass spectrometer (GC-MS) was produced by Hewlett Packard, USA. Gas chromatography (Gas Chromatography) conditions: column is DB-5 (30 m × 0.25 mm) elastic quartz capillary column, carrier gas is helium gas, the inlet temperature is 250ºC, the column temperature is raised from 50ºC to 300ºC at 10 ºC/min, 30:1 split injection. Mass Spectrometry conditions: ionization mode is EI, electron energy is 70 eV, it flow rate is 1 mL/min, and the scanning mass range is 35 to 550 μ. The cracker was a JHP-5S Curie point cracker manufactured by Nippon Analytical Industries Co., Ltd., with a cracking temperature of 590ºC and an interface temperature of 250ºC.

III Experimental results and analysis

***Rosa Laevigata Michx* TG/DTG Thermal Curve Analysis Study**

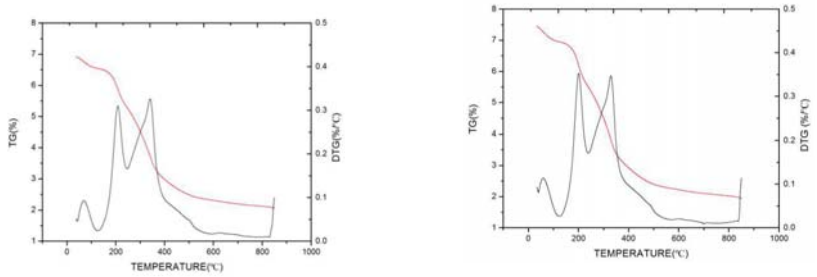

Figure 2 TG/DTG curve of Rosa Laevigata Michx at 25 ºC/min (left) and 55 ºC/min (right)

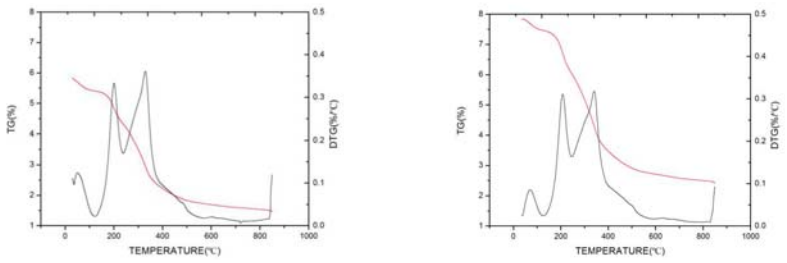

Figure 3 TG/DTG curve of Rosa Laevigata Michx+Ag at 25 ºC/min (left) and 55 ºC/min (right)

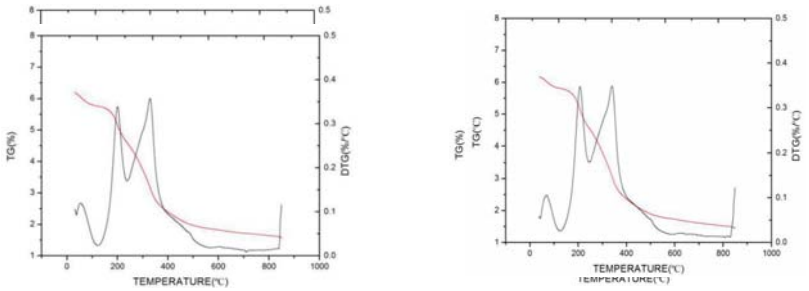

Figure 4 TG/DTG curve of Rosa Laevigata Michx+Fe_3O_4 at 25 ºC/min (left) and 55 ºC/min (right)

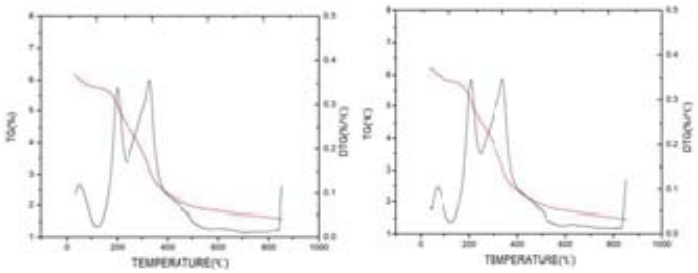

Figure 5 TG/DTG curve of Rosa Laevigata Michx+Ag+Fe_3O_4 at 25 ºC/min (left) and 55 ºC/min (right)

Show in the Figures 2-5, the above four groups of data have certain similarities. The wood samples have gone through four stages. The first stage: from room temperature to 110ºC, the TG curve develops from a certain height to a gentle degree, and the DTG thermal degradation rate curve has a small curvature. The drop is the hot water absorption after the evaporation phase. The second stage: from 110ºC to 400ºC, the TG curve of the wood sample sharply drops at this stage, and the DTG curve rises sharply because of the continuous decrease of hemicellulose and cellulose in the wood sample, resulting in low molecular carbon water in the wood sample. Compounds are easier to pyrolyze. At this stage, the thermal degradation rate curve has fluctuations because of the TG curve slowing down. The third stage: between 400ºC and 840ºC, the TG curve and the DTG curve of the wood sample tend to be gentle. The fourth stage: At the end stage, a small TG curve drops sharply and the DTG curve rises sharply.

PY-GC-MS Analysis of *Rosa Laevigata Michx* Extracts

Table 1. PY-GC-MS analysis results of *Rosa Laevigata Michx* extract

Peak	R. Time	Chemical component	Area %
1	1.57	Hydrazine, methyl-	20.98
2	1.64	1,3-Butadiene	16.56
3	1.84	4-Penten-1-ol	2.67
4	1.96	1,3-Cyclopentadiene	4.54
5	2.22	Butanenitrile, 4-oxo-	0.53
6	2.30	Furan, 2-methyl-	0.8
7	2.52	Isobutyronitrile	0.05
8	2.66	1,3-Cyclohexadiene	1.77
9	2.88	Benzene	9.53

10	3.19	Benzene	0.07
11	3.30	1,5-Hexadiyne	0.02
12	3.43	2,4-Hexadiene, 2-methyl-	0.01

According to the Table 1, a total of 275 peaks were isolated from the PY-GC-MS analysis of the methanol/stupid (85ºC) of *Rosa Laevigata Michx*+Ag chips, from which 239 compounds were identified. The main contents are: Formic acid (37.65%), Benzene (7.48%), 1,3-Cyclopentadiene (5.27%), 1-Pentanol, 5-methoxy- (5.17%), Toluene (4.14%), 1,3-Cyclohexadiene (1.94%), 1,3,5,7-Cyclooctatetraene (1.67%), Naphthalene (1.31%), Benzene, 1-ethenyl-2-methyl- (1.03%), Indene (1%), Ethylbenzene (0.93%), Furan, 2-methyl- (0.82%), 2(3H)-Furanone, dihydro-5-methyl-5-phenyl- (0.74%), Fluorene (0.71%), and Butanedinitrile, 2,3-dimethyl- (0.7%).

Table 2. PY-GC-MS analysis results of *Rosa Laevigata Michx*+Fe_3O_4 extract

Peak	R. Time	Chemical component	Area %
1	1.64	1-Butyne, 4-methoxy-	36
2	1.85	4-Penten-1-ol	3.08
3	1.96	3-Penten-1-yne, (E)-	4.51
4	2.22	3-Pentyn-1-ol	0.52
5	2.30	Furan, 2-methyl-	0.93
6	2.51	Isobutyronitrile	0.06
7	2.66	1,3-Cyclohexadiene	1.84
8	2.89	Benzene	7.83
9	3.18	Benzene	0.22
10	3.30	1,5-Hexadien-3-yne	0.1
11	3.43	Cyclopropane, trimethylmethylene-	0.04
12	3.56	Furan, 2,5-dimethyl-	0.1

According to the Table 2, a total of 287 peaks were isolated from the PY-GC-MS analysis of the methanol/stupid (85ºC) of *Rosa Laevigata Michx*+Fe_3O_4 chips, from which 260 compounds were identified. The main contents are: 1-Butyne, 4-methoxy- (36%), Benzene (8.05%), Toluene (4.57%), 3-Penten-1-yne, (E)- (4.51%), 4-Penten-1-ol (3.08%), 1,3,5,7-Cyclooctatetraene (1.90%), 1,3-Cyclohexadiene (1.84%), Naphthalene (1.46%), Indene (1.37%), Ethylbenzene (1.06%), 1,4-Methanonaphthalene, 1,4-dihydro- (0.96%), Furan, 2-methyl- (0.93%), Phenol (0.93%), Fluorene (0.86%), .alpha.-Ketocyclododecanone oxime (0.83%), Benzene, 1-ethenyl-2-methyl- (0.81%), Naphthalene, 1,4,6-trimethyl- (0.76%), Biphenylene (0.75%), Naphthalene, 1-ethyl- (0.70%), and so on.

Table 3. PY-GC-MS analysis results of *Rosa Laevigata Michx*+Ag+Fe_3O_4 extract

Peak	R. Time	Chemical component	Area %
1	0.79	1-Propanesulfinothioic acid, S-methyl ester	0.11
2	0.87	2-Aminoimidazole-5-propionic caid	0.14

3	0.98	Cyclohexanepropanol, .alpha.-methyl-	0.31
4	1.62	Formic acid	36.47
5	1.86	4-Penten-1-ol	2.97
6	1.96	3-Penten-1-yne, (E)-	4
7	2.22	Pentanedinitrile	0.45
8	2.30	Furan, 2-methyl-	0.78
9	2.53	Isobutyronitrile	0.05
10	2.66	1,3-Cyclohexadiene	1.59
11	2.89	Benzene	6.98
12	3.18	Benzene	0.23

According to the Table 3, a total of 250 peaks were isolated from the PY-GC-MS analysis of the methanol /stupid (85°C) of *Rosa Laevigata Michx*+Ag+Fe_3O_4 chips, from which 219 compounds were identified. The main contents are: Formic acid (36.47%), Benzene (7.21%), Toluene (4.25%), 3-Penten-1-yne, (E)- (4.00%), 4-Penten-1-ol (2.97%), 1,3,5,7-Cyclooctatetraene (2.35%), Naphthalene (1.87%), 1,3-Cyclohexadiene (1.59%), Indene (1.34%), Ethylbenzene (1.14%), Fluorene (0.97%), Phenol (0.91%), 1H-Indene, 1-methyl- (0.88%), Naphthalene, 2-methyl- (0.86%), 1,4-Methanonaphthalene, 1,4-dihydro- (0.83%), 2-Propenal, 3-phenyl- (0.81%), and Furan, 2-methyl- (0,78%).

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