

Characterization of Wines Produced from Fungus Resistant Grapes

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Introduction

The vineyards of the Styrian wine region are located in the southern part of Austria close to the Slovenian border covering approximately 4.500 hectares. Predominantly steep slopes are cultivated with inclinations up to 60%. This area is a classical cool-climate region with an average annual temperature of 10.5° C and precipitation of approximately 1.000 mm per year. Main rainfall months are especially May, June, July & ,August and September in which 55 to 70% of the annual precipitation falls. The mechanical management of the steep slopes is difficult and quite dangerous, too. The establishment of fungus- resistant grape varieties can clearly reduce plant protection efforts and also brings economic advantages. First experiments with fungus resistant grape varieties date back to the early '80s. Most varieties of the initial trials were not accepted by the consumers due to their sensory properties. The recent generation of fungus-resistant grape varieties show much more compromising results and a higher acceptance on the market.

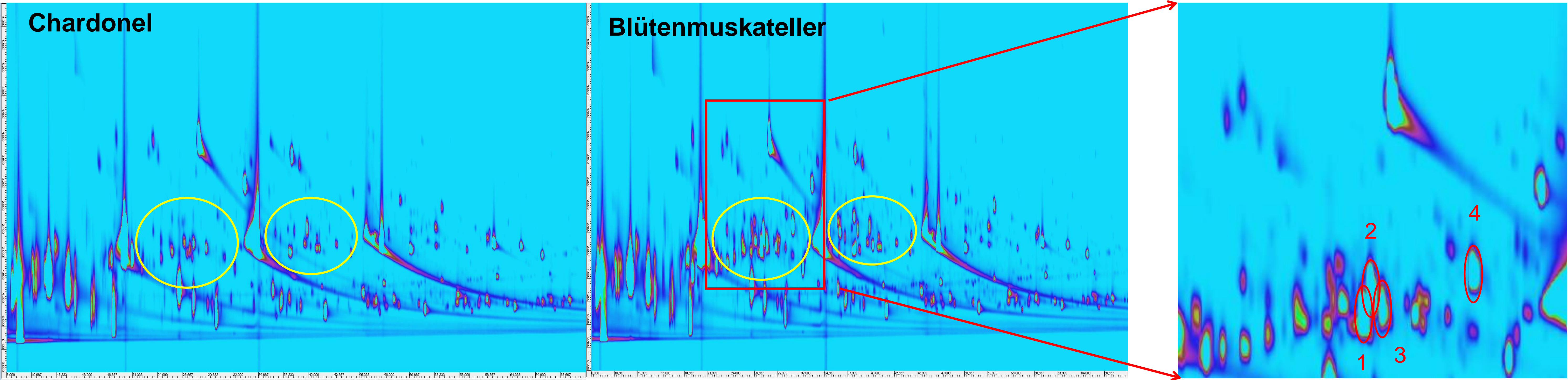
Sensory Analysis

Sensory analysis was performed by a trained panel with specific expertise in wine tasting consisting of 12 members. All panelists are members of the Austrian Wine quality board which is responsible for the Austrian wine quality banderol, where a sensory judgment for each quality wine is mandatory. Sensory evaluation was done by quantitative descriptive analysis on a 10 point scale by using five different descriptors

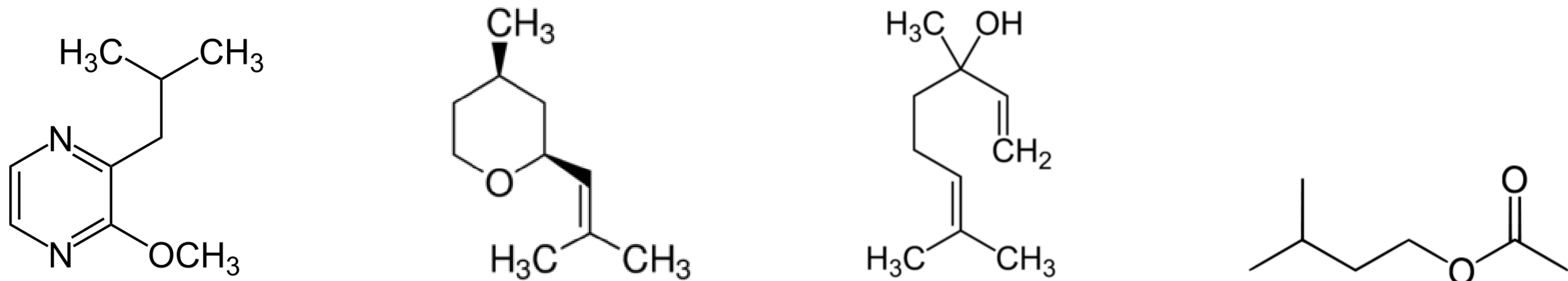
Variety	Sensory Descriptions
Blütenmuskateller	intensely fragrant, acidic, Sauvignon-/Muscat-/Scheurebe-type
Bronner	slightly fruity, neutral, medium bodied, Burgundy-type
Cabernet blanc	green, spicy, pomaceous fruit, well balanced, Sauvignon-/Burgundy-type
Chardonel	apple, banana, neutral, tender, lean, Burgundy-type
Muscaris	flowery (roses), citrus, stone fruits, complex, full bodied, Muscat-type
Souvignier gris	slightly fruity, spicy, full bodied, Burgundy-/Riesling-type
VB 32-7	green, green pepper, spicy, full bodied, Sauvignon-type
1924-1	green, lean, acidic, pomaceous fruit, simple, Welschriesling-type

Analytical Methods

Aroma compounds were analyzed by HS-SPME using a 2 cm 50/30 µm DVB/Carboxen/PDMS fiber with different techniques and parameters. The aroma substances except Isobutylmethoxypyrazine were quantified by the standard addition procedure with GC-MS (SIM) at 5 different concentration levels adjusted to the expected concentration. Isobutylmethoxypyrazine (IBMP) was quantified by using deuterated IBMP-d3 as internal standard and GC-MSMS (Shimadzu TQ-8040) in MRM. Transitions and Collision Energies were:
IBMP: 124.1>94.1(11), 124.1>81.1(7)
IBMP-d3: 127.1>95.1 (13),127.1>83.1(7)
Comprehensive GCxGC-MS
For the characterization of the volatile fraction GCxGC-MS with a single quadrupole detector (Shimadzu QP2010 Ultra) was used.
Columns: 30 m ZB-5 MS 0.25*0.25 was coupled via a push fit connector to a 2.5 m BP-X50 0.15*0.15
Temperature programme:
40° C (1`) @ 2 ° C/min to 230° C (0 min) @ 20° C to 290° C (5`)
Zoex Jet Modulator, modulation frequency 8 s
Hot Jet 280° C, 350 msec pulse
Data acquisition: Scan, mass range 35-280 amu, 50 scans/s
The left chromatogram shows Chardonel the right shows the volatiles from Blütenmuskateller. Large deviations in the yellow marked areas (mainly terpenes and esters) are observed. In the zoomed area of Blütenmuskateller Linalool (1), Hotrienol (2), cis-Rose oxide (3) and Nerol oxide (4) are marked.



Aroma Compounds



Wine	IBMP [µg/L]	OAV*	cis-Rose oxide [µg/L]	OAV*	Linalool [µg/L]	OAV*	Isoamylacetate [µg/L]	OAV*	Sum Ester C4-C8 [µg/L]	OAV
Blütenmuskateller	<0.001	<1	8.3	42	237	16	1900	63	2531	1087
Bronner	<0.001	<1	0.3	2	12	<1	1899	63	2179	894
Cabernet blanc	8	4	0.1	1	11	<1	720	24	1754	728
Chardonel	<0.001	<1	0.1	<1	11	<1	1560	52	2708	1110
Muscaris FR 493-87	<0.001	<1	5.9	29	524	35	1500	50	2110	868
Sauvignon gris	<0.001	<1	0.1	<1	29	2	1390	46	2464	1017
VB 32-7	12	6	0.2	1	11	<1	2950	98	2345	959
1924-1	<0.001	<1	0.1	<1	37	2	680	23	1496	614

OAV Odour Activity Value is the concentration in the wine divided by the sensory threshold