

# WineScreener™

## ● Overview Wine-Profiling™

An innovative solution for the analysis of wine using Nuclear Magnetic Resonance (NMR) spectroscopy has been developed by Bruker BioSpin with the help of Winespin Analytics. The principle of the method relies on the acquisition of the spectroscopic fingerprint specific to each individual sample. These profiles are compared to a large database of authentic wine samples using a multivariate statistical approach. Wine-Profiling by NMR combines quality control and testing of safety issues and authenticity in an unique way.



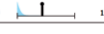

### Features:

- Cost-effective, automated push-button NMR solution based on 400 MHz including evaluation and reporting for comprehensive wine screening
- Reliable screening method providing targeted and non-targeted analyses from a single measurement
- Targeted analysis for all varieties and origins provides automatic quantification of 56 parameters per sample
- Quantification values compared to official reference values and to the concentration distribution of authentic samples supporting interpretation of the results
- Verification models to detect any deviation from authentic reference data in a non-targeted analysis approach
- Prediction of authenticity parameters of wine such as grape variety, geographical origin and vintage by means of classification analysis



### Targeted Analysis / Quantification




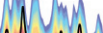
(Poly-)phenols:

Compound	Value	Unit	LOQ	Official Reference			Wine-Profiling™ NMR Reference Database
				Flag	min	max	
caftaric acid	68	mg/L	15	○	-	-	17  119
epicatechin	<30	mg/L	30	○	-	-	<30 mg/L in reference set
gallic acid	<25	mg/L	25	○	-	-	<25  33
shikimic acid	95	mg/L	20	○	-	-	<20  91
trigonelline	14	mg/L	10	○	-	-	<10  19

Excerpt of a quantification table of a Riesling wine

### Classification Analysis

(Poly-)phenols:

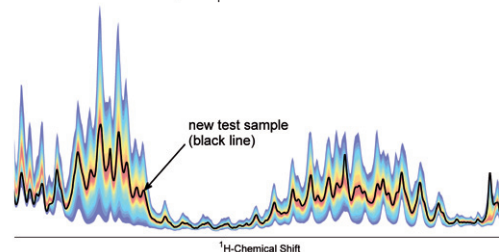
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World Wide  
Red Wine  
Model

The aim of a classification model is to determine if a wine sample is consistent with a group in the model (shown example: variety "Merlot")

### Non-Targeted Analysis / Verification

4% of overall NMR-profile



Verification models are non-targeted analyses comparing the whole NMR-profile of a specific sample with one corresponding group of reference spectra

# Specifications Wine-Profiling™

## Standard Parameters

arabinose, bread units, carbohydrate units, citric acid, energy value, ethanol, ethanol-vol%, fructose, glucose, glucose/fructose ratio, glycerol, lactic acid, malic acid, must weight, sucrose, sugar-free extract, tartaric acid, total alcohol, total alcohol-vol%, total extract, total fermentable sugar, total sugar (bef. inv.)

## Degradation Parameters

acetic acid, acetoin, cadaverine, ethylacetate, ethyllactate, formic acid, fumaric acid, furfural, gluconic acid, HMF, putrescine

## Statistical Models for Variety-Classification and Non-Targeted Analysis

Available models for grape variety discrimination (origin dependent) and corresponding verification models:

Variety/Models	German / Austrian White Wine Model	German / Austrian Red Wine Model	World Wide White Wine Model	World Wide Red Wine Model	Verification Model
Cabernet Sauvignon	-	-	-	International	International
Chardonnay Blanc	Germany / Austria	-	International	-	International
Dornfelder	-	Germany / Austria	-	-	Germany / Austria
Merlot Noir	-	-	-	International	International
Müller Thurgau	Germany / Austria	-	-	-	Germany / Austria
Pinot Blanc/Gris	Germany / Austria	-	-	-	Germany / Austria
Pinot Noir	-	Germany / Austria	-	-	Germany / Austria
Portugieser Blau	-	Germany / Austria	-	-	Germany / Austria
Riesling Weiss	Germany / Austria	-	International	-	International
Sauvignon Blanc	Germany / Austria	-	International	-	International
Silvaner Grüner	Germany / Austria	-	-	-	Germany / Austria
Syrah	-	-	-	International	International
Tempranillo	-	-	-	International	International
Veltliner Grün	Germany / Austria	-	-	-	Germany / Austria
Welschriesling	Germany / Austria	-	-	-	Germany / Austria
Zweigeltrebe Blau	-	Germany / Austria	-	-	Germany / Austria

## (Poly-)phenols

caftaric acid, epicatechin, gallic acid, shikimic acid, trigonelline

## Stabilizing Agents

benzoic acid, salicylic acid, sorbic acid

## Higher Alcohols / Fermentation Products

1,3-propanediol, 2,3-butanediol, 2-methyl-propanol, 2-phenylethanol, 3-methyl-butanol, acetaldehyde, galacturonic acid, glycerol/ethanol ratio, methanol, pyruvic acid, succinic acid

## Amino Acids

4-aminobutanoic acid, alanine, arginine, proline

## Additional classification models for Riesling Weiss

- Region Model Baden, Mosel, Rheingau, Rheinhessen, Württemberg, Pfalz
- Vintage Model Germany 2011/2012
- Origin Model Germany/Austria

## • Bruker BioSpin

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Method supported/offered by:

