

INDEX

A

- Alcoholic fermentation, Vin Santo
 - analytical and organoleptic, yeast
 - madre, 90–91
 - microorganisms, 88
 - non-*Saccharomyces*, 88–90
 - S. cerevisiae* strains, 89
 - vinsantaia*, 90
 - grape drying, microbial population
 - apiculate yeasts, 81
 - Greco Bianco and Mantonicio Bianco, 82
 - lactic acid bacteria, 81
 - Malvasia and Zibibbo grapes, 82–83
 - microflora, 80–81
 - yeasts, 81–82
 - madre addition
 - description, 83
 - S. cerevisiae*, 83–84
 - sensory attributes, 84, 85
 - Zygosaccharomyces*, 83
 - passito, 80
 - Picolit, 82
 - starter inoculum
 - Italian passito wines, 84
 - mixed, 88
 - non-*Saccharomyces*, 87–88
 - passito wines, 85
 - Saccharomyces*, 85, 86
 - Saccharomyces* yeast, 84
 - S. cerevisiae*, 84–85
 - S. cerevisiae* and *S. bayanus*, 86
 - S. uvarum*, 86
 - T. delbrueckii* and *Z. bailii*, 88
 - Z. rouxii* strain, 88
 - vinsantaia, 80
- Amarone wine
 - alcoholic fermentation and maceration
 - advantages, starter strains, 297
 - anthocyanin extraction and color
 - stabilization, 299
 - botrytized, 299
 - “cap”, 298
 - chemical–physical change, 299
 - environmental condition, 296
 - grape maceration, 298
 - hexanols, 298–299
 - nutrients release, 297
 - phenolic compounds, anthocyanins
 - and tannins, 297–298
 - prefermentative cold maceration,
 - 298–299
 - starter yeast strains, 297
 - strains sequence, 297
 - sulfur dioxide and volatile acids,
 - 296–297
 - temperatures, 297
 - yeast flora, 297
 - area, production
 - characterization, 289
 - Eastern part, 289
 - hills, 288
 - natural boundaries, 288
 - rainfall, 289
 - soils and Prun stone, 289
 - temperatures, 289
 - valley and Garda Lake, 289
 - winds, 289
 - biotechnology
 - grape dehydration phase, 302–303
 - stages, 302
 - winemaking process, 303
 - grapevine cultivars
 - Corvina, 290
 - Corvinone, 290
 - genetic heritage, 290
 - indigenous varieties, 289
 - Molinara, 291
 - Rondinella, 291
 - varietal composition, 291
 - varietal transplantations, 291
 - history
 - Acinatico*, 286
 - occurrence, 286
 - Recioto* wine, 287
 - sensory attributes, 287–288
 - significance, 286
 - stuck fermentation, 287

Amarone wine (*cont.*)

- sweet food/beverage, 287
- tastes, 287
- technology, 286–287
- as “very bitter”, 287
- malolactic fermentation
 - autochthonous *O. oeni* strains, 300
 - LAB, 299
 - Leuconostoc oenos*, 300
 - ribotyping and macrorestriction profile analyzes, 300
- maturation, cooperage
 - “aging”, 300
 - ambient temperature and humidity, 301
 - autolysis, yeast cells, 301
 - clarification, 301
 - fragrance, 301
 - humidity control, 301
 - oak cooperage, 301
 - “protective colloids”, 302
 - sur lees* maturation, 302
 - tannins and aldehydes, 300–301
 - wood porosity, 300–301
- production
 - grape selection, 291–292
 - postharvest grapes drying, 292–295
 - sensory characteristics, 296
- Amontillado sherry
 - characterization, 27
 - odor-active compound, 31–32, 33
 - two-stage process production, 27
- Apple vermouth
 - cider, 265
 - flow sheet, preparation, 266
 - PCA and descriptive analysis, 266–267

B

- Biotechnology, amarone
 - grape dehydration phase
 - hermohygrometric conditions, 302
 - infection, *B. cinerea*, 302–303
 - stages, 302
 - winemaking process
 - aging, 303
 - cold and alcohol tolerance, 303
 - sensory individuality, 303
- Botrytized wines
 - aging and stabilization
 - Botrytis* glucan, 189
 - calcium mucate crystals, 189
 - Cladosporium cellare*, 188, 189

- premium sauternes, 188
- Szamorodni, 188
- Tokaji aszú, 188
- biogenic amines
 - formation, 192
 - histamine contents, 192–194
 - malolactic fermentation, 192
 - occurrence, 193
 - Tokaji aszú, 194
- Botrytis cinerea*, 148
 - fermentation
 - chemical composition, 179–185
 - technique, 186–187
 - yeasts, 176–179
 - grape processing
 - cold pressing technology, 174–175
 - decanting, 175–176
 - maceration, 175
 - oxidation, 174
 - puttonyos aszú, 175
 - sulfiting, 175
 - harvest, production, 173–174
- health promoting attributes
 - antioxidant capacity, 191
 - polyphenols, 190
 - red wines, 190
 - resveratrol, 190
 - Sauvignon/Sémillon grapes, 192
 - Tokaji aszú, 189–190
- and late-harvest wines, 148
- mycotoxins
 - OTA, 194, 195
 - Penicillium* and *Aspergillus* species, 195
 - Prädikat wines, 195
- noble rot
 - effects, juice composition, 165–170
 - grape microbiota, 170–172
 - induction and control, 172–173
 - infection, *B. cinerea*, 161–162
 - process and conditions, 163–165
- sweet, 159–160
- technological and analytical parameters
 - French, Australian, South African and Californian, 152
 - Hungary, Germany and Austria, 150
- types
 - German and Austrian, 157–158
 - passito wines, 160–161
 - Sauternes and French styles, 158–159
 - Tokaji aszú, 149–156
- Bottle-aged port, 139

C

- “Camara de Lobos”, 211
- Canteiros, Madeira wines, 213–214
- Carbonic maceration (CM) wines
 - berry fermentation, 2
 - distinctive sensory characteristics
 - aging and shelflife, 4
 - aroma compounds, 4
 - color depth and tannic sensation, 3–4
 - esters, 4
 - foxy and raspberry aromas, 4
 - economy, 5
 - grape berries, AM
 - activation and termination, 13
 - anoxia, 12–13
 - cell exploitation, 11
 - CO₂, 12
 - cytoplasmic enzymes, 11–12
 - intracellular fermentation, 11
 - sequence, 12
 - grape-berry ripening, 13
 - history
 - description, 3
 - dessert grapes, 2–3
 - French Academy of Agriculture, 3
 - winemaking process
 - devatting, pressing, 8, 9
 - diffusion fermentations, 11
 - fermentation, 9–11
 - grape harvesting, transportation and vatting, 6–7
 - maceration-fermentation step, 7–8
 - steps, 5, 6
- Chemical composition, port wine
 - polyphenols
 - anthocyanins and flavan-3-ols, 138
 - color composition, 138
 - oxidative cycloaddition products, 138
 - phenolic compounds, 137–138
 - red wine, 137
 - volatiles
 - aroma, young port, 138–139
 - bottle-aged port, 139
 - dichloromethane extract, Touriga Nacional, 141
 - old tawny port wines, sulfur compounds, 142
 - oxidative reaction, 141–143
 - oxygen, free SO₂, pH and time/temperature, 140–141
 - sulfur compounds, young ports, 142
 - temperature and pH, 139–140

young ports, 140

Chemical composition, sherry wines

- alcohols
 - acetaldehyde, 24–25
 - ethanol, 24
 - glycerol, 25
- flor yeast, 23–24
- nitrogen compounds
 - amino acids, 25
 - S. cerevisiae*, 25
- organic acids, 26
- polyphenols
 - amontillado-type, 27
 - chromatograms, 27, 28
 - fino-type sherries, 26
 - LDA, 27–29
 - oloroso-type, 26–27

D

Douro Demarcated Region (DDR)

- Entrepoto de Gaia, 121
- grape varieties
 - blue-black, 127
 - climatic conditions, 125–126
 - red and white, 126, 127
 - Tinta Amarela, 128
 - Tinta Barroca, 128
 - Tinta Roriz, 128
 - Tinto Cão, 128
 - Touriga Franca (*see* Touriga Franca)
 - Vitis vinifera*, 126–127
- location, 122
- Lower Corgo, 122–124
- rabelo boats, 121
- socalcos-terraced vineyards, 120
- soil and climate
 - characterization, 125
 - rock formation, 124
 - schistous, 125
 - temperature, 125
- Upper Corgo, 123, 124
- Upper Douro, 123, 124

E

“Estufagem”, 213

F

Fermentation, botrytized musts

- chemical composition
 - aroma, 182–183, 184
 - carbonyl compounds, 182

Fermentation, botrytized musts (*cont.*)

- gas chromatography–olfactometry, 183
- high sugar content, 179–182
- nitrogen deficiency, 182
- odorants, 183
- traditional wines, 179, 180
- volatile thiols, 183, 186

technique

- carbonyl compounds removal, 187
- cessation, 186–187
- dimethyldicarbonate (DMDC), 187
- fermentors, 186
- temperature control, 186
- Tokaj aszú, 187

yeasts

- alcoholic, 177
- cryptotolerant, 177–178
- molecular identification methods, 178
- non-*Saccharomyces* species, 176
- population dynamics, 176
- starter cultures, 179
- S. uvarum* strains, 178
- taxonomy, 178
- technological traits, 179

Fino sherry

- aroma, 29–30
- biological aging, 30
- and oloroso wines, 27
- phenolic aldehydes, 27
- volatile compounds, 31

Flavoring, vermouth

- aging and finishing, 264
- bottling, 264
- fortification and blending, 264
- herbs and spices

- flavorants classification, 260
- plant part used, 261

methods

- alcoholic infusion, 263
- concentrates, 263
- direct extraction, 263
- macerating, 263–264

G

German and Austrian botrytized wines

- Ausbruch, 158
- Auslese, 157
- beerenauslese (BA) and trochenbeerenauslese (TBA), 157
- Ruster Ausbruch, 158
- Schloss Johannisberg vineyards, 157
- vinification technology, 157–158

H

“Hippocratic wine”, 254

I

Italian Vin Santo

- chemical and organoleptic characteristics
- alcohol content, 47
- color, 63
- composition, 62
- ethanol and sugar concentration, 47, 61
- flavor and taste, Tuscany, 65
- inoculated, volatiles compounds, 65
- residual sugar, 50–61
- styles characterization, 63
- sweet and sweet style, 62
- Tuscany, 61, 62
- Vigoleno, Barbieri, 62, 63
- volatile compounds, 62–63, 64
- vs.* white and red wines, 63–65
- classification and style
- nonaromatic passito wines, 46, 48
- passito wines, 46, 47
- sweetness and alcohol content, 47

J

Jaune wines, 21–22

L

Lactic acid bacteria (LAB), 299

M

Madeira wine making

- amino acids and biogenic amines
- chemical structure, 237
- concentration, 237–238
- nitrogen source, 236–237
- putrescine and cadaverine, 237
- authenticity
- physicochemical parameters, 242–244
- quality certificates, 242
- statistics analysis, 242–244

grape varieties

- poios, 211
- Tinta Negra, 210–211
- vineyards, 211
- Vitis vinifera* varieties, 210–211

history

- discovery, America, 209
- Germany, 210
- Napoleonic Wars, 210

- Portuguese explorations, 209
 - production and export, 210
 - quality control, 210
 - United States, 210
 - mineral composition, 238
 - organic acids, 236
 - parameters
 - analytical, 217
 - physiochemical subdivisions, 215–216
 - polyphenols, table
 - antioxidant capacity, 241
 - beneficial effects, 238, 240
 - biosynthesis, 239
 - chemical structures, 241
 - concentration, 243
 - metabolites, 239–240
 - nonflavonoid phenolic compounds, 239, 240
 - Palheiros red wine, 242
 - protocatechuic acid, 242
 - production and marketing
 - evolution, 214
 - V. vinifera* L. grapes, 214–215
 - specificity
 - baking process, “Estufagem”, 213
 - characteristics, 212
 - harvesting, 211
 - sweetness and divisions, 211–212
 - unit operations, 212
 - wooden casks support, “Canteiros”, 213–214
 - volatile and aroma compounds
 - constituents, 218–228
 - evolution, aging, 228–232
 - extraction techniques and analytical methodologies, 216–218
 - impact odorants, 232–235
 - Mango vermouth, 265
 - Mead production
 - description, 102
 - fermentation
 - alcohol content, 111–112
 - calcium alginate gels/pectate, 113–114
 - heat treatments, 112
 - honey, 113
 - honey pH, 112–113
 - microorganism, 110–111
 - optimization, 113
 - organic acid content, 113
 - production steps, 112
 - rate, 115
 - sugar content, 111
 - temperature and salt concentration, 113
 - flavorants, 115–116
 - honey
 - composition and physicochemical properties, 103–107
 - definition, Portuguese law, 103
 - description, 103
 - microbiota, 109–110
 - quality indicators, 107–109
 - postfermentation adjustments and maturation
 - aging, 114
 - bentonite, 114
 - brandy and alcohol content, 114
 - HMF and phenolic contents, 115
 - shelf life, 115
 - sturdy bottles, 115
 - sugar content, 114
 - production, 110–115
 - scientific and technical research, 102
 - yeast strain, 115
 - Montilla-Moriles wines
 - pedro ximenez, 34
 - two-stage aging process, 21
- N**
- “Noble late harvest”, 160
 - Noble rot, botrytized wines
 - effects, juice composition
 - acidity, 167
 - aroma composition, 169, 186
 - berry sugars, 166
 - cysteine-S-conjugates, 169–170
 - exocellular proteolytic enzymes, 167
 - galacturonic acid, 166–167
 - γ - and δ -lactones, 169
 - glycerol production, 166
 - nitrogen compounds, 168
 - polymerized quinones, 169
 - polysaccharides, 168
 - sugar content, 166–167
 - terpenols, 169
 - grape microbiota
 - acetic acid, 171–172
 - biocontrol agent, 171
 - Candida* species, 170–171
 - lactic acid bacteria, 172
 - Penicillium* and *Aspergillus* species, 171
 - Saccharomyces* species, 171
 - induction and control

Noble rot, botrytized wines (*cont.*)

- field inoculation, 172
- inoculation, 172
- spore suspensions, 172
- weather condition, 172–173

infection, *B. cinerea*

- conidiophore and conidia, 161
- cutinolytic activity, 162
- flowers and leaves, 162
- polyphageous, 161–162

process and conditions

- conidial germination, 165
- micropore formation and wound, epidermis, 164
- mycelia and conidiophores, 163–165
- peristomal microfissures, 163
- phytoalexins production, 165
- pourri roti, 163–165
- pourry plein, 163

O

Odor activity values (OAVs)

- odor thresholds, 225–226
- spider-web, odorants, 226, 227

Oloroso sherry

- benzoic and cinnamic acids, 27
- characterization, 26–27
- Z-whisky lactone, 31

P

Passito wines, 160–161

Physiochemical characteristics, vermouth

apple

- alcohol, 274
- sugar levels, 274

dry and sweet

- composition, 272
- plum, 273

mango, composition, 271, 272

minerals, 275

sand pear base wine and sweet, 273

viscosity, 275

wild apricot, spices level, 273, 275

Plum vermouth

- alcohol concentrations, 267–268
- spices and herbs, 267

Pomegranate vermouth, 269

Port wine

benefit

- IVDP, 129
- quantities, 130

scoring system, 129–130

vineyards classification, 130

chemical composition

- polyphenols, 137–138
- volatiles, 138–143

DDR (*see* Douro Demarcated Region)

description, 120

IVDP, IP, 121–122

production

- alcohol and sugar content, 130
- blending, 132
- bottle aging, 133
- grape crushing, 131, 132
- racking and fining, 131–132
- red port, 130–131
- spirit, 131
- vats/balseiros, 132, 133
- wood casks, 132
- young wine, 131

types

- age indication, 137
- colheita/data de colheita, 137
- color, 135
- crusted, 136–137
- LBV, 136
- reserve, 137
- rosé, 135
- ruby, 135
- sugar content, classification, 133–134
- sweetness, alcohol content and color, 133
- tawny, 135
- traditional, 136
- vintage, 136
- vintage cellar, 134
- white, 135

Production, amarone wine

“aging”, 296

alcoholic fermentation, 295, 296

grape selection

- alcohol content, 291–292
- arele* and *fruttaio*, 292
- harvested clusters, 292

maceration, 295

malolactic fermentation, 296

maturation, 296

postharvest grapes drying

- climatic data database, 295
- dehydration and weight loss, 292–293
- fungal invasion, 293–294
- gray rot, 293–294

- lofts, 295
 - loose moisture, 293–294
 - noble rot, 293–294
 - trays role, 294–295
 - sensory characteristics, 296
 - transformation and crushing, 295
- R**
- Red ports, 135
- S**
- Sand pear vermouth
- dry and sweet versions, 268–269
 - preparation, 268
- Sauternes botrytized wines, 158–159
- “Sélection de Grains Nobles” (SGN), 159
- Sensory quality, vermouth
- astringency and bitterness
 - sucrose, 278
 - time-intensity measurements, 276–278
 - flavor profiling
 - evaluation methods, 279
 - PCA, 279–280
 - quantitative descriptive analysis (QDA), 279
 - sweetness and viscosity, 278–279
 - wild apricot, levels
 - alcohol, 277
 - spices, 277
 - sugar, 276
- Sherry wines
- aroma and sensory characteristics, aging
 - acetaldehyde, 29–30
 - α -butyrolactone and pantolactone, 30–31
 - esters, 30
 - fino wines, 31
 - flor yeasts, 30
 - lactones, oak, 31
 - odor-active compounds, 31–32
 - odor activity value (OAV), 31
 - sotolon, 30
 - volatile compounds, 29
 - wood lactone, 31
 - chemical composition, biological and
 - oxidative aging
 - alcohols, 24–25
 - flor yeast, 23–24
 - nitrogen compounds, 25
 - organic acids, 26
 - polyphenols, 26–29
 - flor film microbiota
 - amino acids, urea and ammonium ions, 23
 - biological aging, 22
 - enzyme activity, 22–23
 - lactic acid bacteria, 23
 - physiological and molecular characterization, 22
 - making process
 - biological aging, 20
 - categories, 21
 - flor yeast, 19–20
 - jaune, 21–22
 - rocío, 21
 - solera and criadera, 20
 - steps, 19
 - sweet wines, 21
 - solera and criaderas system, 18
 - technology
 - accelerated biological aging, 32–33
 - drying condition, 34
 - organic grapes, 34–35
 - velum, 18–19
- T**
- Tamarind vermouth, 269
- Tinta Amarela, 128
- Tinta Barroca, 128
- Tinta Negra Madeira wines
- ethyl hexanoate and octanoate, 226
 - volatile compounds, 226
- Tinta Roriz, 128
- Tinto Cão, 128
- Tokaji aszú
- biogenic amine, 194
 - chemical composition, 156
 - curative powers, 189–190
 - Esszencia/Essencia, 155
 - Fordítás, Máslás and Szamorodni, 155
 - γ - and δ -lactones, 169
 - glycerol production, 166
 - grape cluster, aszú and shriveled berries, 154
 - harvest, 154
 - juice extraction, 175
 - noble-rotted grapes, 149
 - oak barrels, 155
 - vineyards, 149–154
- Touriga Franca
- description, 127
 - wine characterization, 128

Touriga Francesa. *See* Touriga Franca

Touriga Nacional

blue-black grapes, 127

Vitis vinifera, 126–127

V

Vermouth

base wine preparation

requirements, 258

sweetening and color intensification,
258

brandy distillation

fermentation, 259

fractions, 260

Saccharomyces bayanus, 259–260

categories, 252–253, 256

dry (French)

alcohol content, 257

base, 257–258

Europe, 257

fortifying alcohol, 257–258

Martini and Rossi, 258

flavoring, base wine

aging and finishing, 264

bottling, 264

fortification and blending, 264

herbs and spices, 260

methods, 260–264

history

France, 254

Piedmont (Italy), 254

rosé vermouth, 254–255

sweet and dry versions, 254

Vinum Hippocraticum, 254

wormwood, 253

legal requirements, 280

medicinal and aromatic value

oxidative stress, 255

properties, 255

nongrape fruits, preparation

apple, 265–267

mango, 265

plum, 267–268

pomegranate, 269

sand pear, 268–269

tamarind, 269

wild apricot, 269

quality

physiochemical characteristics,
270–275

sensory quality, 276–280

steps, production, 258, 259

sweet (Italian)

American, 256

California, 256–257

France, 256

muscat flavor, 256

pH addition, 257

Vinho do Porto. *See* Port wine

Vin Santo

alcoholic fermentation

analytical and organoleptic, yeast,
88–91, 89

apiculate yeasts, 81

Greco Bianco and Mantónico Bianco, 82

lactic acid bacteria, 81

madre addition, 83–84, 85

Malvasia and Zibibbo grapes, 82–83

microflora, 80–81

passito, 80

picolit, 82

starter inoculum, 84–88

vinsantaia, 80

yeasts, 81–82

barrel maturation

aging, 92

commercial yeast, 93

gross lees, 91

madre, 93

organoleptic characteristics, 93

oxidation, 92

oxygen, 92

phases, aging, 91

phenolic compounds, 92

sensorial characteristics, 94

sugar metabolism, 91

temperature, 91–92

vinsantaia, 91, 93

definition, 42–43

description, 42

drying, grapes

and aroma compounds, 77–79

factors, 76–77

metabolism, 76

techniques, 75–76

grape varieties

passito wines, 74–75

terpene aromas, 73–74

Italy

alcohol content, 44

chemical and organoleptic
characteristics, 47–65

classification and style, 46–47

color, 44

- definitions, 43, 44
- and European Union regulation, 66–67
- nonaromatic passito wines, 48
- passito wines grape drying system, 47
- production areas, 43
- sugar concentration, 43–44
- origin history, 45–46
- pressing and barrel filling
 - “caratelli”, 80
 - juice quality, 79–80
 - temperature, 80
- production
 - areas, 42
 - Florence, 73
 - and marketing, 67–73
 - in Tuscany, 68, 69, 71
 - Vigoleno, 71
- Santorini
 - PDO Santorini, 45
 - taste, 45
 - white grape varieties, 45
- Volatile and aroma compounds, Madeira
 - wine
- constituents
 - compositional parameters, 219
 - ethyl hexanoate and octanoate, 226
 - furan compound values, 235
 - higher alcohols, 226
 - monoterpenoids, 219–224
 - multivariate analysis, 225–226
 - OAVs, 225–226
 - odor-active, 218–219
 - odor descriptors and threshold, 219
 - odor thresholds, 220, 225–226
 - PCA and SLDA, 224–225
 - prefermentative, fermentative and post
 - fermentative, 219
 - profile, varietal origin, 225
 - short-chain aldehydes and alcohols,
 - 227
 - spider-web, odorants, 226, 227
 - V. vinifera*, 224

- evolution, aging
 - chemical families, 232
 - γ -decalactone, 229
 - FAEE and EE concentration, 230
 - heterocyclic acetals, 229–230
 - linear correlation, concentration and
 - age, 230
 - Malvasia wines, aged 1 and 25, 230, 231
 - 3-methylbutan-1-ol and 2-
 - phenylethanol content, 230
 - oak aromas, 228–229
 - potential age markers, 230–232
 - sensory attributes, 228
 - temperature and time, baking, 232
- extraction techniques and analytical
 - methodologies
 - compound analysis, low
 - concentrations, 216–218
 - gas chromatograph detectors, 218
 - GC X GC, 218
 - legal limits, 216
 - SPME and SPDE, 218
 - wine matrix complexity, 216–218
 - impact odorants, 232–235

W

- Wild apricot vermouth
 - evaluation, 269
 - preparation
 - extract, 270
 - flow sheet, 271
- Winemaking process, CM
 - anaerobic metabolism, grape berries, 6
 - devatting, pressing, 8, 9
 - diffusion fermentations, 11
 - fermentation, 9–11
 - grape harvesting, transportation, and
 - vatting, 6–7
 - maceration-fermentation step, 7–8
 - steps, 5, 6
 - “Wine of hospitality”, 45