INDEX

A	pasteurization processes, 106 PCA, 98–99
Acetaldehyde	potentiometric ion-selective sensors,
accumulation, 160	104
concentrations, 162	
free and bound SO ₂ , 160-161	potentiometric sensors, 103, 106
Adulteration, 59, 99	predicting sensorial attribution, 100
Alcoholic fermentation, 4	pulse voltammetry, 101
Allergens, 205	sensorial analysis, 100–102
Amperometric detection, 98	SIMCA models, 99–100
Aroma, wine	square wave and cyclic voltammetry,
effects, 172–177	98
oxidation, 158–159	tea analysis, 104
Artificial effervescence, 27	water monitoring approaches, 103
Artificial neural networks (ANNs),	wine
91–92	adulterations, 99
Artificial tongue	age prediction, 101
adulteration and food falsification, 59	characterization, 98
analytical techniques	food taste properties, 66
impedance spectroscopy, 68–69	historical aspects, 62–63
potentiometry, 67	liquid food, 64–65
voltammetry, 68	nonspecific analytical responses, 60
beverage differentiation, 65	pharmaceutical technology studies, 64
chemometrics	production phase, 58
classification and class-modeling,	qualitative approach and quantitative
83–93	applications, 63
exploratory analysis, 79–83	research-and-development, 58
multivariate experimental design,	sensations, mammals, 60
71–73	terminology, 61–62
preprocessing, 73–78	vanguard analytical strategies, 59
regression techniques, 93–96	variability amount implications, 58
validation, 96–98	_
environmental analyses, 64	В
food science	Beverages. See Champagne and sparkling
aging process, 103	beverages
amperometric detection, 98	Biofilms, 130
ANN models, 100	Biosensors, 103
biosensors, 103	Bubble
commercial electronic tongue, 105	bubbling regimes, 23–24
cross-validation approach, 104–105	bursting process
glucose and ascorbic acid	avalanches, 51–53
determination, 104	flower-shaped structures, 48–49
hybrid sensor, 99	hexagonal pattern arrangement, 47–48
impedance measurements, 98	high-speed photography, 43–44
T	

Bubble (cont.)	photoactive fullerene derivatives, 132
schematic transversal representation,	spore formation, 130
50–51	viruses and structures, 131–132
shear stresses, 49–50	Champagne and sparkling beverages
surface active molecules, 45-47	bubble growth
close-up time sequence and mechanism,	characteristics, 28–29
25	high-speed photography and strobe
growth	lighting, 28
characteristics, 28–29	pressure, 30–31
high-speed photography and strobe	bubble nucleation process
lighting, 28	artificial effervescence, 27
pressure, 30–31	bubbling instabilities, 23–27
microbubbles, 151	cellulose fibers, 15–23
micrometric gas bridge establishment, 26	critical radius, 12–13
size	natural effervescence, 13–15
carbon dioxide content, 33-34	bubbles bursting process
gravity acceleration, 32–33	avalanches, 51-53
pressure, 33	flower-shaped structures, 48-49
significant difference, 34	hexagonal pattern arrangement, 47-48
temperature dependence, 32	high-speed photography, 43-44
two gas pockets, 26	schematic transversal representation,
Bubble nucleation process, champagne	50–51
artificial effervescence, 27	shear stresses, 49–50
bubbling instabilities	surface active molecules, 45-47
bubbling regimes, 23–24	bubble size
close-up time sequence and	carbon dioxide content, 33-34
mechanism, 25	gravity acceleration, 32-33
micrometric gas bridge establishment,	pressure, 33
26	significant difference, 34
two gas pockets, 26	temperature dependence, 32
cellulose fibers	chemical composition, 8–9
bubbling frequency, 20–22	CO ₂ dissolved gas molecules
CO ₂ dissolved concentration, 19–20	blending, 4
conditions, 18	first alcoholic fermentation, 4
real gas pocket trapping, 18–19	second alcoholic fermentation, 5–6
structural levels, 15–16	flute vs. coupe
critical radius, 12–13	champagne serving, 36–37
natural effervescence, 13–15	CO ₂ -dissolved concentrations, 37–38
С	time series data recordings, 39–40
<u> </u>	pressure under the cork, 6–8
Cabernet Sauvignon wine, 169	temperature, role of, 42–43
Cell intraction, photosensitizers	uncontrolled champagne cork, 9–12
biofilms, 130	Chemometrics
cytotoxic species, 125	classification and class-modeling
electron microphotographs, Bacillus	artificial neural networks, 91–92
cereus, 128	class-modeling techniques, 92–93
fungal cells and yeasts, 127, 130	<i>k</i> -nearest neighbors, 85–86
gram negative bacteria, 127, 129	linear discriminant analysis, 86–89
gram-positive bacteria, 127–128	quadratic discriminant analysis, 88
killing effects, 129	soft independent modeling of class
metabolic pathways, 127	analogy, 90–91
modes of light delivery, 133	unequal class models, 88, 90

column centering, 76 exploratory analysis clustering, 82–83 principal component analysis, 79–82 multivariate experimental design experimental factors, 71 factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 signal compression and variable time sequence, 15 visual aspects, 38 Electronic tongue, 103. See also Artificial tongue Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment, 216
exploratory analysis clustering, 82–83 principal component analysis, 79–82 multivariate experimental design experimental factors, 71 factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 visual aspects, 38 Electronic tongue, 103. See also Artificial tongue Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment 216
clustering, 82–83 principal component analysis, 79–82 multivariate experimental design experimental factors, 71 factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 Electronic tongue, 103. See also Artificial tongue Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment 216
principal component analysis, 79–82 multivariate experimental design experimental factors, 71 factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 tongue Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment 216
multivariate experimental design experimental factors, 71 factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment 216
experimental factors, 71 factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215–216 fermented milk products, 217–218
factorial scheme, 71–72 regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 Fatty acids, 198–200 Food and Agricultural Organization (FAO) 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218
regression techniques ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 forward and backward currents, 76 forward second order derivation, preprocessing treatment, 216 forward second order derivation, preprocessing treatment, 216 forward second order derivation, preprocessing treatment, 216
ordinary least squares, 93–94 partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 forward and backward currents, 76 forward squares, 93–94 59 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment, 216
partial least squares, 94–96 row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 Food falsification, 59 Food processing, maroma milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment, 216
row preprocessing effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76
effectiveness, 73–74 exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76
exploratory analysis, 79–83 first and second order derivation, 75–76 forward and backward currents, 76 milk amino acid composition, 215–216 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment, 216
first and second order derivation, 75–76 forward and backward currents, 76 first and second order derivation, 75–76 forward and backward currents, 76 fermented milk products, 217–218 preprocessing treatment, 216
75–76 chemical composition, 215 fermented milk products, 217–218 preprocessing treatment, 216
forward and backward currents, 76 termented milk products, 217–218 preprocessing treatment, 216
preprocessing freatment /16
reduction small-scale method, 216–217
SELECT, 78 thermal treatment, 216
wavelet transform, 77–78 oil, 218
signal variations, 75 protein-rich morama flours
standard normal variate transform, 75
validation dry neating process, 222
cross validation, 97 physico-chemical and protein-related
repeated evaluation set, 98 functional properties, 223
preparation /18=/19
single evaluation set, 97 processing procedure, 220
strategy, 70–77 proving to composition 210, 220
Codex Alimentarius Commission (CODEX), 59 Uses, 222 uses, 222
CO ₂ dissolved gas molecules, beverages
blending, 4
bubbling environment, 35 Glucose and ascorbic acid, 104 first alcoholic fermentation, 4 Glutathione 163
Glattinone, 100
flute vs. coupe
champagne serving, 36–37
time series data recordings, 39–40 vessel influence, 37–38 Hybrid sensor, 99
· · · · · · · · · · · · · · · · · · ·
second alcoholic fermentation, 5–6 temperature, role of, 42–43 K
1 , ,
Cross validation (CV), 97 Cyanogenic glycosides 205 k-Nearest neighbors (k-NN), 85–86
Cyanogenic grycosiaes, 200
Cytotoxic species
photoexcitation, photosensitizer, 125
photoexcitation, photosensitizer, 125 PS-excited triplet reaction, 125–126 Linear discriminant analysis (LDA), 86–89
photoexcitation, photosensitizer, 125
photoexcitation, photosensitizer, 125 PS-excited triplet reaction, 125–126 Linear discriminant analysis (LDA), 86–89
photoexcitation, photosensitizer, 125 PS-excited triplet reaction, 125–126 ROS, 126 E Linear discriminant analysis (LDA), 86–89 M
photoexcitation, photosensitizer, 125 PS-excited triplet reaction, 125–126 ROS, 126 E Linear discriminant analysis (LDA), 86–89 M
photoexcitation, photosensitizer, 125 PS-excited triplet reaction, 125–126 ROS, 126 E M Effervescence process Malachite green, 137

Microoxygenation (MOX)	chemical composition, 215
acetaldehyde	fermented milk products, 217-218
accumulation, 160	preprocessing treatment, 216
concentrations, 162	small-scale method, 216–217
free and bound SO ₂ , 160-161	thermal treatment, 216
aroma effects, 172-177	minor chemical components
microbiological considerations, 179-181	minerals, 203
microbullage delivery, 151-152	phytoestrogens, 203-204
mouthfeel effects, 177-179	vitamins, 203
oxygen spatial considerations, 153-154	moisture, 196
polymer membrane, oxygenation	oil, 218
procedures, 152–153	pests and diseases, 192
red wine color effects and polyphenol	phenolic compounds, 205-207
development	phytosterols, 198, 201
antioxidant assays, 170	potential marketing strategies
Cabernet Sauvignon wine, 169	commercialization strategies,
chemical and instrumental analyses,	229–230
172	competition, 225
color intensity, 164	conjoint analysis, 228–229
color properties, 166	consumer purchasing characteristics,
HPLC analyses, 165	225–227
Monastrell wine, 166–167	market size and characteristics, 224
pigment composition, 165	retail environment, 224–225
polymeric pigments and color	protein, 201–202
density, 168	protein-rich morama flours
red wine maturation, 158	amino acid composition, 221
SO ₂ influence and wine antioxidants,	dry heating processes, 222
162–164	physico-chemical and protein-related
wine oxidation processes	functional properties, 223
oxygen in wine, 154–155	preparation, 218–219
polyphenol-mediated, 155–157	processing procedure, 220
wine aromas, 158–159	proximate composition, 219–220
Monastrell wine, 166–167	uses, 222
Morama bean (Tylosema esculentum)	seed morphology, seedling development
allergens, 205	and growing stages, 192
ash content, 196	soil organic matter, 195
availability, 232–233	soil pH, 193–195
carbohydrate/dietary fiber, 202	staple food, 234
chemical composition, 195–196	triacylglycerols, 198
cultivation, 235–236	trypsin inhibitor, 204–205
cyanogenic glycosides, 205	values, 231–232
dietary use, 233	varieties and classification, 193
economic importance, 189	MOX. See Microoxygenation
fatty acids, 198–200	MRM, 92–93
geographic distribution and description,	Multivariate design of experiments
190–192	(MDOE)
health benefits, 206, 208–212, 233–234	chemometrics, 69
lipids, 196, 198	experimental factors, 71
market, 236–237 milk	factorial scheme, 71–72
	Multivariate range modeling (MRM),
amino acid composition, 215-216	92–93

251

N	photoactive fullerene derivatives, 132
Natural effervescence	spore formation, 130
lumen, 13	viruses and structures, 131–132
mechanism, 14	cytotoxic species
time sequence, 15	photoexcitation, photosensitizer, 125
•	PS-excited triplet reaction, 125–126 ROS, 126
0	effects, 120
Ordinary least squares (OLS), 93	evironmental cleaning and disinfection
Oxidation processes	biofilm destruction and inactivation,
photosensitized oxidation, 123	140
wine	food-grade PSs, 140
aldehydes, 156	immobilized photoactive dyes, 139
aromas, 158–159	inactivate pathogens, 141
condensation processes, 157	photobleaching, 142–143
oxygen, 154–155	self-cleaning materials, 143
polyphenol quinones, 156	virus inactivation, 138
	photoactive dyes (see Photoactive dyes)
P	photochemical reaction, 122
Partial least squares (PLS), 94–96	photophysical reaction, 121
Pasteurization, 106	photosensitized oxidations, 123
PDT. See Photodynamic treatment	photosensitized reactions, 122
Pests and diseases, 192	Phytosterols, 198, 201
Phenolic compound, 205–207	PLS. See Partial least squares
Phenothiazinium dyes, 136	Polyphenols
Phloxine B, 137	oxidation processes aldehydes, 156
Photoactive dyes	condensation processes, 157
antimicrobial properties, 134	polyphenol quinones, 156
cationic polymer poly (vinyl amine), 138	wine aroma, 158
cationic porphyrin derivatives, 134	red wine maturation, 150
endogenous porphyrins, 135	Porphyrin derivatives, 135
malachite green, 137	Potentiometric ion-selective sensors,
MB, 136–137	104
medical and therapeutic applications, 133	Potentiometric sensors, 103, 106
phenothiazinium dyes, 136	Principal component analysis (PCA)
phloxine B, 137 porphyrin derivatives, 135	patern recognition tools, 104
rose bengal, 137	red wine, color effects, 169
TBO, 136	voltammograms, 80
Photodynamic treatment (PDT)	Protein-rich morama flours
application and principles, 123	amino acid composition, 221
cell intraction, PSs	dry heating processes, 222
biofilms, 130	physico-chemical and protein-related functional properties, 223
electron microphotographs, Bacillus	preparation, 218–219
cereus, 128	processing procedure, 220
fungal cells and yeasts, 127, 130	proximate composition, 219–220
gram negative bacteria, 127, 129	uses, 222
gram-positive bacteria, 127–128	•
killing effects, 129	Q
metabolic pathways, 127	Quadratic discriminant analysis (QDA) 00
modes of light delivery, 133	Quadratic discriminant analysis (QDA), 88

R	U
Red wine	Unequal class models (UNEQ), 88, 90
color effects color development, 166	W
PCA projection, 169 polymeric pigments, 168 polyphenol antioxidant measures, 170 wine color parameters, 165, 167–168 maturation, 158 S Sangiovese wine, 168 Soft independent modeling of class analogy (SIMCA), 90–91 Sulfur dioxide antioxidants free SO ₂ , 162 glutathione, 163 quinone reduction processes, 163 wine-aging processes, 163 free and bound SO ₂ , 160–161	Wine adulterations, 99 age prediction, 101 antioxidants free SO ₂ , 162 glutathione, 163 quinone reduction processes, 163 wine-aging processes, 163 characterization, 98 color parameters in Cabernet Sauvignon, 169 in Monastrell wine, 166–167 in Sangiovese wine, 168 oxidation processes aromas, 158–159 oxygen, 154–155 polyphenol-mediated, 155–157 red wine (see Red wine) World Health Organization (WHO), 59
Triacylglycerols, 198 Trypsin inhibitor, 204–205	