



Pavia, 21 July 2025

Spett.le
Acque Minerali Val Menaggio S.r.l.
Piazza del Popolo 1, Como

Chemical and chemical-physical analyses on samples of natural mineral water named **CHIARELLA** collected in Plesio (Como), Italy, on May 26, 2025.

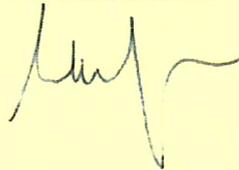
Limpid, colourless and odourless water				APAT IRSA-CNR 2003
Temperature of air	°C	14.4		
Water temperature at source	°C	10.6		2100 APAT IRSA-CNR 2003
pH at source		7.5		2060 APAT IRSA-CNR 2003
Specific conductance at 20°C	µS/cm	362		2030 APAT IRSA-CNR 2003
Total dissolved solids at 180°C	mg/L	238		2090 APAT IRSA-CNR 2003
Oxidability with permanganate (Kubel)	O ₂	mg/L	0.3	UNI EN ISO 8467:1997
Free carbon dioxide	CO ₂	mg/L	15	4010 APAT IRSA-CNR 2003
Silica	SiO ₂	mg/L	4.0	S.M. 3120 B (a)
Hydrogencarbonate	HCO ₃ ⁻	mg/L	256	2010 APAT IRSA-CNR 2003
Chloride	Cl ⁻	mg/L	0.7	4020 APAT IRSA-CNR 2003
Sulphate	SO ₄ ²⁻	mg/L	6.3	4020 APAT IRSA-CNR 2003
Sodium	Na ⁺	mg/L	1.1	S.M. 3120 (a)
Potassium	K ⁺	mg/L	0.20	S.M. 3120 (a)
Calcium	Ca ²⁺	mg/L	45.0	S.M. 3120 B, 3500-Ca B (a)
Magnesium	Mg ²⁺	mg/L	26.6	S.M. 3120 B, 3500-Mg B (a)
Iron (dissolved)	Fe	mg/L	< 0.01	S.M. 3125 B, 3120 B (a)
Ammonium	NH ₄ ⁺	mg/L	< 0.05	4030 A2 APAT IRSA-CNR 2003
Phosphorus (total)	P	mg/L	< 0.05	4110 APAT IRSA-CNR 2003
Sulfide (total)	H ₂ S	mg/L	< 0.01	4160 APAT IRSA-CNR 2003; S.M. 4500S ² D (a)
Strontium	Sr ²⁺	mg/L	0.03	S.M. 3125 B, 3120 B (a)
Lithium	Li ⁺	mg/L	< 0.01	S.M. 3125 B, 3120 B (a)
Aluminium	Al	mg/L	< 0.01	S.M. 3125 B (a)
Bromide	Br ⁻	mg/L	< 0.1	4020 APAT IRSA-CNR 2003
Iodide	I ⁻	mg/L	< 0.05	S.M. 3125 B, (a)
Antimonium	Sb	mg/L	< 0.0012	S.M. 3125 B (a) (b)
Arsenic	As	mg/L	0.002	S.M. 3125 B (a) (b)
Barium	Ba	mg/L	< 0.1	S.M. 3125 B, 3120 B (a) (b)
Boron	B	mg/L	< 0.5	S.M. 3125 B, 3120 B (a) (b)
Cadmium	Cd	mg/L	< 0.0003	S.M. 3125 B (a) (b)
Chromium	Cr	mg/L	< 0.005	S.M. 3125 B (a) (b)
Copper	Cu	mg/L	< 0.1	S.M. 3125 B (a) (b)
Cyanide (total)	CN ⁻	mg/L	< 0.001	S.M. 4500-CN ⁻ E (a) (b)
Fluoride	F ⁻	mg/L	< 0.1	4100 APAT IRSA-CNR 2003 (b)
Lead	Pb	mg/L	< 0.001	S.M. 3125 B (a) (b)
Manganese	Mn	mg/L	< 0.01	S.M. 3125 B, 3120 B (a) (b)

Mercury	Hg	mg/L	< 0.0002	S.M. 3125 B (a) (b)
Nickel	Ni	mg/L	< 0.002	S.M. 3125 B (a) (b)
Nitrate	NO ₃ ⁻	mg/L	6.4	4020 APAT IRSA-CNR 2003 (b)
Nitrite	NO ₂ ⁻	mg/L	< 0.002	4050 APAT IRSA-CNR 2003 (b)
Selenium	Se	mg/L	< 0.001	S.M. 3125 B (a) (b)
Anionic surfactants (as LAS)		µg/L	< 50	5170 APAT IRSA-CNR 2003 (c)
Oil, grease, dissolved, hydrocarbons, emulsion		µg/L	< 10	5160 APAT IRSA-CNR 2003 (c)[UW1]
Benzene		µg/L	< 0.5	UNI EN ISO 17943:2016 (c)
Benzo(a)pyrene		µg/L	< 0.003	5080 APAT IRSA-CNR 2003 (c)
Benzo(b)fluoranthene		µg/L	< 0.006	5080 APAT IRSA-CNR 2003 (c)
Benzo(k)fluoranthene		µg/L	< 0.006	5080 APAT IRSA-CNR 2003 (c)
Benzo(ghi)perylene		µg/L	< 0.006	5080 APAT IRSA-CNR 2003 (c)
Dibenzo(a,h)anthracene		µg/L	< 0.006	5080 APAT IRSA-CNR 2003 (c)
Indeno(1,2,3-cd)pyrene		µg/L	< 0.006	5080 APAT IRSA-CNR 2003 (c)
Others polynuclear aromatic hydrocarbons		µg/L	< 0.006	5080 APAT IRSA-CNR 2003 (c)
Pesticides (Insecticides, herbicides, fungicides, nematicides, acaricides, algicides, rodenticides, metabolites and by-products), individual compound		µg/L	< 0.05	ISS.CBA.049.Rev.00(c); 5060 APAT IRSA-CNR 2003(c); EPA 3535A 2007(c), EPA 8321B 2007(c)
Aldrin, Dieldrin, Eptachlor, Eptachlor epoxide (individual compound)		µg/L	< 0.01	5060 APAT IRSA-CNR 2003, EPA 3535A 2007 (c);
Polychlorinated biphenyls (individual congener)		µg/L	< 0.05	EPA 3535 A2007 (c); EPA 1628 2021 (c)
Chloroform		µg/L	< 0.5	UNI EN ISO 17943:2016 (c)
Chlorodibromomethane		µg/L	< 0.5	UNI EN ISO 17943:2016 (c)
Dichlorobromomethane		µg/L	< 0.5	UNI EN ISO 17943:2016 (c)
Bromoform		µg/L	< 0.5	UNI EN ISO 17943:2016 (c)
Trichloroethylene,		µg/L	< 0.1	UNI EN ISO 17943:2016 (c)
Tetrachloroethylene		µg/L	< 0.1	UNI EN ISO 17943:2016 (c)
1,2-dichloroethane		µg/L	< 0.1	UNI EN ISO 17943:2016 (c)
Halogenated compounds not included in pesticides and polychlorinated biphenyls lists (individual compound)		µg/L	< 0.1	UNI EN ISO 17943:2016 (c)
Total hardness	CaCO ₃	mg/L	222	S.M. 2340 B (a)

- (a) Reference: "Standard Methods for the Examination of Water and Wastewater" - APHA Editor, 22nd Edition.
 (b) Performance characteristics for the analysis of the constituents in Annex I-Decreto del Ministero della Salute 10/2/2015.
 (c) Methods detection limits as in Annex II-Decreto del Ministero della Salute 10/2/2015.

Evaluation (Italian D.Lgs 176/2011): low mineral water.

Prof.ssa Antonella Profumo





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List of the pesticides searched:

	µg/L	
Aldrin	<0.01	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Dieldrin	<0.01	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Eptacloro epossido	<0.01	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Eptacloro	<0.01	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
AMPA	<0.05	ISS.CBA.049.Rev.00+EPA 3535A 2007+EPA 8321B 2007
Bentazone	<0.05	EPA 3535A 2007+EPA 8321B 2007
Glifosato	<0.05	ISS.CBA.049.Rev.00+EPA 3535A 2007+EPA 8321B 2007
Diclobenil	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Atrazina desetil	<0.05	EPA 3535A 2007+EPA 8321B 2007
Clorpirifos-metile	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Terbutilazina	<0.05	EPA 3535A 2007+EPA 8321B 2007
s-metolaclor	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Dazomet	<0.05	EPA 3535A 2007+EPA 8321B 2007
Pendimetalin	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Mesotrione	<0.05	EPA 3535A 2007+EPA 8321B 2007
Isossafutolo	<0.05	EPA 3535A 2007+EPA 8321B 2007
Captano	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Clorpirifos	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
MCPA	<0.05	EPA 3535A 2007+EPA 8321B 2007
Metaldeide	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Propamocarb	<0.05	EPA 3535A 2007+EPA 8321B 2007
Ciprosulfamide	<0.05	EPA 3535A 2007+EPA 8321B 2007
Sulcotrione	<0.05	EPA 3535A 2007+EPA 8321B 2007
Dicamba	<0.05	EPA 3535A 2007+EPA 8321B 2007
Teflutrin	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Tebuconazolo	<0.05	EPA 3535A 2007+EPA 8321B 2007
2,4 D (2, 4 Diserbin E)	<0.05	EPA 3535A 2007+EPA 8321B 2007
Tiencarbazone	<0.05	EPA 3535A 2007+EPA 8321B 2007
Boscalid	<0.05	EPA 3535A 2007+EPA 8321B 2007
Tolclofos metile	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Nicosulfuron	<0.05	EPA 3535A 2007+EPA 8321B 2007
Triclopir	<0.05	EPA 3535A 2007+EPA 8321B 2007
Atrazina desetile	<0.05	EPA 3535A 2007+EPA 8321B 2007
Alaclor	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
alfa-HCH	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Ametrina	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
beta-HCH	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Bromacile	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Bromopropilato	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Carbaryl	<0.05	EPA 3535A 2007+EPA 8321B 2007
Clordano	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Clortoluron	<0.05	EPA 3535A 2007+EPA 8321B 2007
delta-HCH	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
2, 6-Diclorobenzamide	<0.05	EPA 3535A 2007+EPA 8321B 2007
Diclofluanid	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Dicofol	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Endosulfan beta	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Endosulfan alfa	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003

Endrin	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
gamma-HCH (Lindano)	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Esaclorobenzene	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Esazinone	<0.05	EPA 3535A 2007+EPA 8321B 2007
Isodrin	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Linuron	<0.05	EPA 3535A 2007+EPA 8321B 2007
Parathion-etile	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
pp'-DDD	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
pp'-DDE	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Propazina	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Simazina	<0.05	EPA 3535A 2007+EPA 8321B 2007
Terbutilazina-desetile	<0.05	EPA 3535A 2007+EPA 8321B 2007
Tetraclorvinfos	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Tetradifon	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Trifluralin	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003
Vinclozolin	<0.05	EPA 3535A 2007 +5060 APAT IRSA-CNR 2003

Elenco di tutti gli Idrocarburi Policiclici Aromatici ricercati

	µg/L	
Acenaftene	<0.006	5080 APAT IRSA-CNR 2003
Acenaftilene	<0.006	5080 APAT IRSA-CNR 2003
Antracene	<0.006	5080 APAT IRSA-CNR 2003
Benzo(a)antracene	<0.006	5080 APAT IRSA-CNR 2003
Benzo(a)pirene	<0.003	5080 APAT IRSA-CNR 2003
Benzo(b+j)fluorantene	<0.006	5080 APAT IRSA-CNR 2003
Benzo(e)pirene	<0.006	5080 APAT IRSA-CNR 2003
Benzo(g,h,i)perilene	<0.006	5080 APAT IRSA-CNR 2003
Benzo(k)fluorantene	<0.006	5080 APAT IRSA-CNR 2003
Crisene	<0.006	5080 APAT IRSA-CNR 2003
Dibenzo(a,e)pirene	<0.006	5080 APAT IRSA-CNR 2003
Dibenzo(a,h)antracene	<0.006	5080 APAT IRSA-CNR 2003
Dibenzo(a,h)pirene	<0.006	5080 APAT IRSA-CNR 2003
Dibenzo(a,i)pirene	<0.006	5080 APAT IRSA-CNR 2003
Dibenzo(a,l)pirene	<0.006	5080 APAT IRSA-CNR 2003
Fenantrene	<0.006	5080 APAT IRSA-CNR 2003
Fluorantene	<0.006	5080 APAT IRSA-CNR 2003
Fluorene	<0.006	5080 APAT IRSA-CNR 2003
Indeno(1,2,3-cd)pirene	<0.006	5080 APAT IRSA-CNR 2003
Naftalene	<0.006	5080 APAT IRSA-CNR 2003
Perilene	<0.006	5080 APAT IRSA-CNR 2003
Pirene	<0.006	5080 APAT IRSA-CNR 2003

Elenco di tutti i Policlorobifenili (congeneri) ricercati

	µg/L	
PCB-28	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-31	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-52	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-77	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-101	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-105	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-118	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-126	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-128	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-138	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-153	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-156	<0.05	EPA 3535 A2007; EPA 1628 2021
PCB-169	<0.05	EPA 3535 A2007; EPA 1628 2021

Elenco di tutti i composti organoalogenati ricercati (che non rientrano nelle voci 5 e 6)

	µg/L	
Clorometano	<0.1	UNI EN ISO 17943:2016
Diclorometano	<0.1	UNI EN ISO 17943:2016
Cloroformio	<0.5	UNI EN ISO 17943:2016
Cloruro di vinile	<0.1	UNI EN ISO 17943:2016
1,2-dicloroetano	<0.1	UNI EN ISO 17943:2016
1,1-dicloroetano	<0.1	UNI EN ISO 17943:2016
Tricloroetilene	<0.1	UNI EN ISO 17943:2016



Tetracloroetilene	<0.1	UNI EN ISO 17943:2016
Esaclorobutadiene	<0.1	UNI EN ISO 17943:2016
Tetracloruro di carbonio	<0.1	UNI EN ISO 17943:2016
1,1-dicloroetano	<0.1	UNI EN ISO 17943:2016
1,2-dicloropropano	<0.1	UNI EN ISO 17943:2016
1,1,1-tricloroetano	<0.1	UNI EN ISO 17943:2016
1,1,2-tricloroetano	<0.1	UNI EN ISO 17943:2016
1,2,3-tricloropropano	<0.1	UNI EN ISO 17943:2016
1,1,2,2-tetracloroetano	<0.1	UNI EN ISO 17943:2016
1,2-dicloroetilene (cis)	<0.1	UNI EN ISO 17943:2016
1,2-dicloroetilene (trans)	<0.1	UNI EN ISO 17943:2016
Bromoformio	<0.5	UNI EN ISO 17943:2016
1,2-dibromoetano	<0.1	UNI EN ISO 17943:2016
Clorodibromometano	<0.5	UNI EN ISO 17943:2016
Diclorobromometano	<0.5	UNI EN ISO 17943:2016

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