

Drinking Water Quality - Off-Flavour Compounds

BMF 76 - Drinking Water Quality - Off-Flavour Compounds

Clean and safe drinking water is essential for life! Therefore water quality, as well as taste and odour, are highly regulated and monitored. It is also a matter of public trust in your local drinking water.

Off-flavours of drinking water are often taints of either products from microorganisms or from food products.

Some algae, particularly blue-green algae (cyanobacteria) such as *Anabaena*, produce 2-methylisoborneol (MIB) together with other odourous chemicals such as geosmin. These two compounds typically affect the flavour of drinking water or fish living in that water.

Geosmin has a distinct earthy flavour and taste, while 2-methylisoborneol (MIB) gives a musty and earthy flavour to water and is often associated with algal blooms. MIB is also a factor in cork-taint in wine-making.

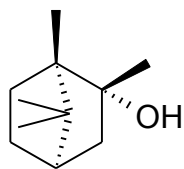


Typical off-flavour compounds:

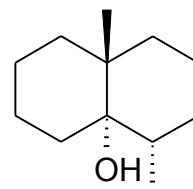
Reference Materials available from Chiron:

Catalogue No.	Name	Abbreviation	CAS No.	Flavour
3887.11-100-ME	(+/-)-2-Methylisoborneol	MIB	2371-42-8	Musty, earthy
10949.11-100-ME	(-)-2-Methylisoborneol- <i>d</i> 3	MIB- <i>d</i> 3	135441-89-3	
3888.12-100-ME	(+/-)-Geosmin		16423-19-1	Earthy
10950.12-100-ME	(+/-)-Geosmin- <i>d</i> 5		216166-83-5 (as enantiomeric form)	
Mixes:				
S-4858-100-ME	Geosmin / MIB Mix.			
S-4859-100-ME	Geosmin- <i>d</i> 5 / MIB- <i>d</i> 3 Internal Standard Mix.			

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2-Methylisoborneol (d3)



Geosmin (d5)

Other off-flavour compounds:

Skatole (3-methylindole) is a mildly toxic compound, which occurs in faeces (produced in the mammalian digestive tract) and has a strong faecal odour. In lower concentrations it has a flowery smell.

Methional is a degradation product of methionine. It is a notable flavour in potato based snacks, i.e. potato chips.

Three haloanisoles can cause “musty” odors in commercial wines:

1. TCA (2,4,6-trichloroanisole) is formed from chlorination of natural wood-phenol and transformed to anisol by biomethylation.
2. TeCA (2,3,4,6-tetrachloroanisole) is formed from the wood preservative TeCP by biomethylation.
3. TBA (2,4,6-tribromoanisole) is formed from the flame retardant TBP (2,4,6-tribromophenol) by biomethylation.

3-Methyl-2-buten-1-thiol (MBT) has a strong smell typical of sulfur compounds. MTB is formed when beer is exposed to daylight.

Nootkatone is the most important aroma compound of grapefruit.

Carvone occurs in two enantiomeric forms, the (*R*)-isomer smells like spearmint, while the mirror image the (*S*)- form smells like caraway.

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Reference materials available from Chiron:

Catalogue No.	Name	Abbrev. / Alternative name	CAS No.	Flavour
3886.9-100-ME	Skatole	3-Methylindole	84-34-1	Faecal odour
10951.9-100-ME	Skatole- <i>d3</i>	3-Methyl- <i>d3</i> -indole	111399-60-1	
10952.9-100-ME	Skatole- <i>d8</i>	3-Methyl- <i>d3</i> -indole- <i>d5</i>	697807-03-7	
3890.4-100-ME	Methional	3-Methylpropionaldehyde	3268-49-3	Potato based snacks
11295.7-100-ME	2,3,4-Trichloroanisol	234-TCA	54135-80-7	
2476.7-K-IP	2,3,6-Trichloroanisol	236-TCA	50375-10-5	
3889.7-100-ME	2,4,6-Trichloroanisol	246-TCA	87-40-1	Musty, cork taint
10959.7-100-ME	2,4,6-Tribromoanisol- <i>d3</i>	TCA- <i>d3</i>	1219798-64-7	
10953.9-100-ME	2,4,6-Trichloroanisol- <i>d5</i>	TCA- <i>d5</i>	352439-08-8	
10954.9-100-ME	2,3,4,5-Tetrachloroanisol	TeCA	938-22-7	Musty, cork taint
2475.7-K-IP	2,4,6-Tribromoanisol	TBA	607-99-8	Musty, cork taint
10955.7-100-ME	2,4,6-Tribromoanisol- <i>d5</i>	TBA- <i>d5</i>	1219795-33-1	
3893.5-100-ME	3-Methyl-2-buten-1-thiol	MBT	5287-45-6	Sulfur smell in beer
10956.5-100-ME	3-Methyl- <i>d3</i> -2-butene- <i>4,4,4-d3</i> -1-thiol		1189879-84-2	
3891.15-100-ME	Nootkatone		4674-50-4	Grapefruit
3892.10-100-ME	(+/-)-Carvone		99-49-5	
10957.10-100-ME	(<i>S</i>)-(+)-Carvone		2244-16-8	Caraway
10958.10-100-ME	(<i>R</i>)-(-)-Carvone		6485-40-1	Spearmint
9333.13-100-IO	<i>B</i> -Ionone		79-77-6	Rose oil
11296.10-100-IO	<i>B</i> -Cyclocitral		432-25-7	Citrus fruits

References:

Izaguirre and Taylor (2004). "A Guide to Geosmin and MIB-producing Cyanobacteria in the United States". Water Science Technology 49 (9) 19-24.bp.114.149252.



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