

**METHODS FOR TAKING
AND PRESERVING SAMPLES**

**FOR THE APPLICATION OF THE
REGULATION RESPECTING THE
QUALITY OF DRINKING WATER**

Registration of copyright:

- Bibliothèque nationale du Québec, 2000
- Canada National Library, 2000

ISBN 2-550-36882-7

Envirodoq ENV/2000/0538

TABLE OF CONTENTS

INTRODUCTION.....	3
SAMPLING METHODS.....	3
PRESERVATION METHODS.....	4

LIST OF TABLES

Table 1: Preservation methods for organic parameters	5
Table 2: Preservation methods for inorganic substances	7
Table 3: Preservation methods for microbiological parameters.....	8

INTRODUCTION

When evaluating the quality of water, collaboration among data users, sample takers and laboratory staff is essential. Hence, this manual presents the different methods for taking and preserving the samples required to analyze the parameters set forth in the Drinking Water Regulation.

Firstly, the manual informs sample takers of the basic safety and preparatory measures that must be taken prior to sampling. Understanding the principles behind the methods of analysis is also important, as sampling protocols can vary widely in accordance with these methods.

In this context, the manual goes on to present the suggested sample volumes, preservatives, types of containers as well as deadlines between sampling, extraction and analysis, if any. This second part summarizes the information on sampling and preservation available from the Ministère de l'Environnement's Centre d'expertise en analyse environnementale du Québec.

SAMPLING METHODS

The quality of analytical findings is directly affected by the way sampling is carried out. To minimize contamination and ensure sample integrity, basic precaution is necessary. Take a sloppy approach to sampling and your samples will be contaminated. To avoid any such problem, care must be taken to:

- never smoke while taking or transporting samples;
- never take samples immediately after gassing up;
- never use containers of unknown origin to store samples (use only containers provided by a laboratory accredited by the Ministère de l'Environnement);
- never rinse laboratory-provided containers containing preservatives required for analyses;
- ensure that containers used for analyses by operators (at sampling sites) are prepared so as to be contaminant free;
- never use metal sampling devices if the analysis is meant to detect trace metals;
- store sampling material in clean and well ventilated areas;
- ensure all containers are closed airtight after sampling;
- properly register all samples taken using appropriate forms;
- carefully pack samples to avoid breakage or leakage, and use properly labelled shipping containers for adequate handling;
- conduct business with a trustworthy transportation service for samples to be kept in good condition within the prescribed analytical timeframe.

In addition to these broad precautionary principles, it is important that all samples intended for microbiological analyses be taken in suitable, sterile containers and that an empty space of at least 2.5 cm be left between the contents and container lid, taking every care to avoid contamination (i. e., avoid inserting fingers or any other object in the container's neck or lid and, when sampling, limit exposure of the container to air to a minimum).

When taking samples intended for chemical analysis of the volatile organic compounds listed in Table 1 of this manual, you must take field blanks along with the sampling bottles. The purpose of field blanks is to determine whether or not contamination has arisen during sampling or shipping. Field blanks are prepared by the laboratory by filling containers with purified water and the proper preservatives. These are to be taken along and handled on the sampling site, then taken back to the laboratory as if they were a sample. They must therefore be opened on the sampling site and remain open for as long as the sampling goes on. Field blanks must always be carried along with the other containers, before, during and after sampling, and be sent along with the samples to the laboratory.

PRESERVATION METHODS

The methods for preserving the different analytical parameters provided in the Drinking Water Regulation are described in the tables contained in this manual. These preservation methods are intricately related to the analytical methods used. In fact, the desired sensitivity and quantification limits can be used to establish the sampling volume and type. Moreover, depending on the analysis method, the choice of containers and preservation techniques will vary accordingly. It is therefore vital to work closely with laboratory staff to obtain the proper additional information. In addition to the specific information contained in the tables, the following general considerations apply:

- From sampling time to reception at the laboratory, all samples must be preserved at approximately 4°C (use ice boxes and refrigerants).
- All extracts (organic chemistry) must be preserved at a temperature below 4°C.

Table 1: Preservation methods for organic parameters

Parameter	Preservative	Container	Suggested volume (l)	Deadline from sampling to extraction or analysis	Extract conservation time
PESTICIDES					
Aldicarb and metabolites	ST	P	0.1	7 days	D/A
Aldrin and dieldrin	N	GA	1	28 days	40 days
Atrazine and metabolites	N	GA	0.5	7 days	40 days
Azinphos-methyl	N	GA	0.5	7 days	40 days
Bendiocarb	N	GA	0.5	7 days	40 days
Bromoxynil	AS	GA	1	21 days	40 days
Carbaryl	N	GA	0.5	7 days	40 days
Carbofuran	N	GA	0.5	7 days	40 days
Chlorpyrifos	N	GA	0.5	7 days	40 days
Cyanazine	N	GA	0.5	7 days	40 days
Diazinon	N	GA	0.5	7 days	40 days
Dicamba	AS	GA	1	21 days	40 days
2,4-dichlorophenoxyacetic, acid (2,4-D)	AS	GA	1	21 days	40 days
Diclofop-methyl	AS	GA	1	21 days	40 days
Dimethoate	N	GA	0.5	7 days	40 days
Dinoseb	AS	GA	1	21 days	40 days
Diquat	N	P	0.25	7 days or 28 days at -20°C	D/A
Diuron	N	GA	0.5	7 days	40 days
Glyphosate	ST	P	0.25	14 days or 28 days at -20°C	D/A
Malathion	N	GA	0.5	7 days	40 days
Methoxychlor	N	GA	1	28 days	40 days
Metolachlor	N	GA	0.5	7 days	40 days
Metribuzin	N	GA	0.5	7 days	40 days
Paraquat (dichlorides)	N	P	0.25	7 days or 28 days at -20°C	D/A
Parathion	N	GA	0.5	7 days	40 days
Phorate	N	GA	0.5	7 days	40 days
Picloram	AS	GA	1	21 days	40 days
Simazine	N	GA	0.5	7 days	40 days
Terbufos	N	GA	0.5	7 days	40 days
Trifluralin	N	GA	0.5	40 days	40 days
OTHER ORGANIC SUBSTANCES					
Benzene	ST2	GB	3 bottles + FB	7 days	D/A
Benzo (a) pyrene	AS	G	1	7 days	40 days

Parameter	Preservative	Container	Suggested volume (l)	Deadline from sampling to extraction or analysis	Extract conservation time
Vinyl chloride	ST2	GB	3 bottles + FB	7 days	D/A
1,1-dichloroethylene	ST2	GB	3 bottles + FB	7 days	D/A
1,2-dichlorobenzene	ST2	GB	3 bottles + FB	7 days	D/A
1,4-dichlorobenzene	ST2	GB	3 bottles + FB	7 days	D/A
1,2-dichloroethane	ST2	GB	3 bottles + FB	7 days	D/A
Dichloromethane	ST2	GB	3 bottles + FB	7 days	D/A
2,4-dichlorophenol	AS	GA	1	14 days	40 days
Monochlorobenzene	ST2	GB	3 bottles + FB	7 days	D/A
Nitritotriacetic acid (NTA)	N	G	0.25	2 days	D/A
Pentachlorophenol	AS	GA	1	14 days	40 days
Tetrachloroethylene	ST2	GB	3 bottles + FB	7 days	D/A
2,3,4,6-tetrachlorophenol	AS	GA	1	14 days	40 days
Carbon tetrachloride	ST2	GB	3 bottles + FB	7 days	D/A
2,4,6-trichlorophenol	AS	GA	1	14 days	40 days
Trichloroethylene	ST2	G	3 bottles + FB	7 days	D/A
OTHERS					
Total trihalomethanes (chloroform, bromodichloromethane, chlorodibromomethane and bromoform)	ST2	GB	3 bottles + FB	7 days	D/A

Table 2: Preservation methods for inorganic substances

Parameter	Preservative	Container	Suggested volume (ml)	Deadline for analysis
Antimony	AN	P	125*	6 months
Arsenic	AN	P or G	125*	6 months
Baryum	AN	P	125*	6 months
Boron	AN	P	125*	6 months
Bromates	EDA	P	500	28 days
Cadmium	AN	P	125*	6 months
Total chromium	AN	P	125*	6 months
Cyanides	NaOH	P or G	125	14 days
Fluorides	N	P	500	28 days
Nitrates and nitrites (expressed as N)	AS	P or G	125	28 days
Nitrites	N	P or G	100	48 hours
Mercury	AN or AC	PD or GD	250	28 days
Lead	AN	P	125*	6 months
Selenium	AN	P or G	125*	6 months
Turbidity	N	P or G	50	48 hours
Uranium	AN	P or G	500	28 days
OTHERS – Sampling site				
Chloramines	N	P or G	50	30 minutes
Free residual chlorine	N	P or G	50	30 minutes
pH	N	P or V	50	2 hours
Turbidity	N	P or G	50	48 hours

* Depending on the analysis method used, these parameters can be analyzed with a total sample volume of 125 ml.

Table 3: Preservation methods for microbiological parameters

Parameter	Preservative	Container	Suggested quantity (ml)	Deadline for analysis
Fecal coliforms	ST3	PPS or GS	100	48 hours
Total coliforms	ST3	PPS or GS	100	48 hours
Somatic coliphages	ST3	PPS	250	48 hours
Male specific coliphages	ST3	PPS	250	48 hours
Enterococci	ST3	PPS or GS	100	48 hours
<i>Escherichia coli</i>	ST3	PPS or GS	100	48 hours
Facultative aerobic and anaerobic heterotrophic bacteria	ST3	PPS or GS	10	48 hours

LEGEND

CONTAINER	
P	Bottles and lid coatings are made of the following plastics: high or low density polyethylene, polypropylene, polystyrene, polyvinyl chloride or teflon
PD	Plastic bottle decontaminated beforehand with chromic acid
PPS	Sterile polypropylene bottle
G	Glass bottle
GA	Glass bottle with aluminum paper on bottle neck
GB	40 ml glass bottle with Teflon, filled to capacity (without air bubbles)
GD	Glass bottle decontaminated beforehand with chromic acid
GS	Sterile glass bottle
PRESERVATIVE	
AC	Add 5 ml chromique acid 1% (p/v) for every 100 ml of sample taken
AN	Acidify sample to pH<2 with HNO ₃
AS	Acidify sample to pH<2 with H ₂ SO ₄ 10 N
EDA	Add 1 ml ethylene diamine to 45 mg/l per litre of sample taken
N	No preservative required
NaOH	Overbase to pH>12 with NaOH 12 N
ST	0.1 ml of sodium thiosulfate 1% (p/v)
ST2	Sodium thiosulfate (40 mg)
ST3	Sodium thiosulfate at a final concentration of 0.01% (p/v)
OTHERS	
D/A	Doesn't apply
FB	Field blank (40 ml bottle filled with boiled water by the laboratory)



HELP US TO SERVE YOU BETTER

You are using the manual DR-09-03 (*Methods for taking and preserving samples for the application of the Regulation respecting the quality of drinking water*) and wish to obtain the updates? Simply fill the attached form and send it to us. We will add your name to our mailing list and as soon as updates are available, we will contact you.

Last name		First name	
Name of business			
Address		Suite / Floor	
No	Street		
Box		Branch	
City / Town		Prov.	Postal code
Telephone		Fax	
E-mail			

For further information about or other publications from de Centre d'expertise en analyse environnementale du Québec, please contact us at:

Centre d'expertise en analyse environnementale du Québec
1665, boul. Wilfrid-Hamel Ouest
Édifice 2, bureau 1.03
Québec (Québec) G1N 3Y7
Tel.: (418) 643-1301
Fax: (418) 528-1091
Internet: www.menv.gouv.qc.ca/ceaeq