

KCMC Biotechnology Laboratory	STANDARD OPERATING PROCEDURE	Effective Date 11 August 2006	SOP-Number EQP.003-02
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Title: WATER QUALITY TESTING			

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This SOP has been read and understood by:

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KCMC Biotechnology Laboratory

STANDARD OPERATING PROCEDURE

Effective Date
11 August 2006

SOP-Number
EQP.003-02

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Date
10 October 2006

Title: WATER QUALITY TESTING

Document History:

Version Number	Reason for Changes	Date
EQP.003-02	Rewording of resistometer check instructions	10 October 2006

Copies distributed to:

Name	Date

Title: WATER QUALITY TESTING

PURPOSE

To assure that the water produced by the distiller unit located in the main laboratory is of acceptable quality for preparation of reagents, dilutions, and other laboratory uses.

PRINCIPLE

Distilled water used to prepare reagents and for other uses in the laboratory is tested monthly for bacterial content, and resistivity (ionic concentration) using a National Institute of Standards and Technology (NIST) traceable resistometer.

SCOPE

This Standard Operating Procedure applies to all Biotechnology laboratory personnel collecting water samples, performing water resistivity testing and culturing for bacterial content.

WATER QUALITY TYPES

Type I (e.g. Millipore water) - for the preparation of solutions, reagents, etc. requiring minimum interference and maximum precision and accuracy.

Type II (Distilled) - for general laboratory testing other than the uses described above.

Type III - for glassware washing (but not final rinsing) and for feed water for production of higher grade water.

WATER QUALITY SPECIFICATIONS

	Type I	Type II*	Type III
Maximum microbial content (CFU/mL)	10	1000	n/a
Minimum resistivity (megohm-cm)	10 (in-line)	1.0	0.1

**Note: Water in use in the Biotechnology Laboratory is Type II.*

SAMPLE COLLECTION

Distiller is located in the Main Laboratory of the Biotechnology Laboratory.

1. Collection of samples for microbial content and resistivity check will be assigned to a technical staff member by the Biotechnology Laboratory Manager.
2. Samples should be collected for testing once per month during the first week of the month.

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RESISTIVITY CHECK (ION CONCENTRATION) Perform first

Equipment/Materials

Digital Conductivity Meter (Resistometer –NIST Traceable)
30 ml of water equilibrated to room temperature

Sample Collection

1. Collect 100 ml of water in a clean beaker in the same manner as you would collect water for routine use.
2. Allow to equilibrate to room temperature (18-25° C).

Procedure

1. Insert the resistometer probe plug into the probe receptacle on the top of the unit.
2. Slide the switch on the side of the unit to “Megohm”.
3. Rinse the probe with the solution to be tested.
4. Insert the probe into the solution to be tested and assure that the probe contacts are immersed.
5. While slowly stirring the probe, read the display.
6. After testing, turn the unit off.
7. Store resistometer in the room with the distiller.

Corrective Actions - Ion Concentration <1.0 megohm/cm:

1. Replace ion-exchange cartridge. (Refer to Operations Manual, Elga PURELAB Water Distillation Unit, page 25).
2. Retest sample using resistometer.

Documentation

1. Record Megohm concentration on Water Quality Record sheet.
2. Complete a QC Deviation form on all unacceptable results and submit to supervisor for review.
3. Return completed Water Quality Record sheets to Lab Manager for review.
4. File record sheet in QC notebook.

MICROBIAL CONTENT CHECK

Equipment/materials

15 ml sterile test tube (available in microbiology)
Blood agar plate
Incubator

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Sample Collection

1. Collect the water from the distiller unit in the same manner as you would for routine laboratory use.
2. Fill a sterile test tube (available in microbiology lab) with 10 ml of water directly from the distiller spigot.
3. Take sample to microbiology laboratory along with Water Quality Record sheet on which resistivity check is recorded.
4. Water samples should be processed within 6 hours but may be refrigerated up to 24 hrs.

Bacterial Culture Inoculation

1. Mix sample thoroughly.
2. Label plate with the word "WATER" and date of collection.
3. Remove 1 ml of sample using a sterile graduated Pasteur pipette or a sterile 1 ml serological pipette and dispense the entire volume on the surface of a blood agar plate.
4. Spread sample evenly over the surface of the agar using a 10 ul loop. Allow water to soak into the agar.
5. Incubate plate aerobically at 35° C for 48 hours with agar bed up if water has absorbed; agar bed down if not absorbed.

Culture Interpretation/Reporting

1. Count the number of colonies growing on the plate using the magnifying lamp. If more than a few colonies are present, take a wooden applicator stick and touch each colony as it is counted. It may be necessary to divide the plate evenly into portions by marking the back of the plate with a marking pen and counting the colonies in that portion and multiplying the count times the number of portions into which the plate was divided. **OR** the sample may be recollected and a smaller volume (e.g. 0.25 ml) plated and counted.
2. The number of colonies counted equals the number of Colony forming Units (CFU)/ml of water. (If smaller sample is plated, multiply the number of colonies times the dilution e.g. if 0.25 ml is plated, multiply the colony count times 4 to calculate the number of CFUs/ml)

Corrective Actions - Microbial Count >1000 CFU/ml:

1. Perform a System Sanitization. (Refer to Operations Manual, Elga PURELAB Water Distillation Unit, page 29)
2. Retest water sample for microbial content.

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Documentation

1. Record CFU count on Water Quality Record.
2. Complete a QC Deviation form for all unacceptable results and submit to supervisor for review.
3. Return Water Quality Record sheet to Laboratory Manager for review.
4. File record sheet in QC notebook.

REFERENCE

Preparation & Testing of Reagent Water in the Clinical Laboratory; Proposed Guideline – Fourth Edition. 2005. CLSI Document C3-P4 Vol 25 No 13 (ISBN 1-56238-570-4). Clinical and Laboratory Standards Institute, Wayne, PA.

Operations Manual, Elga™ Water Distillation System, ELGA, High Wycombe, Buckinghamshire, UK. Version 2, October 2001.

APPENDIX – Water Quality Record sheet