



2012/08/14



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Nitrification Inhibition

Nitrifying bacteria are much more sensitive than heterotrophic bacteria and are susceptible to a wide range of organic and inorganic inhibitors.

Compounds Which Inhibit Nitrification

Organic Compounds:

Acetone

Carbon Disulfide

Chloroform

Ethanol

Monoethanolamine

Phenol

Ethylenediamine

Hexamethylene Diamine

Aniline

Metals and Inorganic Compounds:

Zinc

Free Cyanide

Perchlorate

Copper

Mercury

Chromium

Nickel

Silver

Cobalt

Thiocyanate

Sodium Cyanide

Sodium Azide

Hydrazine

Sodium Cyanate

Potassium Chromate

Cadmium

Arsenic (trivalent)

Fluoride

Lead

Switching Laundry Detergent Enhanced Nitrification?

**Effect of Anionic and Non-ionic
Surfactants on
Activated Sludge Oxygen Uptake Rate
and Nitrification**

**Maazuza Z. Othman, Liqiang Ding and
Yi Jiao**

International Journal of Civil and Environmental Engineering 2:4 2010

The results obtained indicated that high concentrations of surfactants are likely to have an adverse effect on the performance of WWTPs utilizing activated sludge processes.



2010/12/06

Date	NH ₄ ⁺	NO ₃ ⁻	TKN	Total N	Temp C
1/25/2012	20.4	9.66	23.9	33.56	11.7



Plant Based, Non-Polluting Ingredients
• Septic Safe – Greywater Safe • Re

* SURFACTANT DERIVED FROM COCONUTS



Recognized for Safer Chemistry
www.epa.gov/dfe

Earth Friendly Products
Addison, IL 60101
1-630-595-1900 Call 9-30

Made in CA, FL, IL, NJ &

ecos.com
Made in the US

2012/09/11

U.S. EPA's Design for the Environment



Safer Products for People and the Planet

The U.S. EPA's Design for the Environment program helps you identify cleaning and other products that

- perform well,
- are cost effective, and
- contain safer ingredients for your family and the environment

Design for the Environment only labels products that use the safest ingredients and meet strict EPA standards.



**Recognized for
Safer Chemistry**

www.epa.gov/dfe

Date	NH ₄ ⁺	NO ₃ ⁻	TKN	Total N	Temp C
1/25/2012	20.4	9.66	23.9	33.56	11.7
2/23/2012	0.4	11.6	7.8	19.4	13.9
3/29/2012	1.1	9.87	4.7	14.6	17.8
6/07/2012	0.8	5.10	5.3	10.4	22.3
8/09/2012	0.6	11.2	3.3	14.5	25.3

Nitrification Inhibition

- No toilet bowl tablets should be used
- No liquid fabric softeners should be used
- No discharge from water softeners
- No drain cleaners should be used
- Disinfectants or bleaches used sparingly
- Use more biodegradable cleaning products

Wastewater Toxicity

Homeowners can discharge a wide variety of toxic materials. Drainfields are linked to ground and surface waters. There is a need to establish for onsite wastewater systems a way of assessing the occurrence of toxic effluent.

Biological Indicators of Wastewater Toxicity

Nitrifying bacteria are sensitive to a wide range of organic and inorganic inhibitors. They can be used as biological indicators of potential wastewater toxicity. They are like the canary in a coal mine.



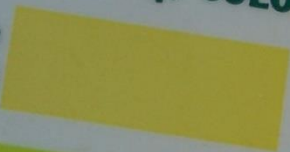




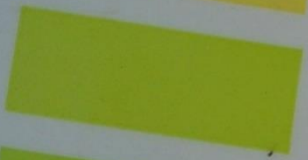
2012/09/11

**FRESHWATER AMMONIA
(NH₃/NH₄⁺) COLOR CARD**

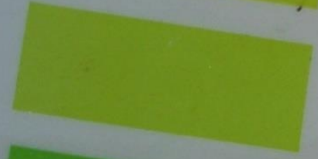
0 ppm
(mg/L)



0.25



0.50



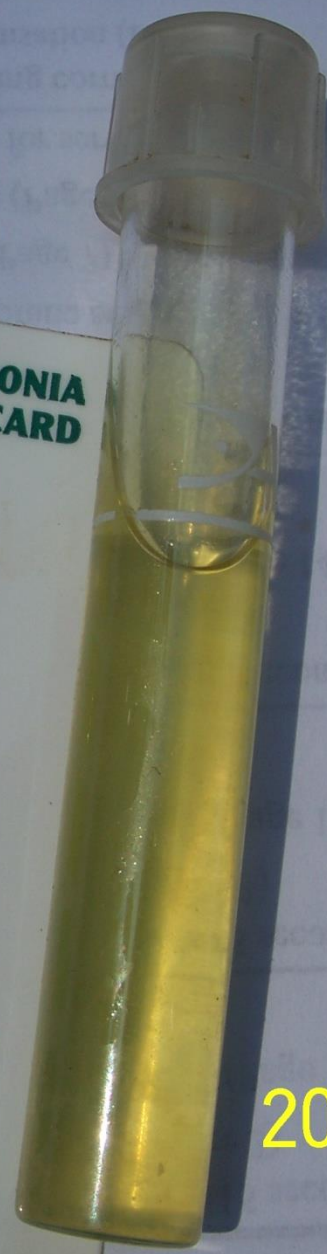
1.0



2.0

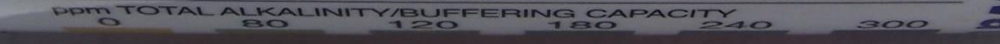
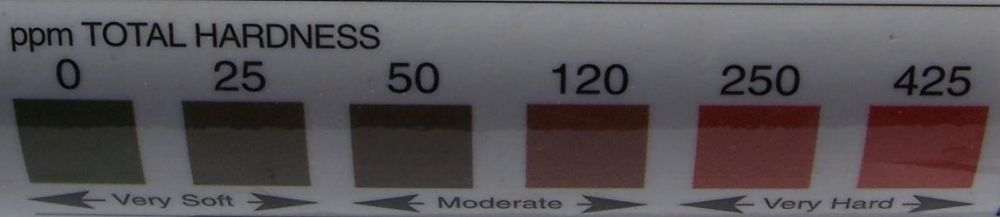
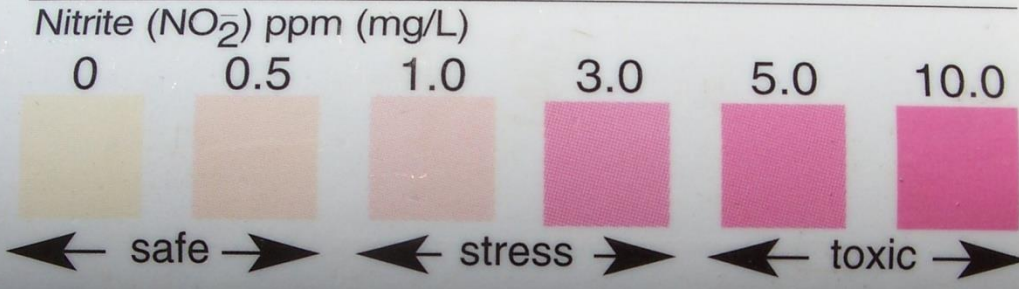
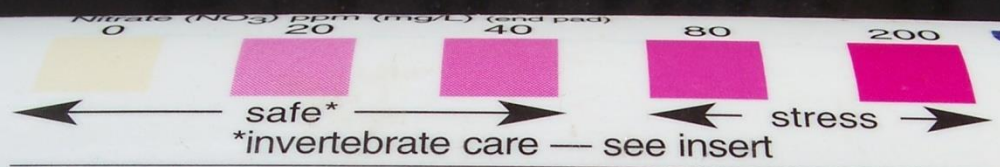


4.0



2011/08/18

25 Test Strips
Nitrate, Nitrite, Hardness,
Alkalinity, and pH



2011/08/16



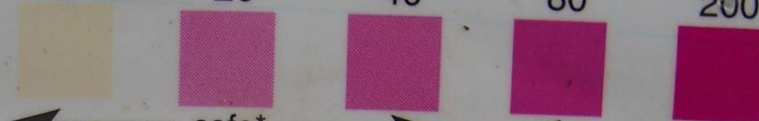
Nitrate, Nitrite, Hardness,
Alkalinity, and pH

25 Test Strips

Saltwater
Directions:
Pull Here

Nitrate (NO_3) ppm (mg/L) (end pad)

0 20 40 80 200



safe*
*invertebrate care — see insert

stress

Nitrite (NO_2) ppm (mg/L)

0 0.5 1.0 3.0 5.0 10.0



safe

stress

toxic

ppm TOTAL HARDNESS

0 25 50 120 250 425



Very Soft

Moderate

Very Hard

ppm TOTAL ALKALINITY/BUFFERING CAPACITY

0 80 120 180 240 300



Ideal Range

pH (pad nearest handle)

6.4 6.8 7.2 7.6 8.0 8.4



Ideal Range

5 in 1 Test / Freshwater Chart

Hydrel

FRESHWATER
FOR ALL

2011/09/15

DESIGN CONSIDERATIONS

NITRIFICATION

- HIGH DISSOLVED O₂
- LOW BOD
- LOWERS ALKALINITY
- HIGHLY SENSITIVE TO INHIBITORY COMPOUNDS
- EFFLUENT NO OR LOW NH₄⁺

DENITRIFICATION

- LOW DISSOLVED O₂
- HIGH BOD
- RAISES ALKALINITY
- LESS SENSITIVE TO INHIBITORY COMPOUNDS
- EFFLUENT NO OR LOW NO₃⁻/NO₂⁻

Biological Nitrogen Removal

NH_4^+ (Nitrification) NO_3^-

KEEP SEPARATE

NO_3^- (Denitrification) N_2

Nitrogen Reducing Unit with Random Dump Media - Air Lift Out

Materials List for Aerobic System Alternative Products May Be Substituted

Item	Item #	Contact Info	Item	Item #	Contact Info
FlexAir tube diffuser:	62-610 polyurethane	Environmental Dynamics Inc Mike Korman (573) 474-9456 www.wastewater.com www.diffuserexpress.com	Needle Valve:	22318	United States Plastic Corp (800) 809-4217 www.usplastics.com
Air Pump:	Hi Blow HP-120		2 Adapters 1/2" x 1/4" "	62014	
Air Pump Housing:	SSCOMBO40	Septic Solutions, Inc. (877) 925-5132 www.septicsolutions.net	Plastic Media 3.5" Bio Ring Floaters:	30 Cubic Feet	Jaeger Environmental Christopher Harden (540) 862-8426
Alarm and Control Panel:	RAB Basic 30301	(Request Mounted Alarm)	Plastic Media 3.5" Tri Packs Floaters:		

Air Pump Housing and Controls

