

*

-	-	-
-1	12	400
		1351
	2008-9-30	2007-10
		1937

			(2)
		(19)	
	(32)		(27)
(2)	% 9		
		34.29	
/ 25.36		163.894.9	2005
		.(27) 2000	/ 17.79
			%54.5
2006	10		
118			234
		2000	1937
		(3)	

:

400

10

17

()
() 7

24

6

		20		1
		20		2
		1.5		3
		20		4
		20		5
		20		6
		20		7
		1.5		8
		20		9
		500		10
		1.5		11

		600		12
		600		13
		500		14
		600		15
		500		16
		600		17

:

(10)

EC

TDS

(26)

pH-meter

(9)

pH

(10)

(4)

:

(Abtc)

(TC) Total Coliforms

Aerobic bacterial total count

MacConkey Agar Nutrient Agar

FC

(10 ;9)

(39 ;2)

(MPN)

FS

- MacConkey Broth

(EC Broth) *E.coli* Broth

Azide Dextrose Broth

Pseudomonas aeruginosa

Pseudomonas Isolation Agar

Salmonella

(7)

(10).

(40 ;28)

:

:

0.000=P

(16)

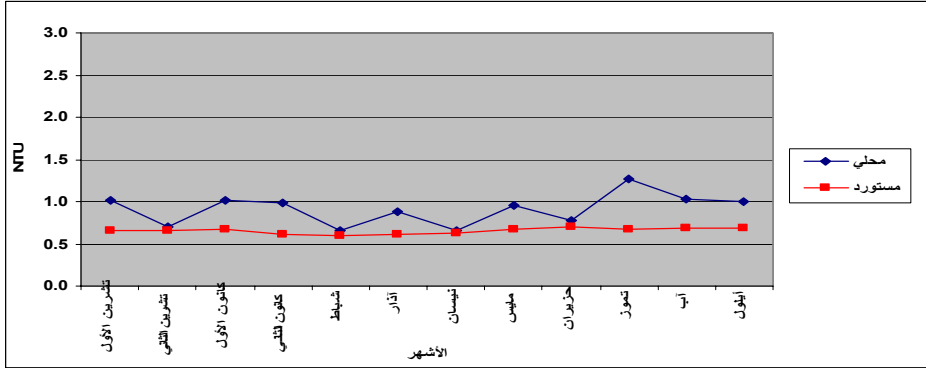
1.3 –0.6 NTU

(1)

(25)

(30) (NTU).

(15)



(1): (NTU)

:TDS & EC

TDS (Total Dissolved Solids) EC (Electrical Conductivity)

$$0.571 = P$$

RO

(20)

=r

1=r EC

TDS

$$0.856 = r$$

$$0.632 = r$$

$$0.873$$

TDS EC

$$0.0002 = P$$

(3 2)

(38)

(36)

EC / 228.5² / 357.0

TDS

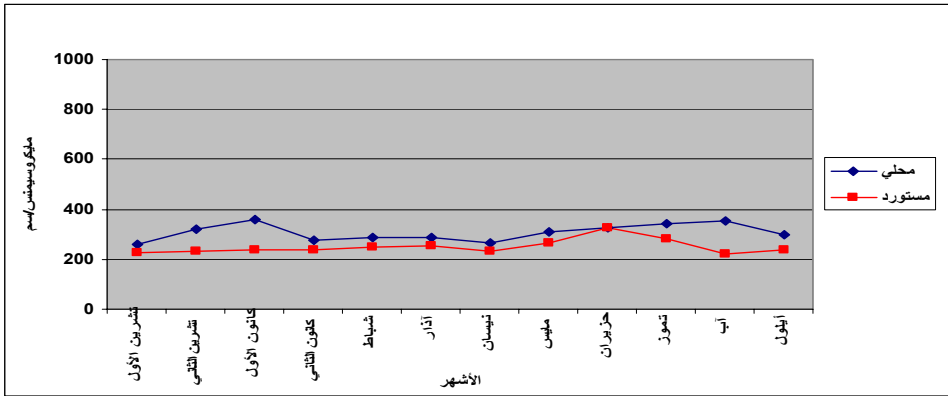
TDS EC / 141.7² / 221.4

EC

(10)

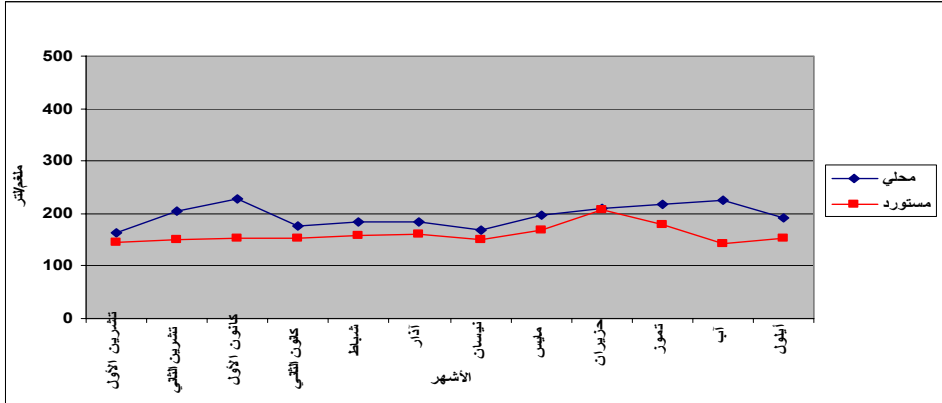
(38)

TDS



EC

:(2)



(3): (TDS)

pH

$$0.000005=P$$

(4)

(14) pH

(23)

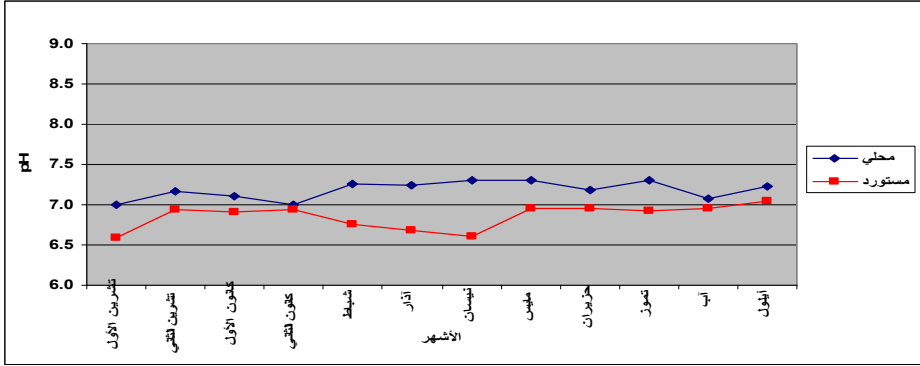
CO₂

pH

(8) pH

7.31

.6.59



(4): pH

:

0.000=P

/ 50

(5)

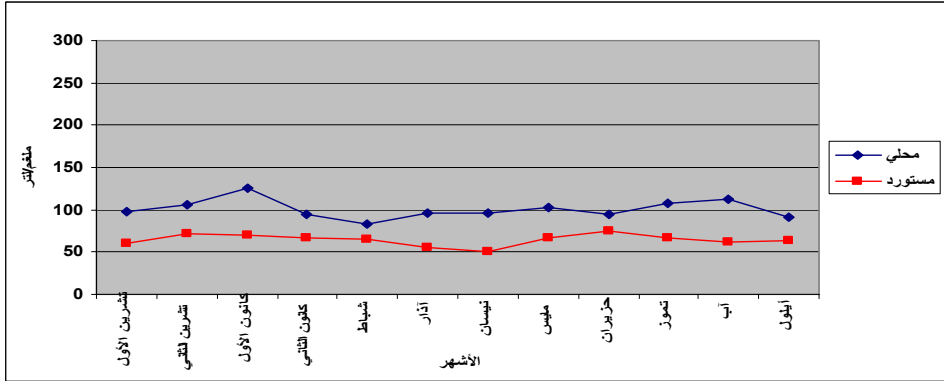
125.2

(14)

(22).

(TH)

(37 ;13).



(5):

:

$$P = 0.000$$

$$/ 29.2$$

$$(6) / 12.9$$

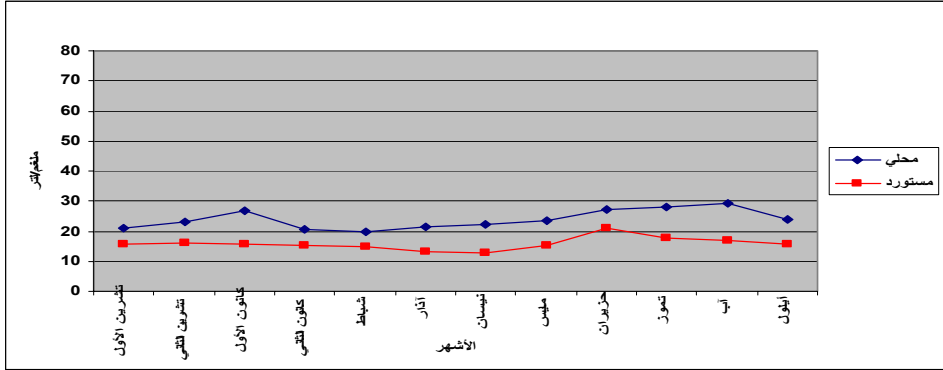
(12)

(1).

(1)

(5).

(21)



:(6)

:

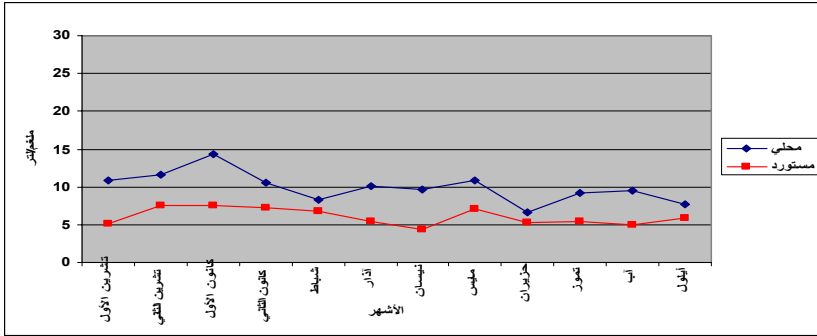
0.000 = P

14.3

(7)

/
/ 4.3

.(5)



(7):

(18)

/ 76 - 36.9

(8)

. / 250 1937

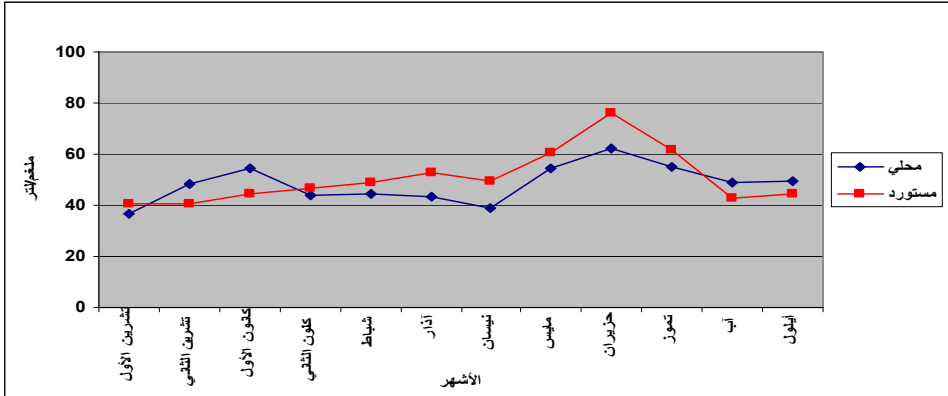
%0.05

CaCl₂

KCl

NaCl

(25).



(/)

: (8)

:

(1)

pH

0.145-

(9)

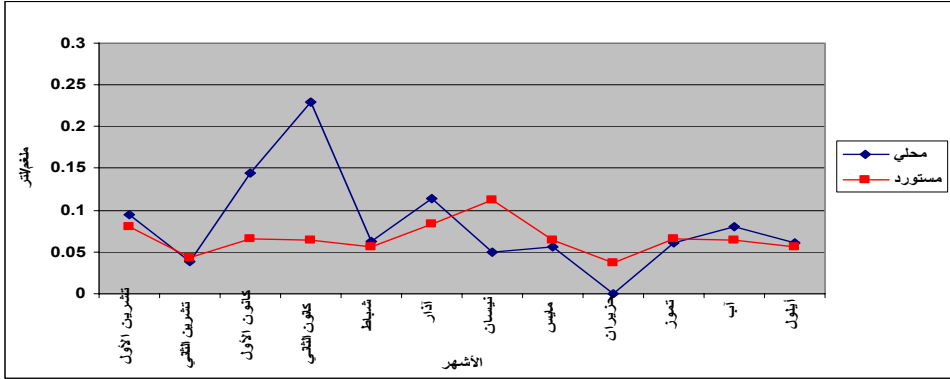
pH

/ 0.00

:

pH

. -0.751 - 0.574 = r

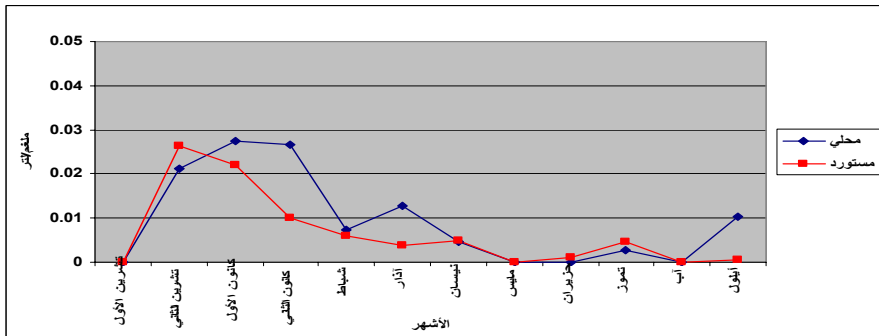


(9) : (/)

p=0.476

/ 0.027-0.000

(10) .



(10) : (/)

:

Abtc (Aerobic bacterial total count)

0.000=P

Abtc

(16)

(6)

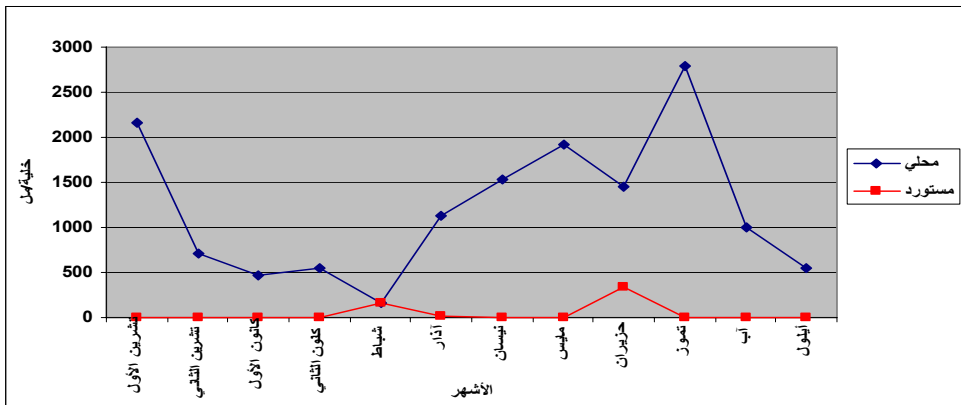
Abtc

(CFU/ml)

2793

/ 0

(11)



Abtc

:(11)

:TC (Total Coliform)

(35).

TC

0.0001=P

(16)

(3)

UV

/ 54

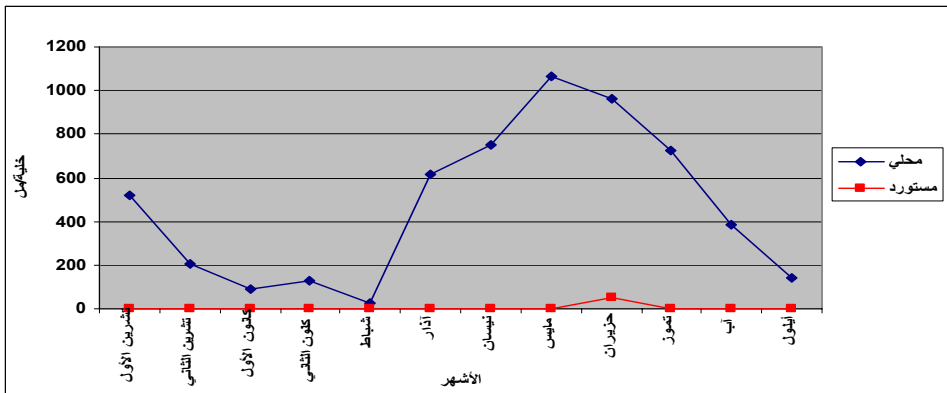
CFU/ml 1068

TC

CFU/ml 0

CFU/ml 23

(12)



TC

:(12)

:FC (Fecal Coliform)

FC

0.008=P

CFU/100ml 4.9-0.0

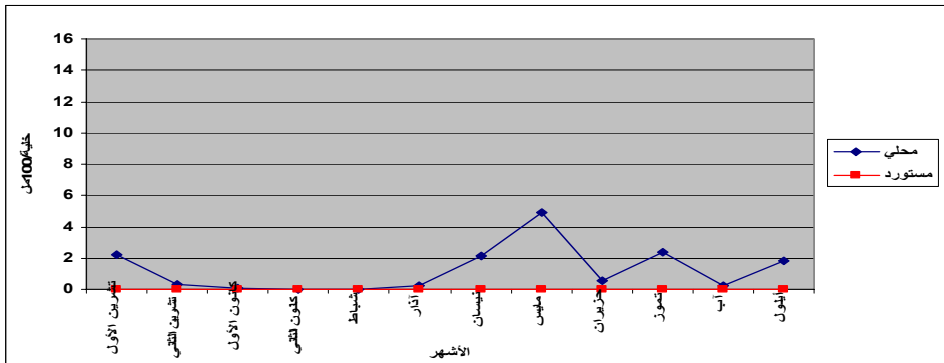
(13) FC

0.654 ,0.657 = r TC Abtc FC
FC - 0.523= r

UV

2000 356

FC



FC

:(13)

:FS (Fecal Streptococci)

.(17) *E. coli*

FS

FS

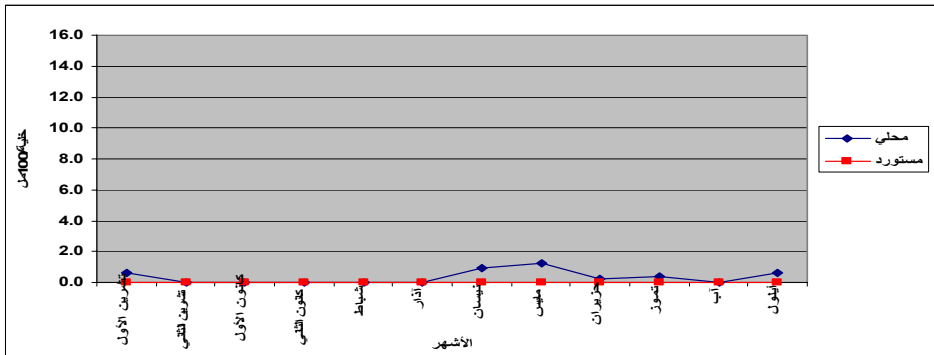
0.012 =r

CFU/100ml 1.3-0.0

FS

(14)

2000 356



FS

:(14)

Pseudomonas aeruginosa

(24)

= r

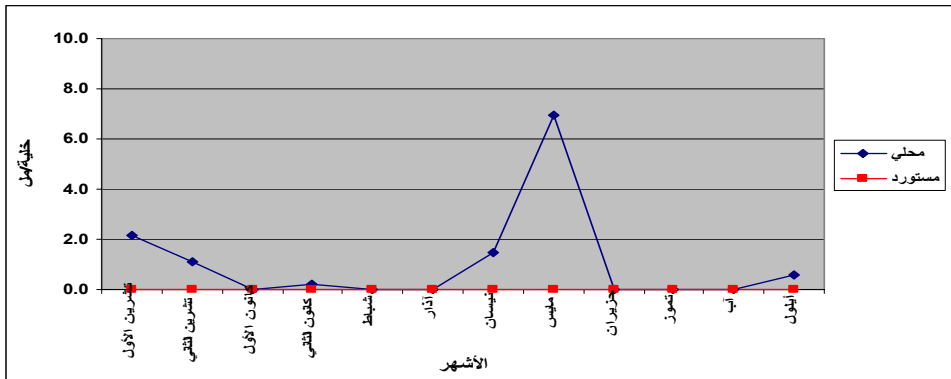
FS FC TC 0.802 , 0.866 , 0.538

CFU/ml 7-0

(15)

(6)

(10).



(15):

Salmonella spp.

:

:

%14.25

%11

(1)

%26.18

%5.6

%3.25

%1

%12

%11

%0.5

%1.50 %1.75

10 9

.(33)

%0.75 %0.50

2

.(31)

:

(2)

1351

1937

%41.50

%39

%2.50

%67.24

%5.95

%39

%41.5

%2.5

(16)

%32.5

TC

%0.5

%32.0

%5.50 %6.75 %11.25

%9.48 %11.64 %19.40

- .1 (1992).
- .108 .
- .2 (1991).
- .459 .
- .3 (2008).
- .2008-1995
- .4 (1990) .
- .133 -112.
5. Abed, K. F. and Alwakeel, S. S. (2007). Mineral and microbial content of bottled and tap water in Riyadh, Saudi Arabia. Middle-East J. Sci. Res. 2(3): 151-156.
 6. Abd El-Salam, M. M.; El-Ghitany, E. M. A. and Kassem, M. M. M. (2008). Quality of bottled water brands in Egypt, Part II: Biological water examination. J. Egypt Public Health Assoc. 83(5): 467-486.
 7. Acumedia Manual. (2004). Acumedia Manual and Protect Information Sheets, Acumedia Manufacturers Inc., USA, Canada. 3.
 8. Al-Matroud, S. S. (2003). Evaluation Of Irrigation Water Quality and It's Effect On Soil Infiltration Rate In Riyadh Region. MSc. Thesis. Collage of Agriculture, King Saud University, Saudi Arabia.
 9. AOAC. (2005). Official Methods of Analysis, 18th ed., Edited by Horwitz, W. and G. W. Latimer. AOAC International.
 10. APHA, AWWA and WFF. (2005). Standard Methods For The Examination Of Water and Wastewater, 21st ed., Edited by Eaton, A. D.; L. S. Clesceri.; E. W. Rice. and A. E. Greenberg. American Water Work Association and Water Environment Federation, USA.
 11. Azioz, T. (2008). The Battle Over Bottled Vs. Tap Water. Waste Management World, The Pacific Institute: 5.
 12. Buringh, P.(1960). Soils and Soil Conditions In Iraq. Ministry Of Agriculture, Baghdad, Iraq :322.
 13. Cech, T. V. (2003). Principles Of Water Resources History, Development, Management and Policy. John Wiley and Sons Inc. U.S.A. 446.

14. Chukwu, O. and Musa, J. J. (2008). Soil Salinity and Water Logging Problem Due To Irrigation Project. *Agric. J.* 3(6): 469-471.
15. EPA. (1999). Guidance Manual Turbidity Provision: Importance Of Turbidity, US. Environmental Protection Agency. 1-12.
16. EPA. (2005). Water Health Series: Bottled Water Basics. US. Environmental Protection Agency (EPA). 10.
17. EPA. (2006). Distribution Systems Indicators Of Drinking Water Quality. US. Environmental Protection Agency, Washington, DC.
18. Falatah, A. M.; Al-Omran, A.; Nadeem, M. E. and Mursi, M. M. (1999). Chemical composition of irrigation ground water used in irrigation in some agricultural regions of Saudi Arabia. *Emirates J. Agric. Sci.* 1: 11-23.
19. Ferrier, C. (2001). Bottled Water Understanding A Social Phenomenon Discussion Paper. 25.
20. Fisher, A.; Reisig, J.; Powell, P.; and Walker, M. (2008). Reverse Osmosis (R/O): How It Works, Cooperative Extension, University Of Nevada, Agricultural Experiment Station, USA. 4.
21. Garzon, P. and Eisenberg, M. J. (1998). Variation in the mineral content of commercially available bottled waters: implications for health and diseases. *Am. J. Med.* 105: 125-130.
22. Gupta, D. P.; Sunita, S. and Sahran, J. P. (2009). Physiochemical analysis of ground water of selected area of Kaithal city (Haryana) India. *Researcher.* 1(2): 25-30.
23. Hassan, F. M. (2004). Limnological features of Diwanyia River. Iraq. *J. Um-Salama for Science.* 1(1): 1-6.
24. Hunter, P. R. (1993). The microbiology of bottled natural mineral water. *Journal of Appl. Microbiol.* 74: 352-355.
25. Health Canada. (1996). Guidelines For Canadian Drinking Water Quality, 6th ed., Minister of Health, Canada Communication Publishing Group, Ottawa, Canada. 1-75
26. Hp Technical Assistance. (1999). Understanding Electrical Conductivity, Hydrology Project, World Bank & Government of The Netherlands Funded, New Delhi, India. 30.
27. Hairston, J. E. (2008). Bottled Water: Beneficial Industry or Super Can Job. Alabama State Water Program, Auburn University, National Water Conference. 10.
28. ISO. (2002). Microbiology-General Guidance on Methods For Detection of Salmonella. ISO 6579, 4th ed., International Standard, Geneva, Switzerland.

29. Korzeniewska, E.; Filipkowska, S.; Domeradzka, S., and Wlodkowsk, K. (2005). Mineral water stored of different temperatures. Polish Journal of Microbiology. 54(1): 27-33.
30. Kostamo, J. (2008). Detecting Microbial Contaminants in Drinking Water. In: Advanced Studies in Environmental Microbiology and Biotechnology Ecological Sanitation and Manure Treatment as Improve Water Hygiene. Edited by, Tanski, H. H. University of Kuopio, Finland. 19-23.
31. Melligan, M. (2003). Ozone Treatment For Residential Well Water. Water Quality Products, Scranton Gillette Communications Inc., USA. 24-27.
32. Moore, M. (2003). Can Public Water Utilities Compete With Bottled Water. Tap Magazine, Spring, National Drinking Water Cleaning House, West Virginia University. 20- 29.
33. Michaud, C. (2007). Water Softening Resin Guide: Water Softening Basics, Application Notes. Purolite Inc., USA, Europe, Asia Pacific. 6.
34. Pip, E. (2000). Survey of bottle drinking water available in Manitoba, Canada. Environmental Health Perspectives. 108(9): 863-866.
35. Rompre, A.; Servais, P.; Baudart, J.; de-Roubin, M. and Laurent, P. (2002). Detection and enumeration of coliforms in drinking water: current methods and emerging approaches. Journal of Microbiological Method. 49: 31-54.
36. SDWF. (2008). TDS & pH. Safe Drinking Water Foundation. 6.
37. Water Corporation. (2004). Water Quality Issues: Hard Water Bulletin. No. 8. Water Corporation, Australia. 2.
38. Wellcare. (2007). Wellcare Information For You About Total Dissolved Solids (TDS). Wellcare Program Of Water System Council (WSC). Wallcare Publishing. 4.
39. WHO. (1985). Guidelines For Drinking-Water Quality: Health Criteria and Other Supporting Information. 2nd ed., World Health Organization, Geneva. 335.
40. WHO. (2003). Global Salm-Surv: A Global Salmonella Surveillance and Laboratory Support Project Of The World Health Organization, laboratory protocols. level 1: Identification Of Salmonella. 4th ed., Edited By Rene, S. 18.

Study of Some Physiochemical and Microbial Properties of Local and Imported bottled Water in Baghdad City

(*)S. M. Mahmood Razuki	M. A. AL-Rawi
COSQC	College of Science, Uni. Of Baghdad

Abstract

The physiochemical and microbial properties and the percentage of failure in the application of physiochemical and sanitary demands which is stated in confirmed Iraqi standards were studied for 400 local and imported bottled water samples which is the most used in Baghdad city. The results of this study clarified the rising in values and concentrations of turbidity, pH, electrical conductivity, total dissolved solids, total hardness, calcium, magnesium, lead, and iron in local samples in the comparison with the imported one; while the monthly average of chloride concentrations were rising in imported samples in the comparison with local samples which recorded the highest percentage of failure in the application of sanitary demands. While the imported samples recorded the highest percentage of failure in the application of physiochemical demands. The results of this study clarified the presence of high significant positive correlation among the studied microbial properties and high significant negative correlation between these properties and lead concentrations averages and between the last one and pH values averages.

(*) Part of M.Sc. thesis for the first author.