

قسم صحة ورعاية الحيوان
كلية الطب البيطري - جامعة الزقازيق
رئيس القسم : أ.د / جمال العليمي

الحالة الصحية لمصادر المياه الجوفية المستعملة للحيوانات فى محافظة القليوبية

جمال الدين العليمي ، حسن عيداروس ، أحمد البسيوني ، منى عشوب

من أساسيات تربية الحيوانات وجود كميات وفيرة من المياه للشرب ذات صفات صحية جيدة للحفاظ على نظافة الحيوانات ومساكنهم وكذلك كميات أخرى لتنظيف وغسيل الأوعية والادوات التى تستعمل فى تداول المنتجات الحيوانية وان هذه النقطة لها علاقة قوية بصحة الانسان . لذلك كان من المهم أن تكون المياه المستعملة للحيوان ومنتجاته خالية من مسببات الأمراض .

تم فحص مياه خمسين تلمبة من قري ومدن مختلفة بالطرق القياسية المتبعة عالمياً لبيان مدى مطابقتها هذه المياه لشروط المياه النقية واتضح مايلي :-

- ١ - ١٤ عينة فقط كانت صالحة للاستعمال بينما ٣٦ عينة كانت غير مناسبة للاستعمال .
- ٢ - أثبت اختيار مسحوق اللبن سهولة عمله ويعتمد عليه كاختبار حقلّي .

Dept. of Hygiene and Preventive Med.,
Faculty of Vet. Med., Moshotohor, Zagazig Univ.,
Head of Dept. Prof. Dr. G.M. El-Olemy.

**HYGIENIC QUALITY OF GROUND WATER SOURCES
USED FOR ANIMALS IN KALYOBIA GOVERNORATE**
(With 4 Tables)

By
**G.M. EL-OLEMY; H.A. AIDAROS; A.A. EL-BASSIOUNI
and MONA ASHOUB**
(Received at 20/6/1988)

SUMMARY

50 ground water samples collected from Kalyobia Governorate and subjected to physical, chemical and bacteriological examination for determination of their hygienic conditions for animal consumption.

Turbidity units of examined samples ranged from 5-20 units, 43 samples were colourless and 7 samples were faint to very faint colour.

Ph Values ranged from 7.5 to 7, total solids from 1-14 mg/L while ammonia contents from 1-100 mg/L in 25 samples, nitrite found in 16 samples and nitrate in 3 samples, chloride, total hardness and organic matter contents ranged from 17-682 mg/L, 60-125 mg/L and 0.4-59 mg/L respectively.

T.B.C. per 1 ml. of examined water ranged from 15-30500 at 37°C and from 9-9000 at 20°C, Coliform count ranged from 2-1100 in 25 samples and E.coli type 1 count 2-1100 in 19 samples (MPN/100 ml).

Milk powder test proved to be a reliable easy to do field test.

14 samples of examined water were whole some and 36 samples were unfit.

Recommendations were suggested for production of ground water of good hygienic specifications.

INTRODUCTION

Of the primary importance in the keeping of domesticated live stock is that drinking water must be available to the animals in adequate amounts. In addition to the supply for drinking purposes, maintenance of cleanliness in animals themselves and for the buildings in which they are housed.

Considerable amounts of water are also necessary for the cleaning of the various utensils used in the handling of animal products. This latter aspect has a direct bearing on public health, and for this reason water supplies for dairies, creameries, abattoirs, etc. should conform to standards demanded of public water supplies for ordinary domestic purposes.

The objective of this work is to judge the hygienic quality of ground water in Kalyobia which is mainly made available by means of driven wells, applying interational guide lines for drinking water quality.

MATERIAL and METHODS

50 water samples were taken from different villages of Kalyobia Governorate. Each water sample was 1.5 Liters and taken into separate clear colourles glass stoppered bottles, 1 Liter amount for chemical and physical analysis and 500 c.c. amount for bacteriological examination.

Sampling were carried out according to A.P.H.A. (1975).

I - Physical examination are carried according to FAHMY (1964).

II - Chemical examination:

- 1 - pH (Reaction): Using pH indicator paper range 4.5 - 8.5.
- 2 - Total dissolved solids (T.D.S.): were determined according to A.P.H.A. (1971) and W.H.O. (1971).
- 3 - Ammonia: was determined by using the directness. Lerization method. (W.H.O. 1971).
- 4 - Nitrites and Nitrates: were determined according to practical notes on animal hygiene (1984).
- 5 - Chlorides, organinc matter (oxygen consuming power) and total hardness (using of EDTA titrimeteric method) by methods recommended by W.H.O. (1971).

III - Bacteriological examination:

1 - Total bacterial count:

The bottle containing the sample was first shaken several times, Serial dilutions of the original water sample 1:10, 1:100 and 1:1000 in serial saline solution were prepared. From the original samples as well as it's dilutions two nutrient agar plates were inoculated by mixing 1 ml. with 10 ml. nutrient agar. One plate was incubated at 37°C for 24 hours. Counting of colonies per plate was carried out with the help of magnifying lens and plates having 30 to 300 colonies were used for counting. To obtain the bacterial counts, the number of colonies in 1 ml. of each diluted sample at both 37c° and 22c° was multiplied by its dilution number and recorded.

2 - Coliform Group Count and E.Coli type 1: as recommended by W.H.O. (1985).

3 - Quick milk test for indicating bacterial contaminations in water.

DAVIES (1949) mentioned that the milk medium is used to test bacterium's power to coagulate casein and ferment lactose. The result in production of acid and clot in some bacteria as strept. Pyogenes, staph. aureus or acid, clot and gas production as in case of coliform and acid, clot and rapid gas production with breaking down of clot, stormy fermentation as in case of clostridia. In the use of milk for detection of coliforms in water the following test was used as follows:

In a clean sterile test tube one gram of sterile full cream powdered milk was reconstituted with 9 c.c. of the water to be tested. The tubes were plugged with cotton wool then incubated at 37°C over night. The presence of acid only caused clotting of casein while acid and gas caused clotting of milk with production of small pin head gas bubles in the clot. In case of suspected presence of cl.welchii (cl. perfringes) there is a violent break of the clot by the great amount of gas produced (stormy reaction). Anaerobic condition in the tubes was produced by the presence of a cream layers on top of milk.

GROUND WATER, HYGIENE

RESULTS

Results are shown in tables 1, 2, 3 & 4.

DISCUSSION

The physical examination of the examined 50 water samples are shown in table (1), both turbidity and colour of water are generally speaking of no high significance indicating on its sanitary condition (FAHMY, 1964).

From table (2) it is shown that the results of chemical examination of examined samples are nearly with slight variations of other ground water samples collected by different authors in different localities in Egypt FAHMY (1964), ZALATA (1972), EL-RASHEDY (1980) and ABD EL-KADER (1983).

The variation of the chemical contents of examined samples in different localities may be to the difference in the nature of ground state in different localities from which the tested water samples were collected.

The bacteriological findings of examined samples are shown in table (3). The results achieved that the colony count alone is of little value in detecting the presence of faecal pollution (W.H.O. 1971). While the fecal coliform organisms in 17 samples (34%) exceeded the permissible limit, it is a useful test to affirm the presence of fecal pollution.

E.coli type 1 was found in 38% of examined samples, it is agreed that E.coli should not be present in drinking water as far as man is concerned and that it would be altogether unpracticable in a water supply used exclusively for animals to insist on the same standards established for water intended for human consumption.

From table (3) it is shown that 43 water samples changes the reconstituted milk with these water producing acid and gas in 40% of the samples, so the milk test has been proved as a quick test to give an answer when water quality is questionable and laboratory facilities are not at hand.

Consulting the results of table (4) it is found that 16 samples were disqualified according to chemical tests only, only 3 samples failed the bacteriological tests and passed the chemical findings, 17 samples were disqualified as drink water because they did not pass both chemical and bacteriological tests, 14 samples can be described as wholesome and they passed both the chemical and bacteriological examination. From these findings it is very important to do many tests both chemical and bacteriological to give a final decision whether the water is fit or unfit for use.

It is worth to mention that the unfit 36 water samples were related to driven well badly constructed and located in the proximity of places which are open to pollution from the washings, liquid manure and manure of faryards.

REFERENCES

- Abd El-Kader, M.A.E. (1983): Studies on hygienic condition of water supplies in dairy stables. M.V.Sc. Thesis Fac. of Vet. Med., Zagazig Univ.

G.M. EL-OLEMY, et al.

- A.P.H.A. (1971): Standard methods for the examination of water and waste water, 13th Ed., Washington, D.C.
- A.P.H.A. (1975): Standard methods for the examination of waters and waste water, 13th Ed., Washington, D.C.
- Davies, G.O. (1949): Gaiger and Davies Veterinary Pathology and Bacteriology, 3rd Ed., London.
- El-Rashedy, S.G. (1980): The sanitary condition of water used in dairy farms, in upper Egypt. M.V.Sc. Thesis, Fac. of Vet. Med., Assiut Univ.
- Fahmy, M.E.A. (1964): Hygienic condition of water for animal consumption in Egyptian villages. M.D. Vet. Thesis, Fac. of Vet. Med., Cairo Univ.
- Practical Notes on Animal Hygiene (1984): Fac. of Vet. Med., Cairo University.
- W.H.O. (1971): International standards for drinking water 3rd Geneva.
- W.H.O. (1985): Guide lines for drinking water quality, Geneva.
- Zalata, A.A. (1972): Geology of the area around Gabal El-Shayib, Eastern desert, Egypt, pH. D. Thesis, Ain Shams Univ.

Table (1)
Physical properties of ground water samples in Kalyobia Governorate

Colour		Turbidity	
- No. of samples	50	- No. of samples	50
- No. of colourless samples	43	- No. of clear samples	39
- No. of coloured samples	7	- No. of turbid samples	11
No. of faint yellow	5	7 samples	5 units
No. of very faint yellow	2	2 sample	10 units
		1 sample	15 units
		1 sample	20 units
		Max.	20
		Min.	5
- Percent of coloured	14%	- Percent of turbid	22%
- Standard permissible limits (W.H.O. 1971)		- Standard permissible limits (W.H.O. 1971)	
permissible -----		permissible	5 units
Excessive -----		Excessive	25 units

GROUND WATER, HYGIENE

Table (2)
Chemical contents of ground water samples in Kalyobia Governorate

Chemical contents	No. of negative samples	No. of positive samples	Percent of positive samples	Maximum	Minimum	Standard permissible limits (W.H.O. 1971)		No. of sample higher than excessive level
						Permissible	Excessive	
Reaction (PH)		50	100%	7.5	7	7.0 - 8.5	6.5 - 9.2	
Total solids (mg/L)		50	100%	14	1	500	1500	
Ammonia (mg/L)	25	25	50%	100	1			
Nitrites	34	16	32%					
Nitrates	47	3	6%					
Chlorides (mg/L)		50	100%	682	17	200	600	2
Organic matter (mg/L)	2	48	96%	59	0.4			
Total hardness [mg/L (as Ca Co ₃)]		50	100%	1250	60	100	500	17

Table (3)
Bacteriological findings of ground water samples in Kalyobia Governorate

Bacteriological findings	No. of negative samples	No. of positive samples	Percent of positive samples	Maximum	Minimum	Standard permissible limits (W.H.O., 1985)		No. of samples higher than permissible limits
						Treat water	Untreated water	
Bact. count at 37°C per ml.		50	100%	30500	15			
Bact. count at 20°C per ml.	10	40	80%	9000	9			
Coliform count per 100 ml.	25	25	50%	1100	2	0	10	17
E. coli type I per 100 ml.	31	19	38%	1100	2	0	0	19
Milk tests:	7	43	86%					
Acid		11	22%					
Acid and gas		20	40%					
Stormy		12	24%					

Table (4)
Table showing disqualified samples or chemical findings or bacteriological findings or both chemical and bacteriological findings

No. of samples	Chemical findings	Bacteriological findings
16	+	-
3	-	+
17	+	+
14	-	-

N.B. : disqualified = +
good = -

