TOXIC CONTAMINANATS AND BACTERIAL DISTRIBUTION OF URBAN DOMASTIC WATER SUPPLIES

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ABSTRACT

Water-related diseases continue to be one of the major health problems globally. An estimated 4 billion cases of diarrhoea annually represented 5.7% of the global disease burden in the year 2000 (WHO 2002). One of the major strategies for tackling this problem is the installation of protected sources such as boreholes, standpipes or wells to provide water of better quality. However, such communal facilities are located some distance from the home, requiring collection and transport from the source and subsequent storage of water within the household. It has frequently been observed that the microbiological quality of water in vessels in the home is lower than that at the source, suggesting that contamination is widespread during collection, transport, storage and drawing of water (Van Zijl 1966; Lindskog & Lindskog 1988). This contamination may lessen the health benefits of water source improvements.Hence present study is undertaken to study the contamination of drinking water of kalaburagi.

KEYWORDS:
Drinking water, bacterial count, hardness, Dissolve oxygen ,Temperature, Turbidity, Total Alkalinity, Carbon dioxide, Chloride, Sulphate, Biological oxygen demand, Chemical oxygen demand, chemical contamination.

INTRODUCTION

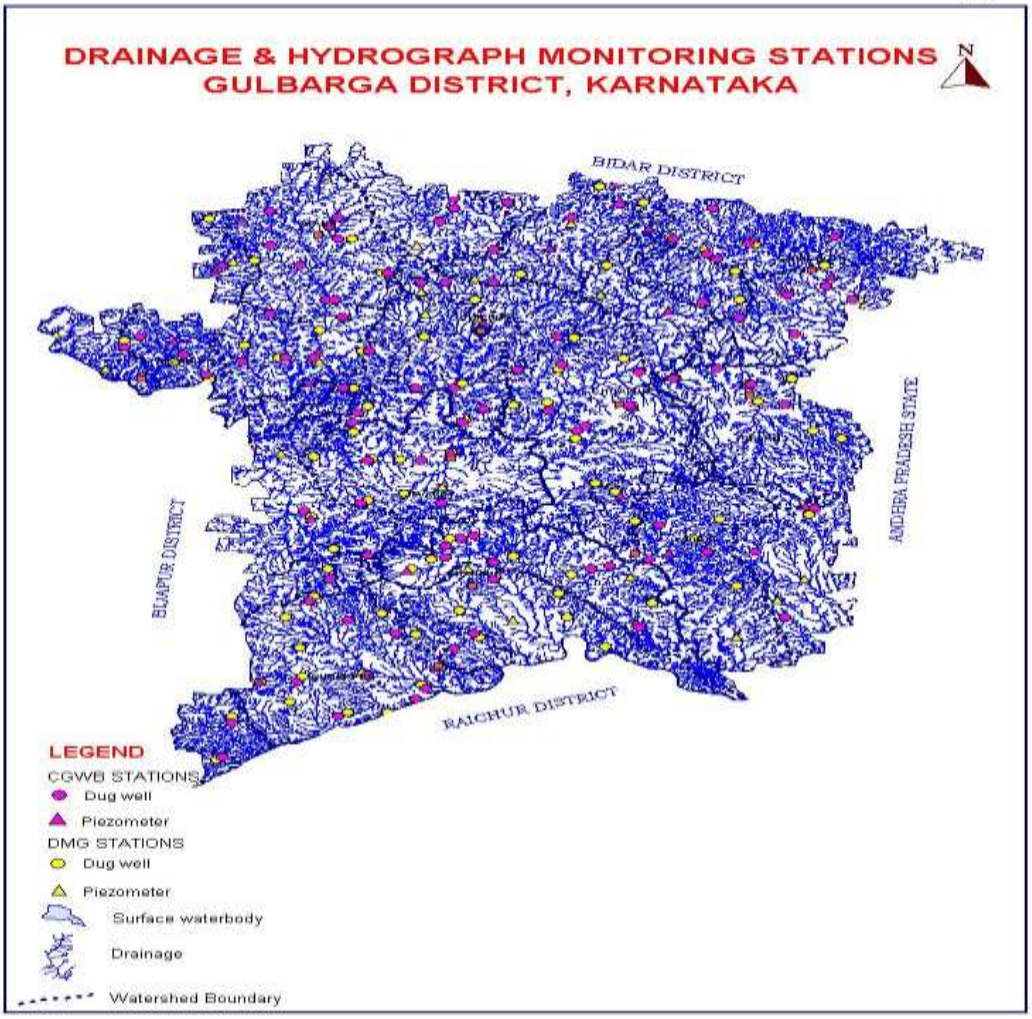
The biological contamination in drinking water is a major problem of public health in developing world. WHO estimates that about 1.1 billion people globally drink unsafe water and the vast majority of diarrhoeal disease in the world (88%) is attributable to unsafe water, sanitation and hygiene (WHO 2003). The most common and widespread health risks associated in drinking water in developing countries are of biological origin. The quality of drinking water may be ascertained by its microbiological examination. The greatest risk from microbes in water is associated with consumption of drinking water that is contaminated with human and animal excreta, although other sources and routes of exposure may also be significant. The aim of this study was to analysed. the drinking water quality in respect to microbial contamination in domestic urban water in Gulbarga/kalaburagi areas . The data of this study may provide some important information about public health risks associated with drinking water quality in this region. More than 100 years ago scientists discovered that human faeces contained bacteria which if present in water, indicated that the water was not safe to drink Escherichia in 1885 observed 2 types of organisms present in faeces, one of which he named Bacterium coli (B. coli, which is now called Escherichia coli) and the concept that the presence of B. coli implied pollution of water was readily adopted. It is recorded that the concept of "indicators" had already been suggested in 1880 by van Fritsch based on his observations of Klebsiellae in human faces that were also present in water (Hendricks, 1978).

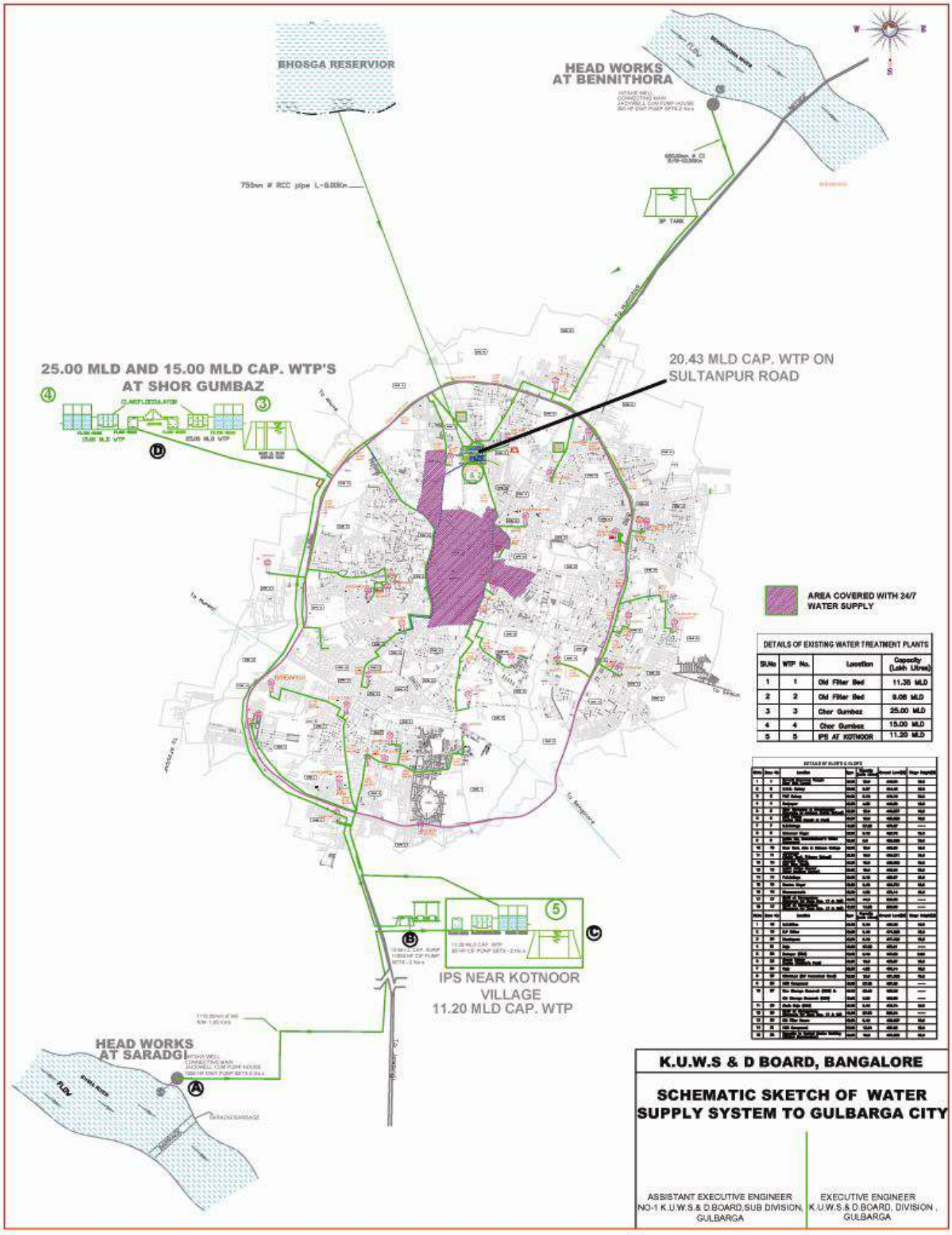
MATERIALS AND METHOD:

STUDY AREA

Kalburagi district lies in the northern part of Karnataka between 16o11' –17o45' N. latitudes and 76o03' - 77o30' E longitudes, with a geographical areaof 16,174 sq km. The district is bounded by Bidar district in the north, Bijapur district in west, Raichur district in south and Andhra Pradesh in the east..Asofthe2014Indiacensus kalburagi had a population of 11,01,989. Males constitute 55% of the population and females 45%. kalburagi has an average literacy rate of 67%, higher than the national average of59.5%: male literacy is 70%, and female literacy is 30%. In G kalburagi,15% of the population is under 6 yearsof age. Kannada and Tamil are the main languages spoken in this city. A sizeable population also speaks all mix fruit juice of language like Kannada, Hindi, urdu. The weather in kalburagi consists of three main seasons. The summer spans from late February to mid-June. It is followed by the southwest monsoon, which spans from late June to late September. It is then followed by dry winter weather until mid-January.Temperatures during the different seasons are:Summer : 26 C to 39 °C,Monsoon: 23 to 32 °C,Winter : 12 to 31 °C

Fig-2


DRAINAGE & HYDROGRAPH MONITORING STATIONS
GULBARGA DISTRICT, KARNATAKA
N
BIDAR DISTRICT
BIJAPUR DISTRICT
ANDHRA PRADESH STATE
RAICHUR DISTRICT
LEGEND
CGWB STATIONS
Dug well
Piezometer
DMG STATIONS
Dug well
Piezometer
Surface waterbody
Drainage
Watershed Boundary


BHOSGA RESERVIOR
HEAD WORKS AT BENNITHORA
25.00 MLD AND 15.00 MLD CAP. WTP'S AT SHOR GUMBAZ
20.43 MLD CAP. WTP ON SULTANPUR ROAD
AREA COVERED WITH 24/7 WATER SUPPLY
DETAILS OF EXISTING WATER TREATMENT PLANTS
Sl.No | WTP No. | Location | Capacity (Lakh Litres)
1 | 1 | Old Filter Bed | 11.36 MLD
2 | 2 | Old Filter Bed | 9.08 MLD
3 | 3 | Chor Gumbaz | 25.00 MLD
4 | 4 | Chor Gumbaz | 15.00 MLD
5 | 5 | IPS AT KOTNOOR | 11.20 MLD
IPS NEAR KOTNOOR VILLAGE 11.20 MLD CAP. WTP
HEAD WORKS AT SARADGI
K.U.W.S & D BOARD, BANGALORE
SCHEMATIC SKETCH OF WATER SUPPLY SYSTEM TO GULBARGA CITY
ASSISTANT EXECUTIVE ENGINEER NO-1 K.U.W.S.& D.BOARD,SUB DIVISION, GULBARGA
EXECUTIVE ENGINEER K.U.W.S.& D.BOARD, DIVISION , GULBARGA

SAMPLE COLLECTION :

Samples were collected in clean and sterilized plastic bottles of 2 liter capacity. The samples were collected to examine the water quality in the month of February and the Year 2013 of different areas in kalburagi, and brought to the laboratory for Physico-chemical parameters selected are pH, EC, Turbidity, Total Alkalinity, Total Hardness, Total Dissolved Solids, Dissolved Oxygen, carbondioxide, Chloride, BOD, COD, Chlorides, Phosphates and Nitrates, biological contamination, chemical contamination,analyzed by following standard methods.

RESULTS AND DISCUSSION:

The physic-chemical tests and biological examination were conducted employing Standard scientific methods so as to minimize the determinate errors. the test have Been conducted for every month and the below data had been listed with respected to mansoon ,winter &summer season

Table. Physico-chemical and microbial analysis of water samples collected In Gulbarga city.(SUMMER SEASON)

Sl.No	PARAMETERS	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1.	PH	8.1	7.9	8.0	7.8	8.2	8.0	8.3	8.0
2.	CONDUCTIVITY	188µs/cm	198µs/cm	129µs/cm	145µs/cm	181µs/cm	400µs/cm	200µs/cm	350µs/cm
3.	TDS	400mg/l	410mg/l	380mg/l	490mg/l	430mg/l	385mg/l	490mg/l	430mg/l
4.	TOTAL HARDNESS	175mg/l	214mg/l	238mg/l	170mg/l	176mg/l	175mg/l	167mg/l	178mg/l
5.	TOTAL ALKALINITY	253mg/l	198mg/l	95mg/l	120mg/l	98mg/l	150mg/l	160mg/l	154mg/l
6.	CHLORIDE	244mg/l	180mg/l	172mg/l	120mg/l	174mg/l	193mg/l	200mg/l	193mg/l
7.	BOD	-0.6mg/l	0.02mg/l	1.5mg/l	-0.7mg/l	1.6mg/l	0.9mg/l	-0.55mg/l	1.4mg/l
8.	DO	1.6mg/l	1.53mg/l	2.01mg/l	0.72mg/l	2.01mg/l	0.88mg/l	0.48mg/l	0.88mg/l
9.	CARBON DI OXIDE	22mg/l	00	11mg/l	13.2mg/l	11mg/l	19.8mg/l	77mg/l	19.8mg/l
10.	SULPHATE	18mg/l	24mg/l	16mg/l	20mg/ll	16mg/l	15mg/ll	45mg	17mg
11.	TEMEPRATURE	26◦c	27◦c	25◦c	27◦c	24◦c	24◦c	26◦c	25◦c
12.	BIOLOGICAL EXAMINATION	4/100ML	NILL	5/100ML	NILL	5/100ML	4/100ML	NILL	4/100ML

S-SAMPLE: S-1:GUNJ,S-2:STATION,S-3:MARKET,S-4 :M.S.K .MILL,S-5:MIJGORI:,S-6: KHAJA COLONY, S-7:MOTHER FILTERBED.S-8:DARGA,

Table. Physico-chemical and microbial analysis of water samples collected In Gulbarga city.(MONSOON SEASON)

SL. NO	PARAMETERS	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1.	PH	8.0	7.9	8.2	7.8	8.0	7.4	8.3	7.7
2.	CONDUCTIVTY	200µs/cm	189µs/cm	240µs/cm	180µs/cm	198µs/cm	174µs/cm	248µs/cm	168µs/cm

3.	TDS	384mg/l	338mg/l	332mg/l	484mg/l	410mg/l	427mg/l	326mg/l	432mg/l
4.	TOTAL HARDNESS	144mg/l	170mg/l	224mg/l	164mg/l	224mg/l	190mg/l	230mg/l	190mg/l
5.	TOTAL ALKALINITY	175mg/l	202mg/l	267.5mg/l	162.5mg/l	267mg/l	187.5mg/l	205mg/l	187mg/l
6.	CHLORIDE	232mg/l	170mg/l	292mg/l	322mg/l	290mg/l	380mg/l	400mg/l	380mg/l
7.	BOD	-0.3mg/l	-0.7mg/l	-0.3mg/l	0.3mg/l	-0.1mg/l	1.7mg/l	0.4mg/l	1.5mg/l
8.	DO	1mg/l	1.1mg/l	0.6mg/l	1.2mg/l	0.72mg/l	8.46mg/l	7.25mg/l	8.5mg/l
9.	CARBON DI OXIDE	7.7mg/l	8.8mg/l	10.6mg/l	9.8mg/l	11mg/l	27.4mg/l	15.4mg/l	37mg/l
10.	SULPHATE	29mg/l	14mg/l	32mg/l	43mg/l	19mg/l	6mg/l	13mg/l	16mg/l
11.	TEMPERATURE	23◦c	26◦c	27◦c	27◦c	25◦c	26◦c	27◦c	27◦c
12.	BIOLOGICAL EXAMINATION	nill	nill	nill	2/100ml	nill	6/100ml	2/100ml	4/100ml

Table. Physico-chemical and microbial analysis of water samples collected In Gulbarga city.(WINTER SEASON)

Sl.No	**PARAMETERS**	**S-1**	**S-2**	**S-3**	**S-4**	**S-5**	**S-6**	**S-7**	**S-8**
1.	PH	8.1	7.9	8.0	7.6	8.1	8.2	8.1	8.2
2.	CONDUCTIVITY	174µs/cm	188µs/cm	159µs/cm	165µs/cm	189µs/cm	340µs/cm	190µs/cm	370µs/cm
3.	TDS	360mg/l	310mg/l	480mg/l	280mg/l	3780mg/l	380mg/l	450mg/l	4700mg/l
4.	TOTAL HARDNESS	198mg/l	320mg/l	248mg/l	206mg/l	287mg/l	212mg/l	328mg/l	220mg/l
5.	TOTAL ALKALINITY	195mg/l	207mg/l	242mg/l	160mg/l	224.5mg/l	202.5mg/l	207mg/l	204mg/l
6.	CHLORIDE	337mg/l	210mg/l	212mg/l	302mg/l	212mg/l	200mg/l	206mg/l	210mg/l
7.	BOD	-1.6mg/l	-0.25mg/l	0.3mg/l	-0.65mg/l	-0.3mg/l	-0.2mg/l	-0.15mg/l	-0.3mg/l
8.	DO	3.46mg/l	0.48mg/l	0.54mg/l	0.2.33mg/l	0.40mg/l	2.3mg/l	0.52mg/l	2.0mg/l
9.	CARBON DI OXIDE	1.8mg/l	23.1mg/l	40.2mg/l	68.2mg/l	45.1mg/l	70mg/l	16.5mg/l	77mg/l
10.	SULPHATE	16mg/l	14mg/l	26mg/l	21mg/ll	13mg/l	12mg/ll	25mg	12mg
11.	TEMEPRATURE	26◦c	27◦c	25◦c	25◦c	27◦c	21◦c	23◦c	23◦c
12.	BIOLOGICAL EXAMINATION	nill	NILL	2/100ML	NILL	5/100ML	nill	NILL	nill

Since the water samples analyzed in the present investigation are contaminated it is an evidenced by higher values & presence of coli form alarming situation from public health point of view. Hence there is necessity to extend such studies to tap water of individuals areas(mijgori,darga,khaja colony, station) in kalburagi .The most probable number is a parameter which indicates the presence of coli form bacteria. Pollution in the water samples presence of coli form also indicates the possibility of presence of other pathogenic microorganism and further indicates the possibility of contamination of water source with drainage

CONCLUSSION

Water supplies have been aware of the role of water in disease transmission for more than 150 years , during which time the primary focus of managing drinking water has been the protection of public health. The fundamental issues associated with public health impacts and the need for safe drinking water are currently well understood .Hence based on these studies recommendations can be made to the local authorities to take suitable control measures for drinking water source in Gulbarga

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