

Comparative Analysis of RO Rejected Waste Water and Sewage Waste Water with Domestic Waste Water in Various Places in and Around Kumbakonam Town, Tamil Nadu

L.Bathmapriya

Research Scholar

Department of Biochemistry,
Government Arts College (Autonomous),
Kumbakonam- Tamil Nadu.

Dr.M.Jeyaraj

Assistant Professor

Department of Biochemistry,
Government Arts College (Autonomous),
Kumbakonam- Tamil Nadu.

Abstract:- Water pollution is one of the major problem in a today's scenario. Polluted water is liberated from any industrial places or which contains a high amount of hazardous compounds. This water is discarded into water bodies like river, lake, etc. If this polluted water is discarded directly into the water bodies it can causes serious effect on environment and human's life. This type of water pollution can also affect the ecosystem adversely. So, analysis before release of water from industries is essential. The environmental quality is greatly focused on water because of its importance in maintaining the human health and health of the ecosystem. Many parts of the world are facing water scarcity problem due to limitation of water resources coincided with increasing population and low water resources etc., In the present study, different waste water such as RO reject waste water, Domestic waste water and Sewage waste water samples were collected from 10 different areas, radial distance of 5 km in and around kumbakonam, Tamilnadu, India. Then the various physico-chemical and microbial analyses were performed based on standard methods. The comparative results showed a more poluted quality is sewage water and followed by RO reject water and domestic waste water. The physicochemical and bacterial characters of the sewage water were unworthy. The sewage water recycling was necessary to minimize the water born diseases.

Keywords:- Physicochemical, microbial, pollution, waste water, Tamil Nadu.

I. INTRODUCTION

Water is an asset that has numerous utilizations, including diversion, transportation, and hydroelectric power, household, mechanical, and business employments. Water likewise underpins all types of life and influences our wellbeing, way of life and monetary prosperity. Albeit in excess of seventy five percent of the world's surface is comprised of water, just 2.8 percent of the Earth's water is accessible for human utilization. At introduce, around 33% of the world's kin live in nations with direct to high water

pressure and the overall freshwater utilization raised six crease between the years 1900 and 1995 more than double the rate of populace development. In this manner, numerous parts of the world are confronting water shortage issue because of confinement of water assets corresponding with developing populace.

Water contamination is the most basic natural issues because of the expanding populace and quick industrialization [1]. For the treatment of metropolitan sewage water different traditional techniques are utilized as a part of India yet they are staggering expense and not prudent [2]. Microalgae based wastewater treatment framework have picked up significance amid the last 50-60 years and now it is generally acknowledged that microalgae based metropolitan sewage water treatment frameworks are as compelling as traditional treatment frameworks [3]. To utilize microalgae for wastewater treatment is an old thought and a few scientists have created methods for misusing the green growth's quick development and supplement evacuation limit. The supplement expulsion is fundamentally an impact of osmosis of supplements as the green growth develop, however other supplement stripping wonders additionally happen, e.g. alkali volatilization and phosphorus precipitation because of the high pH initiated by the green growth [4]. A portion of the reports uncover that an extensive part, now and then up to 90 %, of the phosphorus evacuation is because of this impact [5, 6, and 7]. Notwithstanding tertiary treatment, microalgae may furnish heterotrophs in optional treatment with oxygen, and can likewise be utilized to retain e.g. metals from mine wastewater. The expansion in pH amid photosynthesis additionally has a sterilizing impact on the waste water [8].

Waste water is a general term used to speak to the water with low quality that contains more measures of contaminations and microorganisms. On the off chance that wastewater is released into the close-by water bodies, it can cause genuine natural and medical issues to the people. Wastewater treatment is an essential measure to lessen the toxin and different contaminants exhibit in wastewater. The initial phase in wastewater treatment technique is essential

treatment which evacuates the solids, oil, and oil from wastewater. Auxiliary treatment or natural treatment is the second step, which abuses microorganisms to wipe out the synthetic substances display in wastewater. Last advance is the tertiary treatment; which takes out the microorganisms from wastewater before releasing into the stream [9]. Profluent created from the optional treatment plant contains more measures of supplements (nitrogen and phosphorus) and if these effluents are released into water bodies; it causes eutrophication and influences the biological system. To expel these supplements, a few procedures are utilized, yet the inconveniences of this sort of treatment are staggering expense and expanded slop creation [10]. As a contrasting option to the customary treatment strategies, microalgae are recommended to expel the supplements from wastewater [11]. The utilization of microalgae or microalgae (ocean growth) to expel poisons and supplements from the wastewater is called phycoremediation. Microalgae wastewater treatment is eco benevolent and offers the upside of a financially savvy method for supplement evacuation and biomass creation [12]. The microalgae developed in wastewater can be utilized as vitality source, manure, fine synthetic substances generation and as feed to creatures [13,14].

Fresh water is a limited asset, fundamental for agribusiness, industry and even human presence, without new water of sufficient amount and quality, economical improvement won't be conceivable [15]. Waterways assume a noteworthy part in osmosis or stealing away of civil and mechanical wastewater and overflow from rural land, the previous constitutes the consistent contaminating source though the later is an occasional marvel [16]. With the fast improvement in horticulture, mining, urbanization, and industrialization exercises, the waterway water pollution with risky waste and wastewater is turning into a typical marvel. In India right around 70% of the water has turned out to be

contaminated because of the release of residential sewage and mechanical effluents into regular water source, for example, waterways, streams and additionally lakes [17]. The uncalled for administration of water frameworks may cause major issues in accessibility and nature of water [18]. Since water quality and human wellbeing are firmly related, water investigation before utilization is of prime significance. Certain physical, concoction and microbiological guidelines, which are intended to guarantee that the water is attractive and alright to drink before it can be portrayed as consumable [19]. In this manner, the present examination was intended to dissect the physicochemical and microbial investigation of three distinctive waste water tests utilizing standard techniques.

II. MATERIALS AND METHOD

Study region and accumulation of water tests:

The water characteristics of three water tests (Ro rejected, domestic and sewage water) from ten better places in and around kumbakonam town tamilnadu, India were considered for physicochemical and bacteriological parameters. The water tests were gathered in borosil glass bottles in the period of January 2018. The gathered examples were put away at 4°C. The pH of the water tests was estimated by utilizing the electrometric strategies and other physicochemical parameters investigated by standard techniques given in APHA (1989). The bacteriological investigation like the quantity of bacterial states, number of aggregate coli shape was estimated by standard plate count (SPC). All the gathered water tests were broke down inside 24 hr. The quantities of bacterial settlements were checked by province counter. All estimations were done utilizing ten recreates. The information introduced are mean of ten autonomous conclusions.

S.NO	PH			TDS (mg/l)			COLOUR (TCU)			ODOUR			TASTE			TURBIDITY (NTU)		
	RO W	D W	S W	RO W	D W	S W	RO W	D W	S W	RO W	D W	S W	RO W	D W	S W	RO W	D W	S W
STATION 1	6.8	8.2	9.1	285	813	1257	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non-agreeable	BDL	703	1623
STATION 2	6.4	8.6	9.3	276	810	1200	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	710	1670
STATION 3	6.3	8.3	9.2	289	802	1250	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	693	1510
STATION 4	6.5	7.9	8.9	265	806	1265	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	730	1550
STATION 5	6.2	8.1	8.8	259	820	1234	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	723	1615
STATION 6	6.9	7.8	9.0	250	825	1300	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	697	1600
STATION 7	6.1	8.5	8.5	268	835	1325	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	750	1617
STATION 8	6.2	8.1	9.3	258	840	1286	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	685	1670
STATION 9	6.5	8.2	9.1	243	810	1259	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	715	1620
STATION 10	6.4	7.9	9.2	241	845	1247	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	700	1610
TOTAL	64.3	81.6	90.4	2634	8206	12623	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	7106	16085
AVERAGE	6.4	8.1	9.0	263.4	820.6	1262.3	<2TCU	LBG	DBB	agreeable	Pungent	repellent	Agreeable 'c'	salty	Non agreeable	BDL	710.6	1608.5
ISI STANDAR	6.5 to 8.5	6.5 to 8.5	6.5 to 8.5	500	500	500	2TCU	2TCU	2TCU	agreeable	agreeable	agreeable	Agreeable- 'abs's'	Agreeable- 'abs's'	Agreeable- 'abs's'	2NTU	2NTU	2NTU

Table 1. Physical Parameters of Different Waste Water Analysis

TCU – True Color Unit, LBG – Light Brown Grey, DBB – Dark Brown Black, BDL – Below Detection Limit, ROW – RO rejected Waste water, SWW – Sewage Waste Water, DW – Domestic Waste Water, NTU - Nephelometric Turbidity Unit.

S.NO	ALKALINITY (mg/l)			CHLORIDE (mg/l)			BARIUM (mg/l)			IRON (mg/l)			MANGANESH (mg/l)			NITRATE (mg/l)			ZINC (mg/l)			CALCIUM (mg/l)			MAGNESIUM (mg/l)		
	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W	R O W	D W W	S W W
STATION 1	30	200	303	37	192	251	BDL	0.5	0.6	2	5	7	BDL	0.06	0.15	BDL	BDL	BDL	BDL	0.1	0.15	22	145	150	15	41	80
STATION2	28	210	311	35	195	256	BDL	0.4	0.7	4	4	8	BDL	0.05	0.14	BDL	BDL	BDL	BDL	0.2	0.14	23	144	155	16	42	81
STATION3	26	211	298	36	190	250	BDL	0.3	0.5	2	6	9	BDL	0.06	0.16	BDL	BDL	BDL	BDL	0.1	0.15	22	145	145	14	41	82
STATION4	28	198	290	33	193	254	BDL	0.5	0.6	4	5	8	BDL	0.04	0.14	BDL	BDL	BDL	BDL	0.1	0.14	25	146	149	15	42	82
STATION5	30	199	289	39	195	251	BDL	0.4	0.7	4	4	8	BDL	0.07	0.15	BDL	BDL	BDL	BDL	0.2	0.16	24	142	152	14	43	79
STATION6	31	195	299	38	190	256	BDL	0.5	0.8	2	5	7	BDL	0.05	0.16	BDL	BDL	BDL	BDL	0.2	0.14	21	148	148	15	45	77
STATION7	33	194	296	37	195	245	BDL	0.6	0.5	4	4	6	BDL	0.06	0.14	BDL	BDL	BDL	BDL	0.1	0.15	22	149	147	14	41	75
STATION8	28	196	299	36	196	249	BDL	0.4	0.4	4	5	8	BDL	0.05	0.15	BDL	BDL	BDL	BDL	0.2	0.14	23	145	146	14	39	79
STATION9	27	201	306	35	192	246	BDL	0.5	0.6	2	6	9	BDL	0.06	0.16	BDL	BDL	BDL	BDL	0.1	0.14	24	144	155	17	39	74
STATION10	29	210	300	39	197	249	BDL	0.6	0.6	2	6	8	BDL	0.05	0.15	BDL	BDL	BDL	BDL	0.1	0.16	25	150	154	18	38	76
TOTAL	290	2014	3008	365	1935	2507	BDL	4.7	6	30	50	78	BDL	0.55	1.5	BDL	BDL	BDL	BDL	1.4	1.47	231	1458	1501	152	411	785
AVERAGE	29	201.4	300.8	36.5	193.5	250.7	BDL	0.47	0.6	3	5	7.8	BDL	0.05	0.15	BDL	BDL	BDL	BDL	0.14	0.14	23.1	145.8	150.1	15.2	41.1	78.5
ISI STANDARD	200	200	200	200	200	200	1.0	1.0	1.0	0.1	0.1	0.1	0.1	1.0	1.0	45	45	45	5.0	5.0	5.0	75	75	75	30	30	30

Table 2. Chemical Parameters of Three Different Waste Water Treatment

BDL – Below Detection Limit

S.NO	NO OF BACTERIAL COLONIES (CFU/ml)	NO OF FUNGAI COLONIES (CFU/ml)
Ro rejected waste water	100-120	30-45
Domestic waste water	120-175	35-50
Sewage waste water	180-200	50-80
ISI STANDARD	ABSENT	ABSENT

Table 3. Microbial counting of organisms

III. RESULT AND DISCUSSION

Physiological and bacterial nature of various water tests are appeared in the Tables 1, 2 and 3. The worthy furthest reaches of pH in the water is 6.5 to 8.5 (ISI). The pH of water is imperative. The pH esteems investigated utilizing pH meter was observed to be pretty much comparative for each example, where esteems were going from 6.2-9.5. pH in the scope of 6.5 to 8.5 for drinking and household purposes. The pH esteem for Amaravathi waterway was observed to be pretty much like that acquired by Sivakumar et al. The variances in ideal pH reaches may prompt an expansion or reduction in the harmfulness. The outcome was emphatically associated by the pH of Ganga and Ghaghara waterway water where the alkalinity extended from 7.3 to 7.9 (20). The pH estimation of Morana River was additionally in the scope of antacid (21). Estimation of Turbidity mirrors the straightforwardness in water. It is caused by the substances show in water in suspension. In common water, it is caused by dirt, residue, natural issue and other infinitesimal life forms. Normal estimation of turbidity for ISI standard is 2 NTU. Ro rejected waste water is BDL and the sewage and household is 1608, 710 NTU individually. At long last the outcome demonstrated that high turbidity in sewage and local wastewater.

Colour is a vital physical property of water in light of its suggestions for water supply, and the need to diminish it to satisfactory levels by water treatment is profoundly prescribed. In the present examination the shade of the three distinctive waste water was <2TCU in RO rejected, light darker dim in residential and dim dark colored dark in sewage squander water. It was watched outwardly. Scent it was ordered as offensive or non-shocking by coordinate possessing an aroma like the example. Taste of the local and sewage

squander water in non pleasing. Ro rejected waste water is pleasing 'c' rating scale.

The reasonable furthest reaches of calcium is 75 mg/l and magnesium is 30 mg/l (ISI). The outcome demonstrated that the low estimation of calcium and magnesium in Ro rejected waste water (25 and 13 mg/l) individually and high measure of calcium and magnesium in both sewage (150 and 78 mg/l) and residential waste water (145 and 41 mg/l). This outcome was emphatically associated with the calcium substance of the drinking water tests in eastern piece of the Hisar at Haryana, where the calcium content ran from 12 to 160 mg/l in the drinking water (22). Magnesium level got in this examination was related with the magnesium substance of the water tests broke down by Subhadradevi Gandhi (23). Press (Fe) is normally copious in earth's outside. Measure of iron accessible in dissolvable from relies on the centralization of the complex framing particles, pH and oxidation conditions. Without the complex shaping particles, ferric iron isn't fundamentally solvent except if the pH is low. The qualities are 2,5,8 mg/l individually. The reasonable furthest reaches of Iron is 0.1mg/l (ISI). The outcome demonstrated that the abnormal state of iron present in all the three examples.

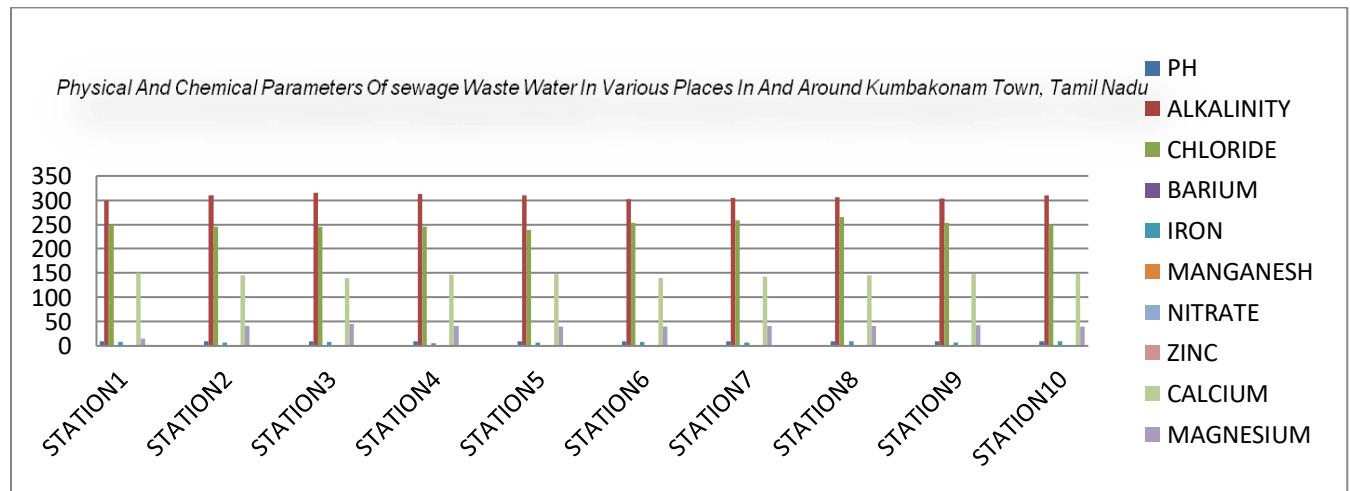
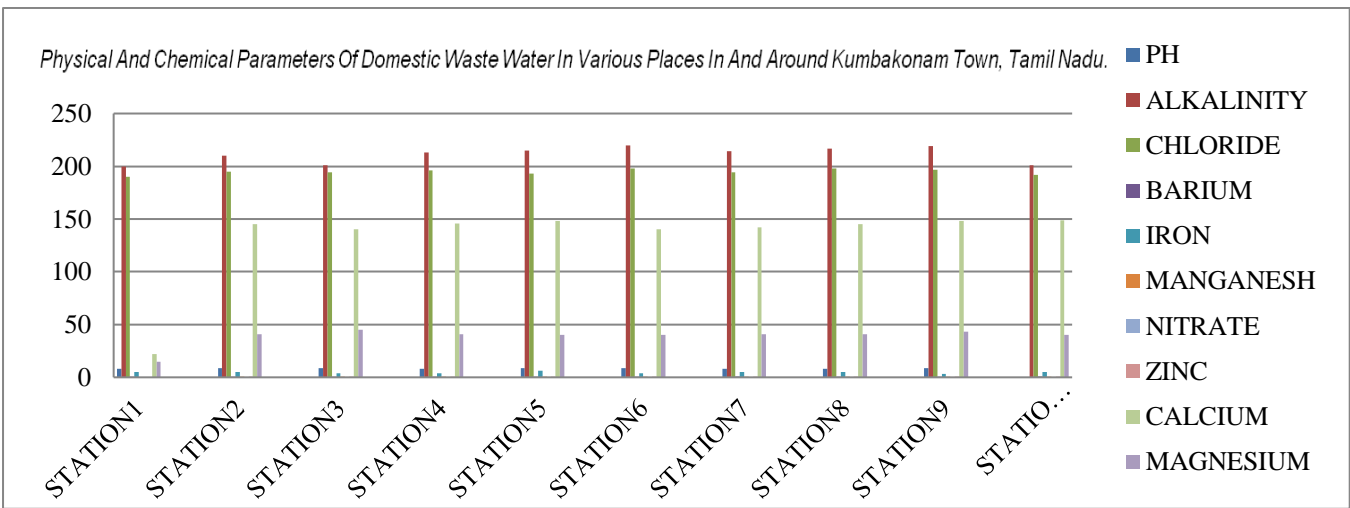
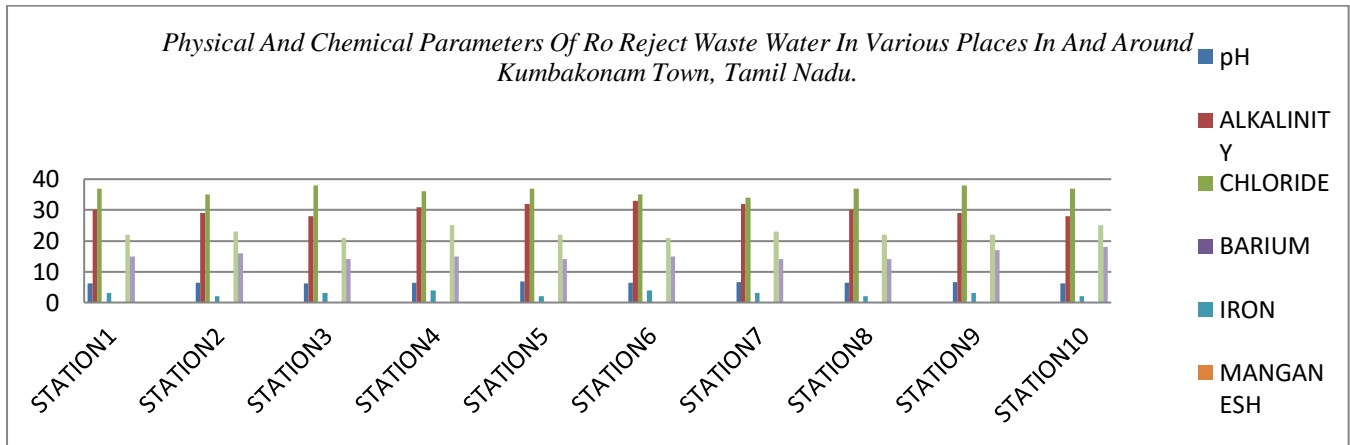
The passable furthest reaches of TDS is 500 mg/l (ISI). The measure of aggregate disintegrated solids in Ro rejected waste water, household squander water and sewage squander water ranges are 263,820 and 1262 mg/l individually. The outcome was demonstrated that Sewage squander water and household squander water TDS is high. Ro rejected waste water is reasonable cutoff. This was decidedly associated with the waterway water tests of the Ranchi locale, where the aggregate broke up solids extended between 50 to 450 mg/l (24). The crumbling of the nature of water was chiefly because of the centralization of the aggregate disintegrated solids (25). The high measures of the aggregate suspended solids were seen in the sewage water tests gathered from all the above examples. These outcomes were decidedly related with Pitamahal Dam store water in summer, winter and blustery seasons. The high measure of the aggregate suspended solids is basically because of the release of mechanical and residential waste (26).

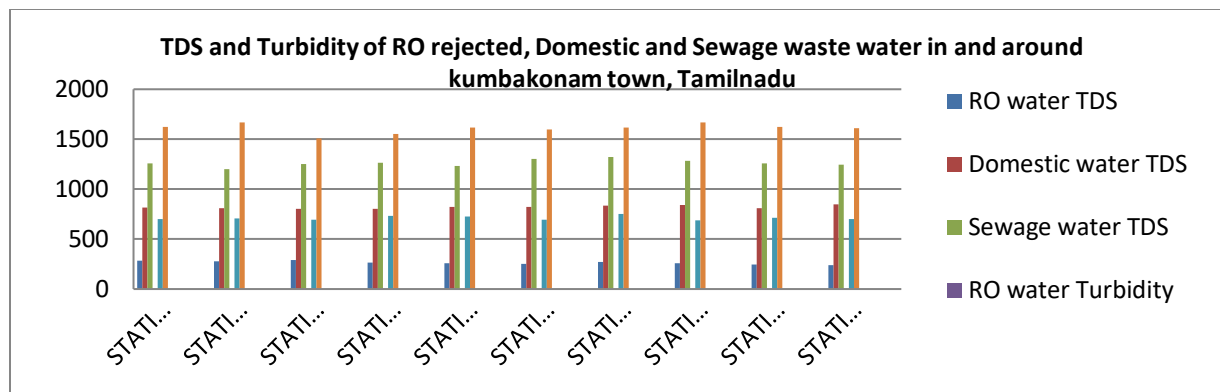
The allowable furthest reaches of alkalinity is 200 mg/l (ISI). The measure of alkalinity in Ro rejected water (29 mg/l) were inside the allowable level staying two examples residential waste water (201mg/l) and sewage squander water (300mg/l) are not an admissible breaking point. Zinc, Manganese and Barium levels of three distinctive waste water tests are beneath in ISI standard esteem.

The allowable furthest reaches of chloride content in water is 200 mg/l according to ISI. The Cl substance of the Ro dismiss (36mg/l) and household squander water (193 mg/l) were inside as far as possible. Sewage squander water is 250mg/l is high not a penetrable point of confinement. This outcome demonstrated that the nitrate esteem is BDL in each of the three waste water tests. The bacteriological examination

of water decides the potability of water. The admissible furthest reaches of bacterial and parasitic settlements in water is Absent/100ml (ISI). This outcome appeared in table 3. The outcome demonstrated that all the bacterial and contagious states ranges are high in three distinctive waste water. The

explanations behind the high number of aggregate bacterial and contagious were because of the release of human and creature faces into the water bodies.





IV. CONCLUSION

Physico synthetic and microbial examination was performed on three diverse waste water tests gathered from different places in and around Kumbakonam town Tamil Nadu, India by standard techniques. These waste water tests are utilized thusly with respect to angling, water system and other local purposes. This examination would help the water quality observing and administration keeping in mind the end goal to enhance the nature of water with keeping up better economical administration. Results acquired indicated high varieties between three distinctive waste water ranges. Similarly sewage squander water was more dirtied than other two waste waters. This investigation would make and create mindfulness among the general population to treat the waste water to local and some other reason.

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