

Table 1. Results of Wastewater analysis

Parameters	Amran	Hajjah STP	Hajjah LS6	Hajjah LS8	Ibb	Aden Al-Shaab	Aden Al-Areesh	
Physical, Chemical and Biological Parameters								
Visual discrip.	Light red	normal	normal	normal	clear	purple	Algae	
BOD (mg/L)	Please refer to Table 2 (the new collected samples by WEC)							
COD (mg/L)	Please refer to Table 2 (the new collected samples by WEC)							
TDS (mg/L)	1952	1180	1653	1690	1055	1527	1656	
EC (uS/cm)	3003	1816	2543	2600	1623	2350	2547	
pH	8.2	8.1	7.8	7.7	8.2	8.3	8.8	
TSS (mg/L)	499	54	640	482	16	498	36	
Cl ⁻ (mg/L)	٤٦١,٥	٣٤٠,٨	٢٦٢,٧	٢٦٢,٧	٢١٣	٤٧٩,٢٥	٥٣٠,٧٣	
Na ⁺ (mg/L)	٤٧٠,٨١	٢٩٩,٩٢	٣٣٠,٧٤	٢١٩,٨٨	٢١٩,٠١	٤٥٠,٠١	٥٥٠,٠٠	
Mg ⁺⁺ (mg/L)	٢٤,٢٣	٤١,٣٤	٥٣,٥	٢٩,٧٩	٣٣,٤٤	٥٩,٥٨	٧٥,٣٩	
Ca ⁺⁺ (mg/L)	٨٠	٤٤	٤٢	٤١	٦٥	٧٤	٥٦	
SAR	١١,١٣	٧,٨١	٨,٠٠	٦,٣٧	13.68	٩,٤٥	١١,٢٨	
TKN (mgN/L)	٧٤,٢٠	٦٦,٥٠	٨٤,٠٠	٩١,٠٠	٦٥,٨٠	٩١,٠٠	٦٣,٠٠	
PO ₄ ³⁻ (mgP/L)	23	19	33	36	32	24	17	
K ⁺ (mg/L)	٥٨,٢٠	٢٩,٣٠	٣٥,٥٠	٣٢,٣٠	٢٥,٥٠	٢٢,٠٠	٣٥,٤٠	
Heavy metals								
B (p.p.m)	١,٦	٠,١	١,٠	٠,١	٠,٢	٠,٦	٠,٩	
Zn (p.p.m)	٠,٠٩	٠,١٣	٠,١٢	٠,١٣	٠,٢١	٠,١١	٠,٣١	
Cu (p.p.m)	٠,٠٦٢	٠,٠٣٣	٠,٠٣٤	٠,٠٥٠	٠,٠٥٣	٠,٠٥٠	٠,٠٤٤	
Cd (p.p.m)	٠,٠١٥	٠,٠١٥	٠,٠١٩	٠,٠٢٣	٠,٠٢٨	٠,٠٣٣	٠,٠٣٤	
Pb (p.p.m)	٠,٠٤٥	٠,٠١٦	٠,٠٠٨	٠,٠٢١	٠,٠٢٣	٠,٠٣٨	٠,٠٢٠	
Cr (p.p.m)	٠,٠٠٥	٠,٠٠٣	٠,٠٠٢	٠,٠٠٠	٠,٠٠٢	٠,٠٠٦	٠,٠٠٦	
Ni (p.p.m)	0.02	٠,٠٣	٠,٠٢	٠,٠١	٠,٠٤	٠,٠١	٠,٠١	
Pollution indicator and Pathogenic bacteria								
TC (#/100ml)	>2400	>2400	>2400	>2400	>2400	>2400	>2400	
FC (#/100ml)	>2400	>2400	>2400	>2400	>2400	>2400	>2400	
Salmonella (S.ssp/100ml)	>18	>18	>18	>18	>18	>18	>18	
Helmenths eggs and Larva	Eggs type	Ascaris, Trichuris and Hookworms						
	Eggs/100ml	Nil	Nil	8	Nil	Nil	Nil	Nil
	Larva type	Ascaris						
	Larva/100ml	Nil	Nil	4	Nil	Nil	Nil	Nil
Protozoa	Intamoeba (#/100 ml)	8	8	20	20	8	8	4
	Giardia (#/100 ml)	40	32	60	64	Nil	Nil	60

Table 2. Sampling and analysis for BOD,COD, TDS and EC

Site	Visual description	BOD ₅ ^{20°C}	COD	TDS at 180 °C	EC at 21 °C
Yarim –In	Normal	962	1842	1054	2260
Yerim-Out-An.P	Algae	350	597	1034	2480
IBB- In	Normal	1316	2187	1158	2430
IBB- effluent	Clear	58	106	858	1862
Aden- Al-Areesh-In	Normal	372	1038	760	2260
Aden- Al-Areesh-effl.	Algae	47	187	3608	6420
Aden- Al-Shaab- In	Normal	430	1016	1490	3430
Aden- Al-Shaab-effl.	Purple	59	462	1808	3700
Amran-in	Normal	1518	2626	1366	3320
Amran- FP2 Out	Milky	476	826	1242	3490
Hajjah- STP- In	Normal	612	1083	1326	2260
Hajjah-STP-Effl.	Normal	172	331	968	2720
Hajjah-S6-In	Normal	1500	3050	1634	3014
Hajjah-S6-Effl. Imhoff	Normal	900	1780	1252	3030
Hajjah-S8-In	Blood	1300	2740	1306	3140
Hajjah-S8- Effl. Imhoff .	Normal	440	1230	1150	4200

Table 3. Results of Sludge analysis

Parameters	Amran	Hajjah STP	Hajjah LS6	Hajjah LS8	Ibb Bed	Ibb store	Yarim	Aden Al-Shaab
Physico-chemical analysis								
pH (1 : 5)	٧,٤٧	٦,٨٩	٦,٦٦	٦,٠٤	٦,٠٠	٧,٥٣	٦,٦١	٦,٨٣
EC ds.m ⁻¹ (1:5)	١,٦	١,٣٣	١,٥٠	٣,٢١	٥,٩٣	٢,٣٣	٢,١١	٤,٧
Moisture conten. %	٢,٠٨١	٣٠,٣٩	٥,٢٦٩	٣٦,٤٤٥	٧٣,١٠٠	٢١,٢٣٩	١٩,٣٣٦	٤,٤٩١
Organic matter %	٥٦,٨٠٢	٤٠,٨٩٢	٥٥,٥٧٠	٧٨,٢٧	٣٨,١٤	٢٣,٧٣١	٢٧,٦٢٧	٣٨,١٥٠
TN %	٢,٤٧٨	٣,٨٣٣	٣,٦٩٦	٤,٢٠٠	4.515	٤,٠٢٢	٢,٣٧٣	٤,١٥٨
TP (mg/Kg)	1477	٢٠١٥	٣٨٠٨	٣٠٩١	٣٨٠٨	٢٩٨٧	١٤٧٧	٣٨٠٨
TK (mg/kg)	٣٨٢٥	٢٦٢٥	٢٤٧٥	٣٤٥٠	٤١٢٥	٥٣٢٥	٦٠٧٥	٤٣٥٠
Heavy Metals								
Zn (mg/kg)	٤٨١	٥٩٤	٦٥٧	٦٠١	٤٦٣	٥١٢	١٧٣	٩٦٨
Cu (mg/kg)	١٩,٠	١٣,٠	١٧,٨	١٧,٣	٢٠,٢	١٨,٨	١٣,١	١٣,٢
Ni (mg/kg)	٨,٦	٨,٠	٨,٣	٥,٧	٧,٢	٩,٠	٩,٤	١١,١
Cd (mg/kg)	٠,١٢	٠,١٠	٠,١١	٠,١٢	٠,١٦	٠,١٥	٠,١٨	٠,٢٣
Pb (mg/kg)	٢,٤	٦,٢	٨,١	٥,٢	٩,٢	٦,٢	١١,٢	٦,٢
Cr (mg/kg)	٩,٨	٥,٦	٥,٧	٣,٥	٥,٧	٥,٣	٥,٥	٩,٠
Pollution indicator and Pathogenic bacteria								
Total Colif. (#/g)	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400
Fecal Colif. (#/g)	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400
Salmonella (S.spp/g)	>18	>18	>18	>18	>18	>18	>18	>18
Helmint h eggs and Larva	Eggs Types	Ascaris, Trichuris and Hookworms						
	Eggs/g	Nil	5	2	1	4	Nil	Nil
	Larva Types	Ascaris						
	Larva/g	Nil	2	Nil	Nil	3	Nil	Nil
Protozoa	Entamoeba (#/g)	4	4	4	2	4	1	4
	Giardia (#/g)	10	8	8	4	4	1	5

Table 4. Results of Soil analysis

Parameters	Amran	Hajjah	Ibb main	Yarim	Yarim	Aden Al-Areesh
pH (1:5)	٧,٦٥	٧,٥٩	٧,٦٧	٧,٣٨	٧,٩٣	٨,٦٢
EC ds.m ⁻¹ (1 : 5)	٠,٢٥	٠,٣٢	٠,١٩	٠,٢٣	٠,٢٤	٢١,١
O.M %	٧,٨١	٥,٨٤	٧,٥٧	١٢,٤٢	١٠,٢٢	٣,١٢٢
TN %	٠,٧٩٥	٠,٧٣٥	٠,٧١٤	٠,٧٧٢	٠,٥٦٥	٠,٥١٥
Extractable P (mg/L)	٢١٦	٨١٤	٤٣,٤٨	٢٧٦	٢٧٦	٣٥٥
Extractable.K (mg/L)	١٢,٠١	١١,٩٢	٨,٨٣	٤٥,٧٩	٣٧,٣٠	٢٥,٠٤
Zn (mg/kg)	٥٢,٥	٦٣,٥	٦٨,٠	٦٦,٠	٧١,٠	١٣,٠
Cu (mg/kg)	٥,٢٨	٥,٤٥	٧,٢٥	٨,٢٤	٥,١٠	٦,٤٥
Ni (mg/kg)	١,٤٧	١,٧٢	١,٤٦	١,٧٧	٠,٢٠	١,٦٨
Cd (mg/kg)	٠,٠٥٠	٠,٠٧٥	٠,٠٩٠	٠,١١	٠,١٠	٠,٠٩٠
Pb (mg/kg)	٢,٤٥	٣,٨٣	٢,٨٥	٣,٢٠	١,٦٣	٢,٥٨
Cr (mg/kg)	٠,٥٨	٠,٤٤	٠,٤٤	٠,٤٢	٠,٥٦	٠,٤٤