JADPR-22-19374

Epidemiological Survey of Bacterial Isolates from Drinking Water Samples in Ibadan North-East Local Government Area, Oyo State, Nigeria

J. Omololu-Aso[1*], **A. Fawole**[1], **O. O. Omololu-Aso**[2], **O. Adesunloro**[1], **K. Azeez**[1]
[1]*Department of Microbiology, Obafemi Awolowo University, Osun State, Nigeria;* [2]*Department of Obstetrics Gyneacology, University College Hospital, Oyo State, Nigeria*
Correspondence to: J.Omololu-Aso, Department of Microbiology, Obafemi Awolowo University, Osun State, Nigeria; E-mail: omololu-aso@oauife.edu.ng
Received: 27-Sep-2022, Manuscript No. JADPR-22-19374; **Editor assigned:** 29-Sep-2022, PreQC No. JADPR-22-19374 (PQ); **Reviewed:** 13-Oct-2022, QC No. JADPR-22-19374; **Revised:** 02-Feb-2023, Manuscript No. JADPR-22-19374 (R); **Published:** 10-Feb-2023, DOI: 10.35248/2329-8731.23.11.287
Citation: Omololu-Aso J, Fawole A, Omololu-Aso OO, Adesunloro O, Azeez K. Epidemiological Survey of Bacterial Isolates from Drinking Water Samples in Ibadan North-East Local Government Area, Oyo State, Nigeria. Infect Dis Preve Med. 11:287.

SUPPLEMENTARY FILE

Supplementary Table 1: Biochemical reactions of isolates recovered from water samples.

Water sources under Ibadan North East Local Government Area, Oyo State.	Gram stain	Coagulase	DNAse	Catalase	Indole	Urease	Oxidase	Citrate	Hydrogen Sulphide	Gas production	Lactose	Glucose	Sucrose	Isolate Identity
T1a	-	-	-	+	-	-	-	-	+	-	-	+	-	*Salmonella typhi*
T1b	-	-	-	+	-	-	-	-	-	+	-	+	-	*Shigella flexneri*
T1c	-	-	-	+	-	-	-	-	-	+	-	+	-	*Shigella flexneri*
T1d	+	-	-	+	-	+	-	-	+	+	+	+	+	*Staphylococcus epidermidis*
T1e	-	-	-	+	-	-	+	+	-	+	-	-	-	*Pseudomonas aeruginosa*
T1f	-	-	-	+	-	-	-	-	+	-	-	+	-	*Salmonella typhi*
T1g	+	-	-	+	-	+	-	-	+	+	+	+	+	*Staphylococcus epidermidis*

T1h	-	-	-	+	-	+	-	+	+	+	-	+	-	*Proteus mirabilis*
T1i	+	+	+	+	-		-	+	-	-	+	+	+	*Staphylococcus aureus*
T1j	-	-	-	+	-	-	-	-	+	-	-	+	-	*Salmonella typhi*
T2a	-	-	-	+	-	-	-	-	+	-	-	+	-	*Salmonella typhi*
Key: T – Temidire, Oje Area, OD – Odo-Osun Area, ID – Idi-Agbon/Beere Area, + - Positive,- Negative														

Supplementary Table 2: Percentage contribution of bacterial isolates recovered from samples obtained in the study area.

Bacterial Isolates/Area Code	**T**	**OD**	**ID**
Salmonella typhi	13(26%)	6(22.2%)	-
Shigella flexneri	3(6%)	1(3.7%)	-
Staphylococcus epidermidis	4(8%)	-	-
Pseudomonas aeruginosa	1(2%)	2(7.4%)	-
Proteus mirabilis	3(6%)	2(7.4%)	2(12.5%)
Staphylococcus aureus	5(10%)	6(22.22%)	2(12.5%)
Klebsiella pneumonia	5(10%)	3(11.11%)	-
Enterobacter aerogenes	5(10%)	-	-
Escherichia coli	3(6%)	2(7.4%)	7(43.8%)
Shigella dysentariae	8(16%)	1(3.7%)	2(12.5%)
Serratia marcescens	-	2(7.4%)	3(18.8%)
Vibrio cholera	-	2(7.4%)	
Total	50(100%)	27(100%)	16(100%)
Key: T: Temidire, Oje Area, OD: Odo-Osun Area, ID: Idi-Agbon/Beere Area			

Supplementary Table 3: Antibiotics Susceptibility Test for 50 Isolates.

ANTIBIOTICS	ISOLATES	S (%)	I (%)	R (%)	TOTAL (%)
Chloramphenicol	50	80	20	-	100
Ciproflaxin	50	100	-	-	100
Amoxacilin	50	-	-	100	100
Augmentin	50	-	-	100	100
Gentamycin	50	-	-	100	100
Pefloxacin	50	-	50	50	100
Streptomycin	50	50	25	25	100
KEY: S: SUSCEPTIBLE; I : INTERMEDIATE; R: RESISTANCE					

Supplementary Table 4: Morphological identification of isolates on nutrient agar colonial morphology of isolates recovered from the water samples obtained from the study areas.

Isolates codes	Shape	Color	Opacity	Surface	Edges	Consistency	Size	Elevation
T1a	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T1b	Circular	Colorless	Translucent	Smooth	Lobate	Dense	Medium	Convex
T1c	Circular	Colorless	Translucent	Smooth	Lobate	Viscoid	Medium	Convex
T1d	Circular	Cream or white	Transparent	Glistening	Entire	Dense	Small	Raised
T1e	Irregular	Greenish blue	Opaque	Smooth	Entire	Dense	Large	Low convex
T1f	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T1g	Circular	Cream or white	Transparent	Smooth	Entire	Dense	Small	Raised
T1h	Irregular	Greyish white	Translucent	Glistening	Entire	Butyrous	Small	Effuse
T1i	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
T1j	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T2a	Circul	Greyish	Transluc	Smoot	Entire	Moist	Medi	Low

	ar	white	ent	h			um	convex
T2b	Circular	Cream or white	Transparent	Glistening	Entire	Dense	Small	Raised
T2c	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T2d	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T2e	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T3a	Circular	Greyish white	Opaque	Mucoid	Entire	Moist	Medium	Dome-shaped
T3b	Circular	White	Opaque	Smooth	Entire	Viscoid	Small	Dome-shaped
T3c	Circular	White	Opaque	Mucoid	Entire	Viscoid	Small	Dome-shaped
T3d	Circular	Golden yellow	Opaque	Smooth	Entire	Moist	Medium	Convex
T3e	Circular	White	Opaque	Smooth	Entire	Butyrous	Small	Dome-shaped
T4a	Circular	Greyish white	Translucent	Mucoid	Entire	Viscoid	Small	Convex
T4b	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Small	Convex
T4c	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
T4d	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
T4e	Circular	Greyish white	Translucent	Smooth	Lobate	Viscoid	Small	Convex
T5a	Circular	Greyish white	Opaque	Mucoid	Entire	Viscoid	Medium	Dome-shaped
T5b	Circular	Greyish white	Opaque	Mucoid	Entire	Viscoid	Medium	Dome-shaped
T5c	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T5d	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T5e	Circular	Golden yellow	Opaque	Smooth	Entire	Moist	Medium	Convex
T5f	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Medium	Low convex
T5g	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Small	Convex
T6a	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
T6b	Irregu	Greyish	Translucent	Glisten	Entire	Butyrou	Small	Effuse

	lar	white	ent	ing		s		
T6c	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Small	Convex
T6d	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Medium	Low convex
T6e	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
T6f	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
T7a	Irregular	Greyish white	Translucent	Glistening	Entire	Viscoid	Small	Effuse
T7b	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Medium	Low convex
T7c	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Medium	Low convex
T7d	Circular	Colorless	Translucent	Smooth	Lobate	Moist	Medium	Convex
T7e	Circular	Golden yellow	Opaque	Smooth	Entire	Moist	Medium	Convex
ID1a	Circular	Greyish white	Translucent	Smooth	Entire	Butyrous	Small	Convex
ID1b	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
ID2a	Irregular	Greyish white	Translucent	Glistening	Entire	Viscoid	Small	Effuse
ID2b	Irregular	Greyish white	Translucent	Glistening	Entire	Viscoid	Small	Effuse
ID2c	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
ID2d	Circular	Greyish white	Translucent	Smooth	Entire	Butyrous	Small	Convex
ID3a	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Small	Convex
ID3b	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
ID3c	Circular	Greyish white	Translucent	Smooth	Lobate	Moist	Small	Convex
ID4	Circular	Red	Opaque	Smooth	Entire	Moist	Large	Convex
OD1a	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
OD1b	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
OD1c	Circular	Red	Opaque	Smooth	Entire	Viscoid	Large	Convex
OD1d	Circul	Golden	Opaque	Smoot	Entire	Moist	Medi	Convex

	ar	yellow		h			um	
OD1e	Circular	Greyish white	Opaque	Mucoid	Entire	Moist	Medium	Dome-shaped
OD1f	Circular	Greyish white	Opaque	Mucoid	Entire	Butyrous	Medium	Dome-shaped
OD2a	Circular	Greyish white	Opaque	Mucoid	Entire	Moist	Medium	Dome-shaped
OD2b	Helical	Yellow	Opaque	Smooth	Entire	Viscoid	Large	Concave
OD2c	Irregular	Greyish white	Translucent	Glistening	Entire	Viscoid	Small	Effuse
OD2d	Irregular	Greyish white	Translucent	Glistening	Entire	Moist	Small	Effuse
OD2e	Helical	Yellow	Opaque	Smooth	Entire	Butyrous	Large	Concave
OD2f	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
OD2g	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
OD3a	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
OD3b	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
OD3c	Circular	Greyish white	Translucent	Smooth	Entire	Viscoid	Small	convex
OD3d	Irregular	Greenish blue	Opaque	Smooth	Entire	Viscoid	Large	Low convex
OD3e	Irregular	Greenish blue	Opaque	Smooth	Entire	Viscoid	Large	Low convex
OD4a	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
OD4b	Circular	Greyish white	Translucent	Smooth	Lobate	Moist	Small	Convex
OD4c	Circular	Greyish white	Translucent	Smooth	Lobate	Butyrous	Small	Convex
Isolates codes	Shape	Color	Opacity	Surface	Edges	Consistency	Size	Elevation
OD5	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
T4-3a	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Small	Convex
T4-3b	Circular	Greyish white	Opaque	Mucoid	Entire	Moist	Medium	Dome-shaped
T4-3c	Circular	Greyish white	Opaque	Mucoid	Entire	Butyrous	Medium	Dome-shaped
T4-3d	Circul	Golden	Opaque	Smoot	Entire	Moist	Medi	Convex

	ar	yellow		h			um	
T5-3a	Circular	White	Opaque	Smooth	Entire	Butyrous	Small	Dome-shaped
T5-3b	Circular	White	Opaque	Glistering	Entire	Butyrous	Small	Dome-shaped
T5-3c	Circular	Cream or white	Transparent	Mucoid	Entire	Dense	Small	Raised
ID1-3a	Circular	Red	Opaque	Smooth	Entire	Viscoid	Large	Convex
ID1-3b	Circular	Red	Opaque	Smooth	Entire	Viscoid	Large	Convex
ID2-3a	Circular	Greyish white	Translucent	Smooth	Undulate	Butyrous	Small	Convex
ID2-3b	Circular	Greyish white	Translucent	Smooth	Entire	Butyrous	Small	Convex
ID3-3a	Circular	Greyish white	Translucent	Smooth	Lobate	Viscoid	Small	Convex
ID3-3b	Circular	Golden yellow	Opaque	Smooth	Entire	Butyrous	Medium	Convex
OD2-3a	Circular	Colorless	Translucent	Smooth	Lobate	Viscoid	Medium	Convex
OD2-3b	Circular	Red	Opaque	Smooth	Entire	Moist	Large	Convex
OD3-3a	Circular	Golden yellow	Opaque	Smooth	Entire	Viscoid	Medium	Convex
OD3-3b	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex
OD3-3c	Circular	Greyish white	Translucent	Smooth	Entire	Moist	Medium	Low convex

Supplementary Table 5: 2 Colonial Morphology (Cultural Characteristics) of and Microscopic Appearance of Isolates.

Isolate code	**MacConkey Agar**	**Eosine Methylene Blue Agar**	**Salmonella-Shigella Agar**	**Gram Staining**	**Shape**
T1a	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T1b	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T1c	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T1d	No growth	No growth	No growth	Gram	Co

				positive	cci
T1e	Colorless colonies	Colorless colonies	Slight growth	Gram negative	Rods
T1f	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T1g	No growth	No growth	No growth	Gram positive	Cocci
T1h	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
T1i	No growth	No growth	No growth	Gram positive	Cocci
T1j	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T2a	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T2b	No growth	No growth	No growth	Gram positive	Cocci
T2c	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T2d	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T2e	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T3a	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
T3b	Pink colonies	Pink colonies	Slight growth of pink colonies	Gram negative	Rods
T3c	Pink colonies	Pink colonies	Slight growth of pink colonies	Gram negative	Rods
T3d	No growth	No growth	No growth	Gram positive	Cocci
T3e	Pink colonies	Pink colonies	Slight growth of pink colonies	Gram negative	Rods
T4a	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negativ	Rods

				e	
T4b	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
T4c	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T4d	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T4e	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
T5a	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
T5b	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
T5c	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T5d	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T5e	No growth	No growth	No growth	Gram positive	Cocci
T5f	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T5g	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T6a	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T6b	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
T6c	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T6d	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T6e	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negativ	Rods

				e	
T6f	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T7a	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
T7b	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T7c	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T7d	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T7e	No growth	No growth	No growth	Gram positive	Cocci
ID1a	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
ID1b	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
ID2a	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
ID2b	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
ID2c	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
ID2d	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
ID3a	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
ID3b	No growth	No growth	No growth	Gram positive	Cocci
ID3c	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
ID4	Pink colonies	Pink colonies	Colorless colonies	Gram negative	Rods

OD1a	No growth	No growth	No growth	Gram positive	Cocci
OD1b	No growth	No growth	No growth	Gram positive	Cocci
OD1c	Pink colonies	Pink colonies	Colorless colonies	Gram negative	Rods
OD1d	No growth	No growth	No growth	Gram positive	Cocci
OD1e	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
OD1f	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
OD2a	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
OD2b	Colorless to light pink colonies	Colorless colonies	Colorless colonies	Gram negative	Rods
OD2c	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
OD2d	Colorless colonies	Colorless colonies	Colorless colonies usually with black centers	Gram negative	Rods
OD2e	Colorless to light pink colonies	Colorless colonies	Colorless colonies	Gram negative	Rods
OD2f	No growth	No growth	No growth	Gram positive	Cocci
OD2g	No growth	No growth	No growth	Gram positive	Cocci
OD3a	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
OD3b	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
OD3c	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
OD3d	Colorless colonies	Colorless colonies	Slight growth	Gram negative	Rods
OD3e	Colorless	Colorless colonies	Slight growth	Gram	Ro

	colonies			negative	ds
OD4a	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
OD4b	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
OD4c	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
OD5	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
T4-3a	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
T4-3b	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
T4-3c	Mucoid pink colonies	Mucoid pink to purple colonies	Slight growth of pink colonies	Gram negative	Rods
T4-3d	No growth	No growth	No growth	Gram positive	Cocci
T5-3a	Pink colonies	Pink colonies	Slight growth of pink colonies	Gram negative	Rods
T5-3b	Pink colonies	Pink colonies	Slight growth of pink colonies	Gram negative	Rods
T5-3c	No growth	No growth	No growth	Gram positive	Cocci
ID1-3a	Pink colonies	Pink colonies	Colorless colonies	Gram negative	Rods
ID1-3b	Pink colonies	Pink colonies	Colorless colonies	Gram negative	Rods
ID2-3a	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
ID2-3b	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negative	Rods
ID3-3a	Pink colonies	Black colonies with green metallic sheen	Small red colonies	Gram negativ	Rods

				e	
ID3-3b	No growth	No growth	No growth	Gram positive	Cocci
OD2-3a	Pale colored or colorless	Colorless colonies	Colorless colonies	Gram negative	Rods
OD2-3b	Pink colonies	Pink colonies	Colorless colonies	Gram negative	Rods
OD3-3a	No growth	No growth	No growth	Gram positive	Cocci
OD3-3b	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods
OD3-3c	Colorless colonies	Pink colonies	Colorless colonies with black centers	Gram negative	Rods

Supplementary Table 6: Standard for antibiotics susceptibility test.

Antibiotics	**Disc Potency**	**Diameter of zones of inhibition**		
		Susceptible	**Intermediate**	**Resistance**
Chloramphenicol	30 µg	≥18	13 - 17	≤12
Ciproflaxin	10 µg	≤21	21– 28	≥29
Amoxacilin	30 µg	≥18	14 - 19	≤13
Augmentin	30 µg	≥18	14 – 17	≤13
Gentamycin	10 µg	≤12	13 – 14	≥15
Pefloxacin	10 µg	≥15	12 – 14	≤11
Streptomycine	30 µg	≥15	12 - 14	≥11
Source: Performance Standards for Microbial Susceptibility Testing; Clinical and Laboratory Standards Institute (2021)				