The 5th International Electronic Conference on Foods

Section: Sustainable Food Security and Food System

Title

Prevalence of Antimicrobial Resistance in Organized Dairy Production Systems

Authors

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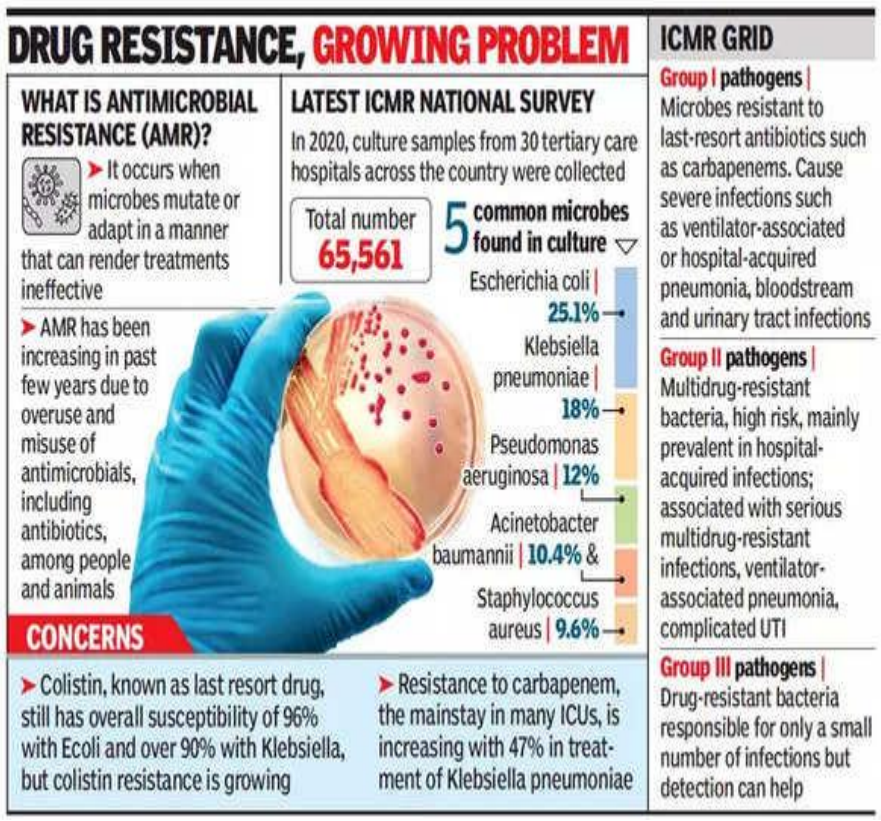
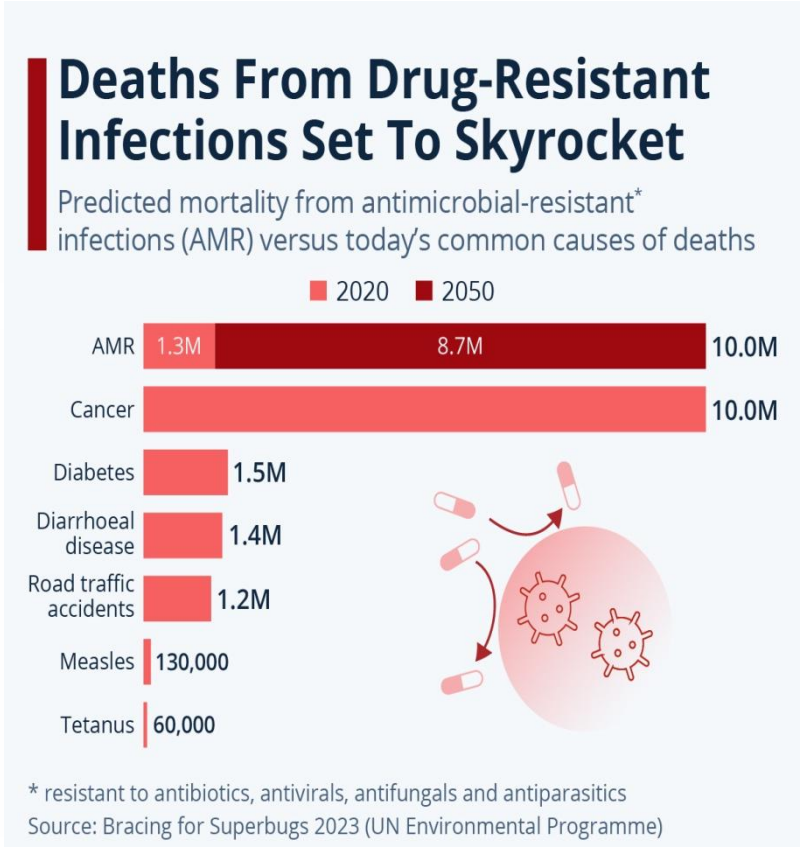
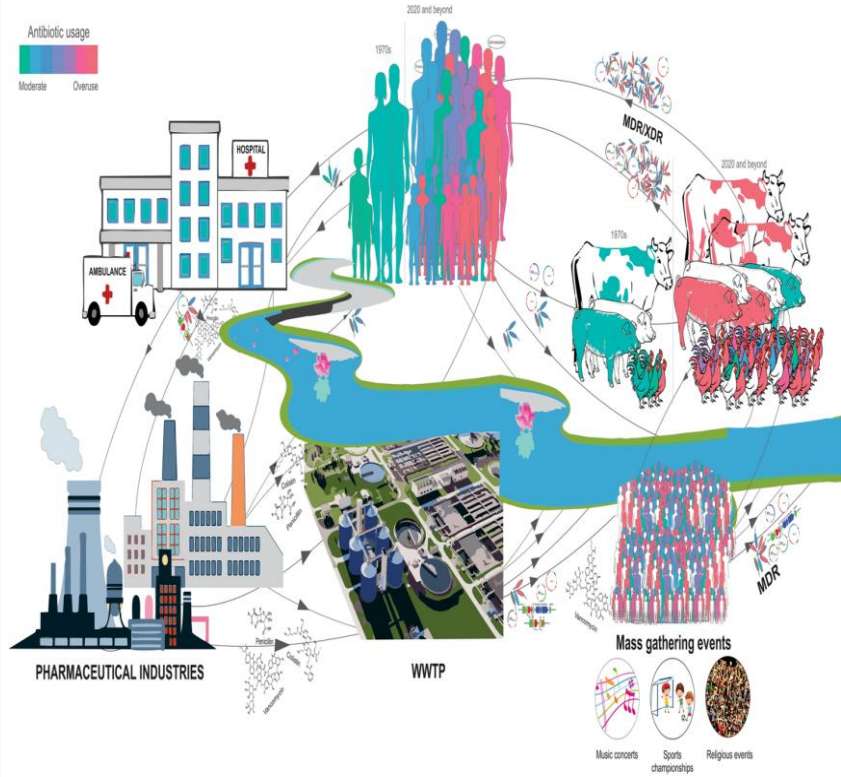
Burden of Antibiotic Resistance







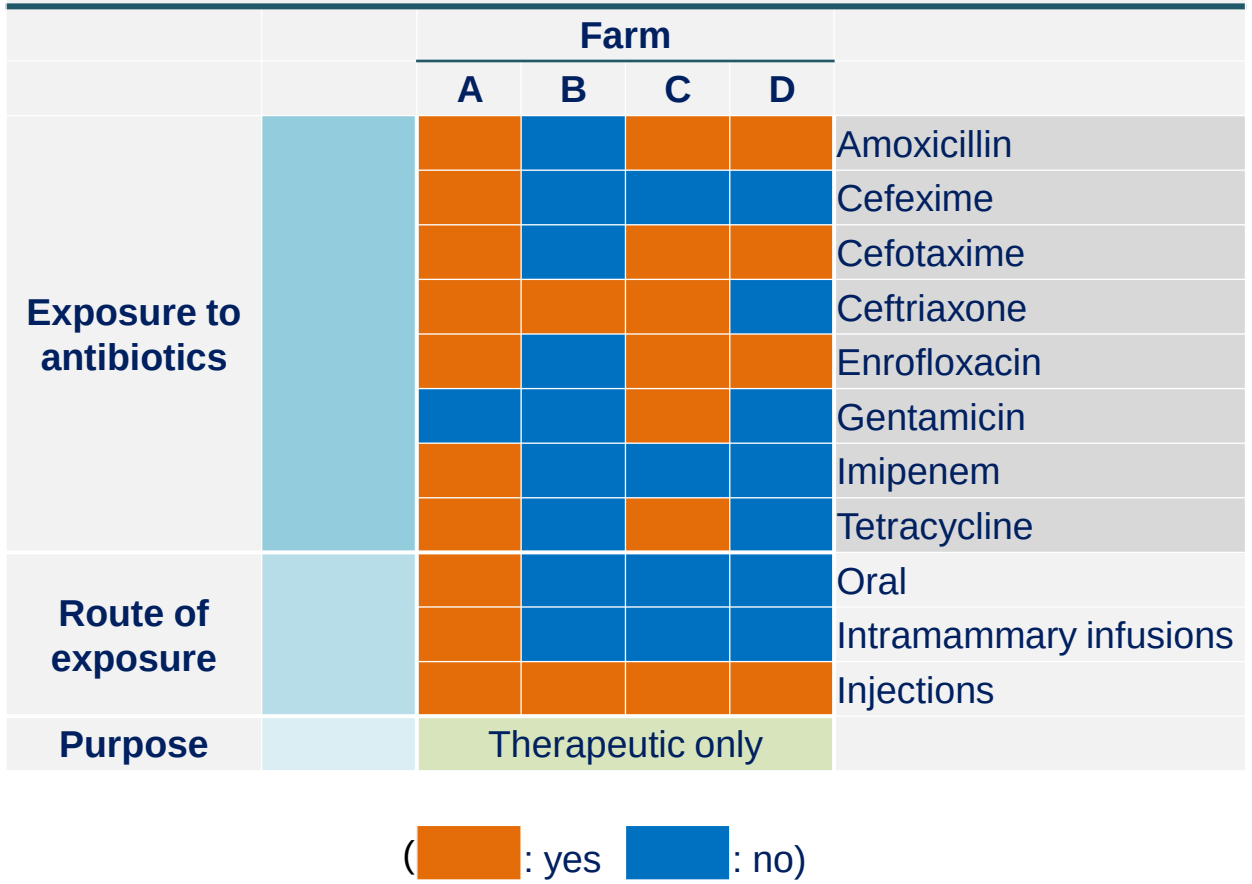
Areas affected because of the spread of AMR

Meta-data of Dairy Farms Selected for Resistome Analysis

Details of soil and wastewater in selected dairy farms

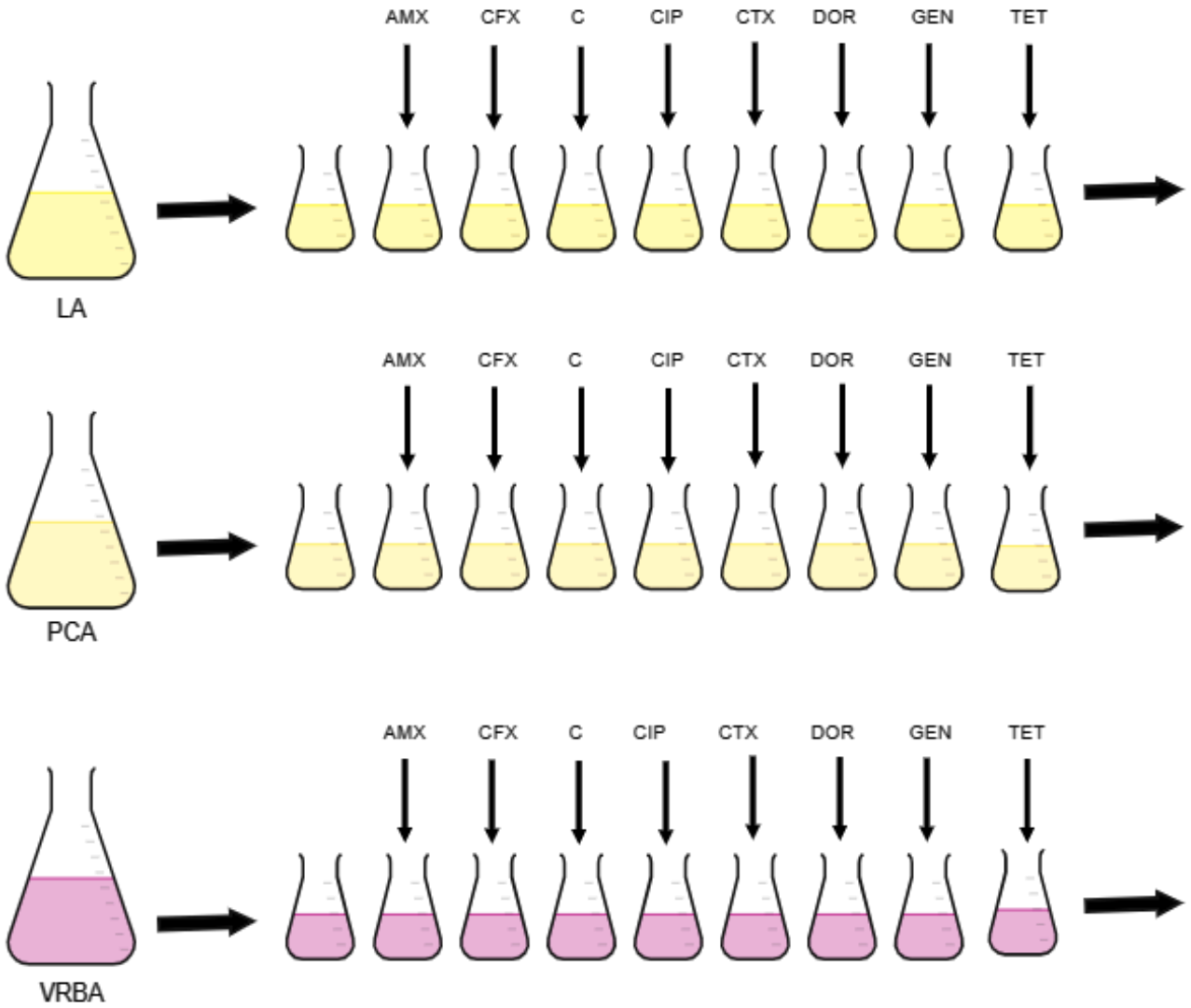
	Farm A	Farm B	Farm C	Farm D
Soil fertilization	Manure	Manure	Manure	Manure
		Fertilizer	Fertilizer	Fertilizer
		Compost	Compost	Compost
Treatments given to wastewater	Equalization, followed by the utilization of UASB (Upflow Anaerobic Sludge Blanket) and aerobic sedimentation	Collected along with dung and applied to crop land	Treated by sedimentation technique	None

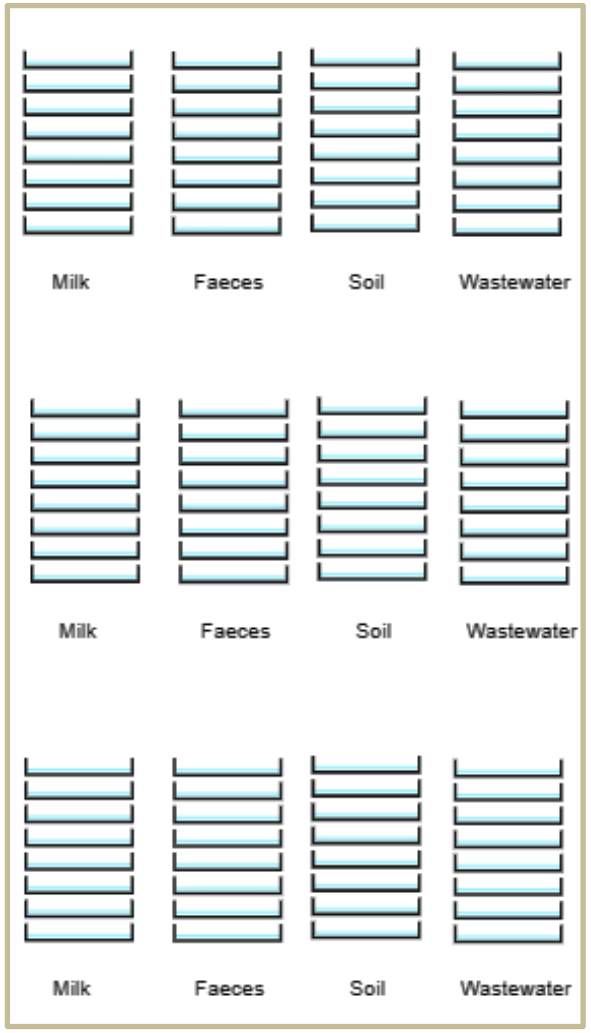
History of antibiotics used in selected dairy farms



Total sample size: 192 (milk (48), faeces (48), soil (48) and wastewater (48))

Execution of Isolation of Putative Antibiotic Resistant Bacteria using Culturomics Approach

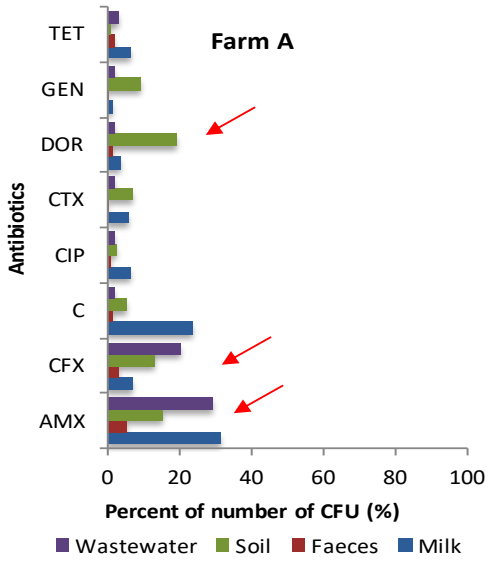


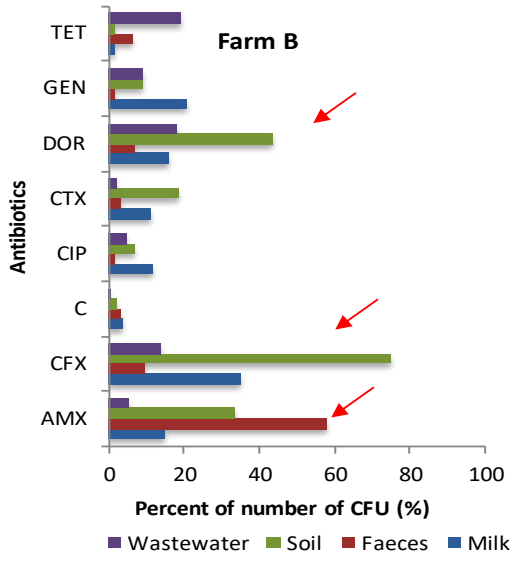


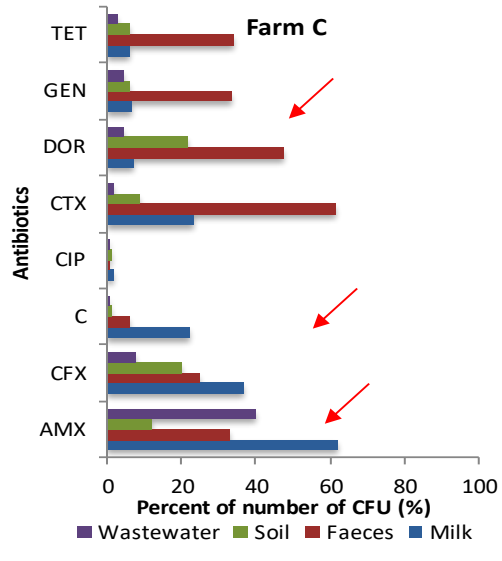
Incubation: 37˚C / 24-48 h

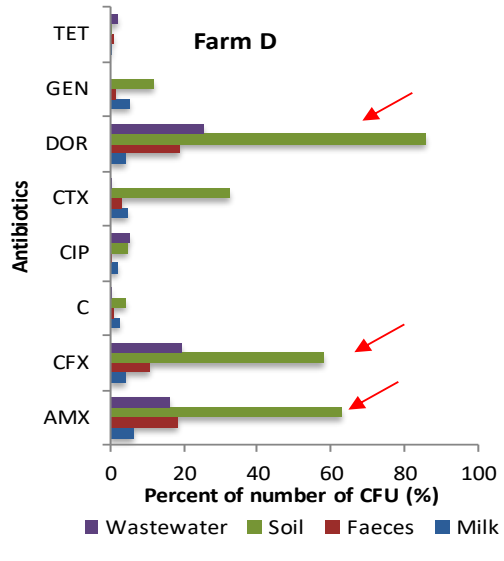
Potential Antibiotic Resistance in Organized Dairy Production Systems

Total Bacterial Load

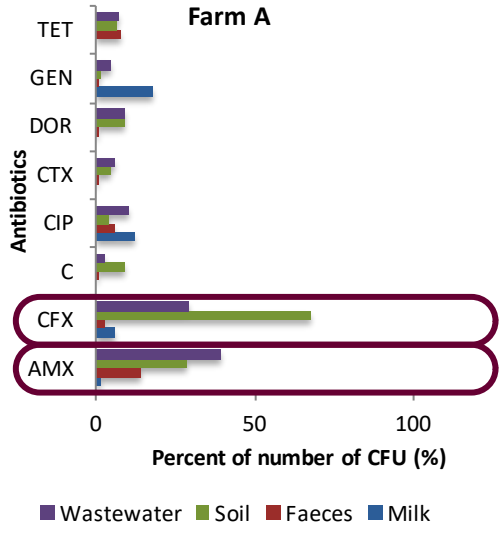


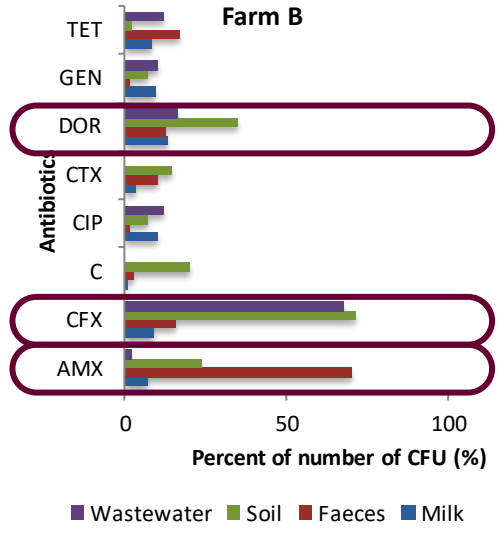


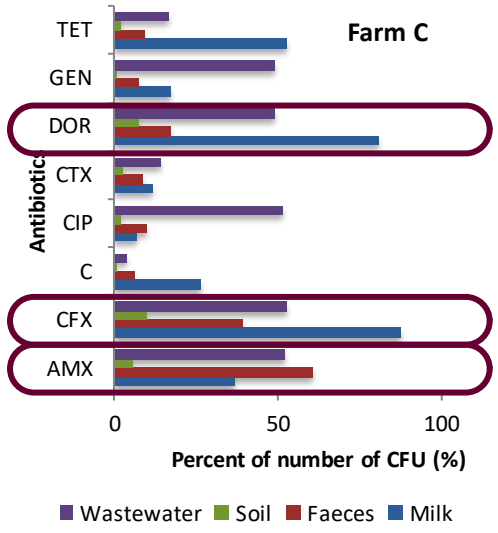


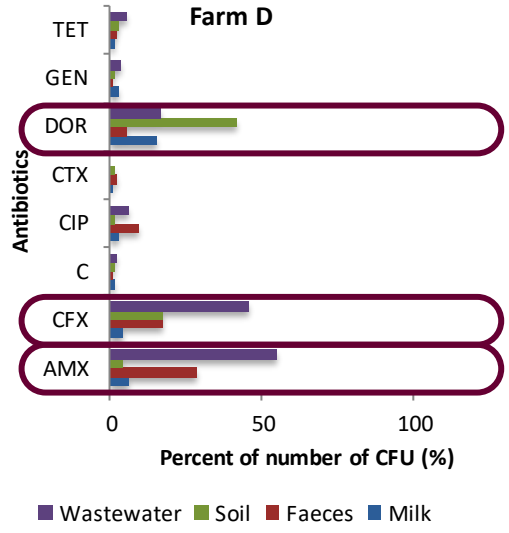


Total Lactic Acid Bacteria



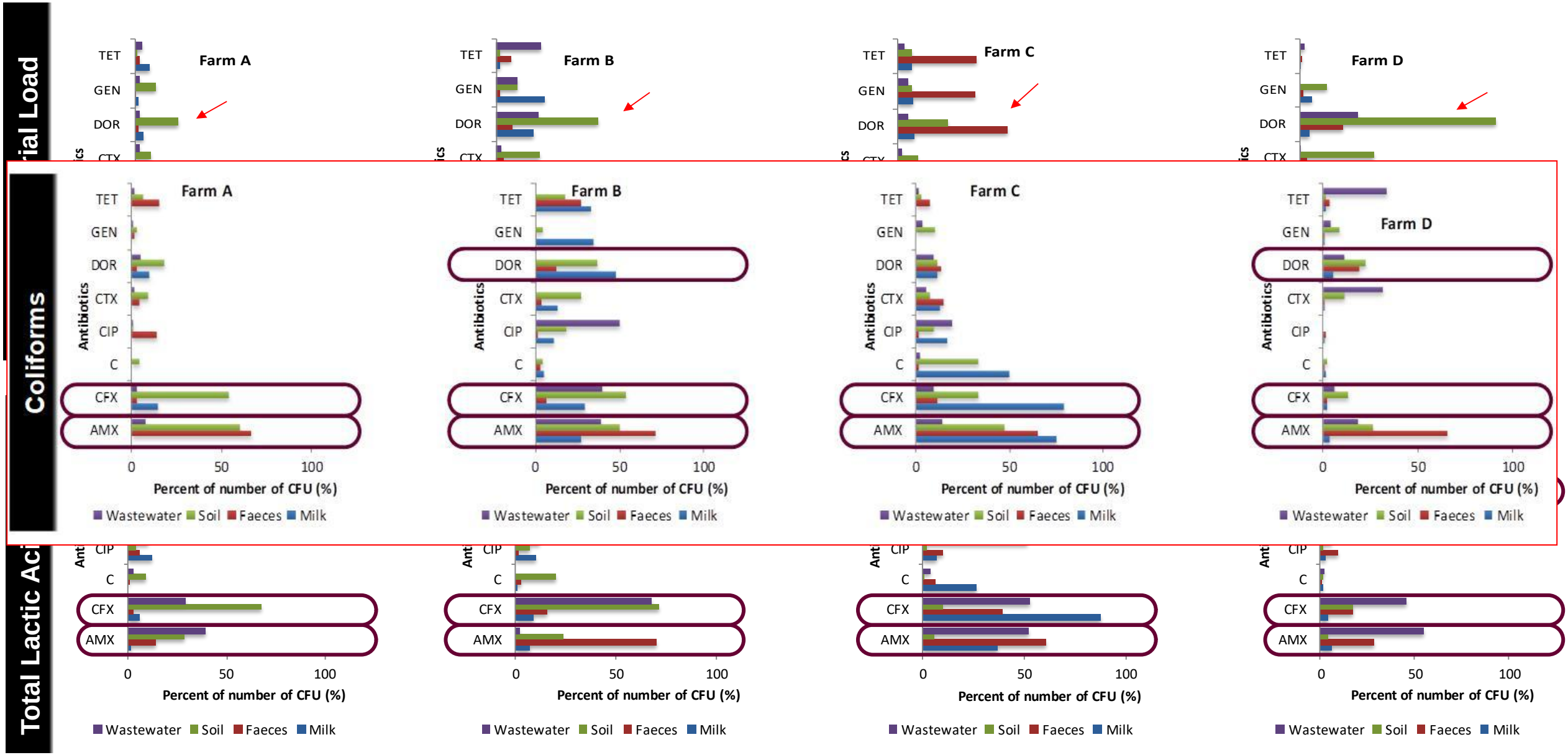






AMX: Amoxicillin; CFX: Cefotaxime; C: Chloramphenicol; CIP: Ciprofloxacin; CTX: Ceftriaxone; DOR: Doripenem; GEN: Gentamicin; TET: Tetracycline

Potential Antibiotic Resistance in Organized Dairy Production Systems

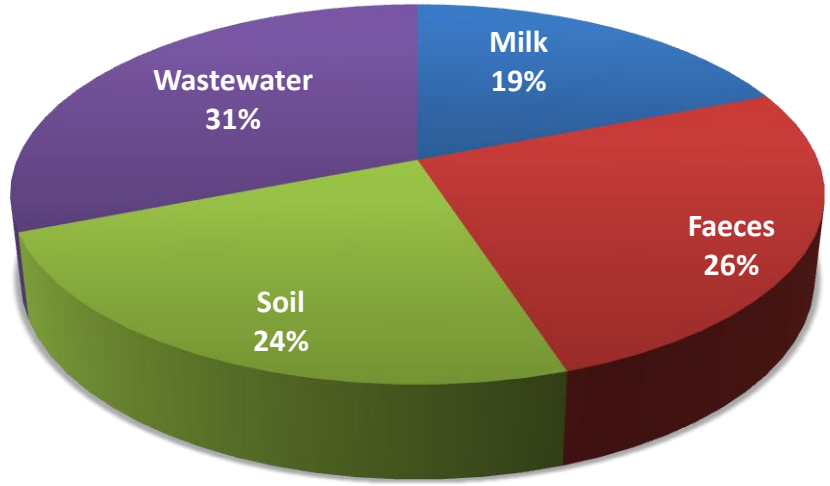


AMX: Amoxicillin; CFX: Cefotaxime; C: Chloramphenicol; CIP: Ciprofloxacin; CTX: Ceftriaxone; DOR: Doripenem; GEN: Gentamicin; TET: Tetracycline

Suspected Antibiotic Resistant Bacteria in Milk, Faeces, Soil & Wastewater

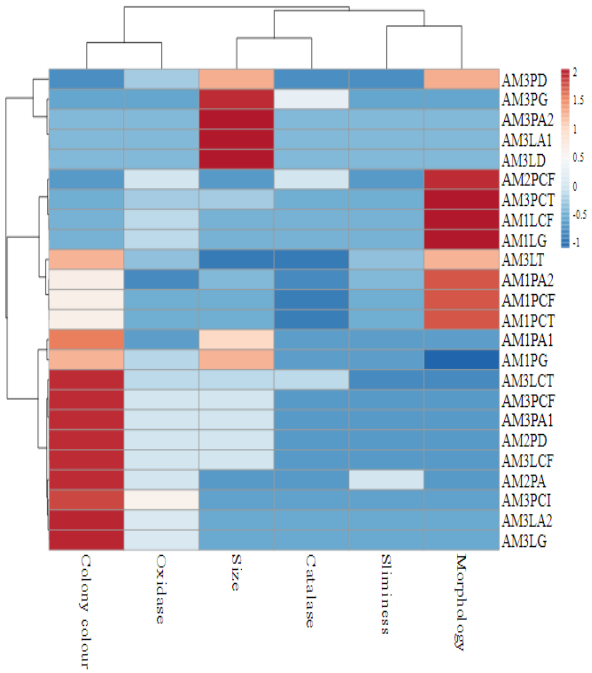
Farm	Milk	Faeces	Soil	Wastewater	Total	%
A	24	57	51	111	243	37
B	46	30	44	18	138	21
C	23	43	45	47	158	24
D	30	39	21	25	115	18
Total	**123**	**169**	**161**	**201**	**654**	
%	19	26	24	31		

Suspected ARB isolated from milk, faeces, soil & wastewater

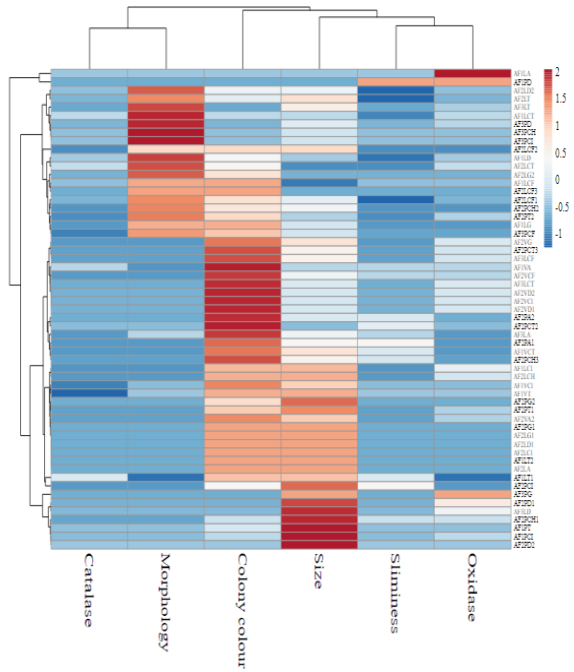


Cluster analysis of suspected ARB isolated from farm A

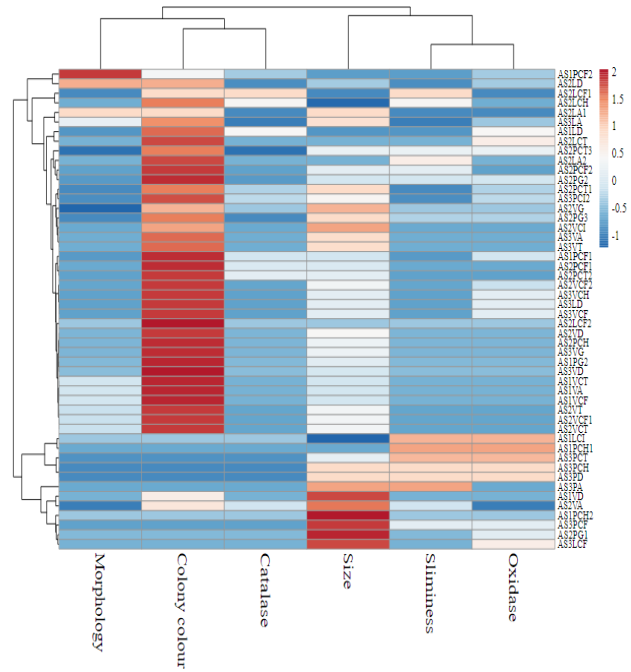
Milk



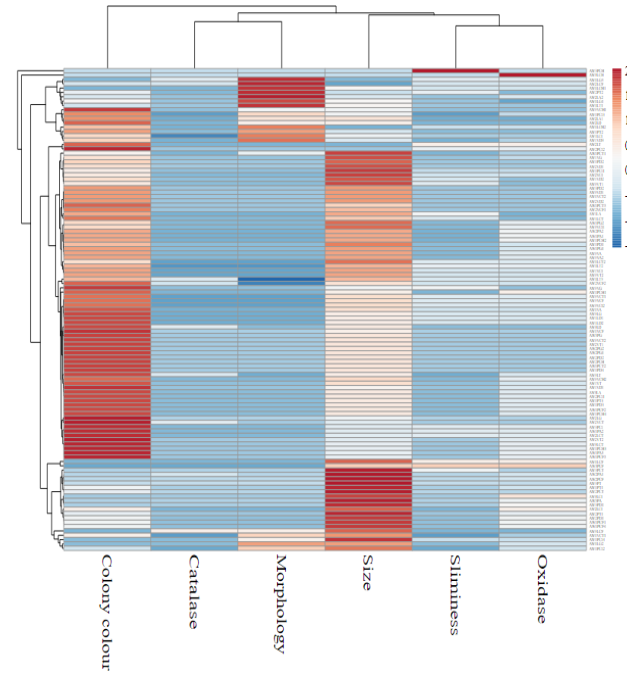
Faeces



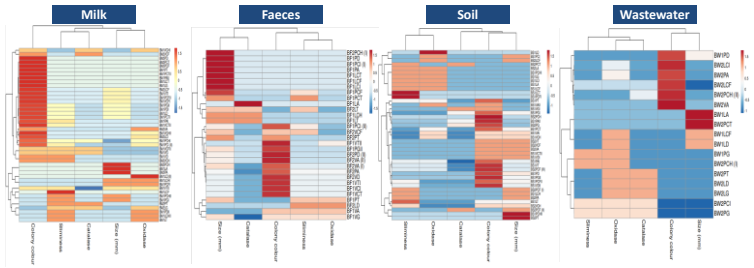
Soil



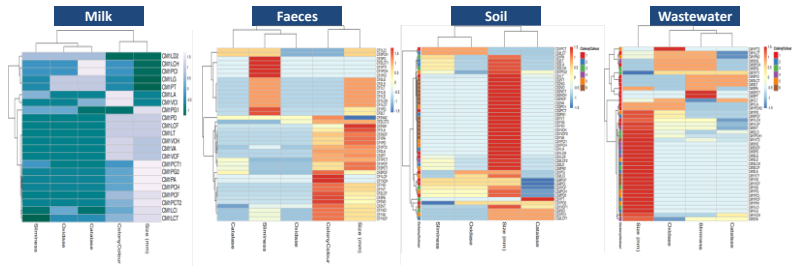
Wastewater



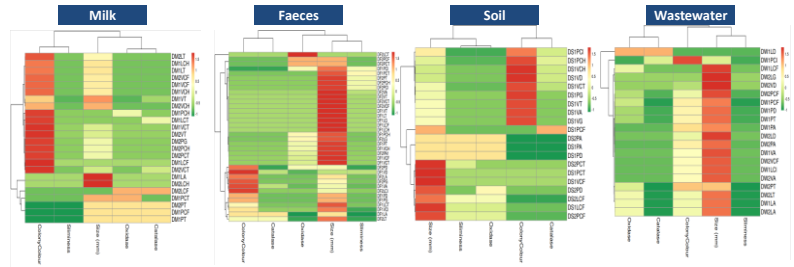
Farm B



Farm C



Farm D



Rows are centered; unit variance scaling is applied to rows. Both rows and columns are clustered using correlation distance and average linkage

Isolates Submitted to Public Domain

Isolate ID	Acc. No.	Species
AF1LA	OP204136	*Shigella flexneri*
AF1LCF	OP204137	*Enterococcus mundtii*
AF1LCI	OP204138	*Escherichia fergusonii*
AF1LCT	OP204139	*Enterococcus mundtii*
AF1LD	OP204140	*Leuconostoc lactis*
AF1LG	OP204141	*Enterococcus mundtii*
AF1PD	--	*Escherichia fergusonii*
AF1PT	OP204142	*Escherichia fergusonii*
AF1VCI	OP204143	*Escherichia coli*
AF1VT	OP204144	*Escherichia coli*
AF2LA	--	*Comamonas jiangduensis*
AF2LCF1	--	*Enterococcus mundtii*
AF2LCH	NA	*Shigella spp.*
AF2LCI	--	*Comamonas jiangduensis*
AF2LT	--	*Enterococcus mundtii*
AF2PA1	OP218222	*Comamonas jiangduensis*
AF2PA2	OP218223	*Comamonas jiangduensis*
AF2PCH1	OP218224	*Acinetobacter seohaensis*
AF2PCH3	OP218225	*Pseudomonas parafulva*
AF2PCT2	--	*Pseudomonas putida*
AF2PCT3	OP218227	*Acinetobacter seohaensis*
AF2PD1	OP218228	*Acinetobacter johnsonii*
AF2PD2	OP218229	*Comamonas jiangduensis*
AF2PG1	OP218230	*Comamonas jiangduensis*
AF2PG2	OP218231	*Comamonas jiangduensis*
AF2VA2	OP218176	*Escherichia marmotae*
AF2VCF	OP218233	*Providencia rettgeri*
AF2VCI	OP218234	*Providencia rettgeri*
AF2VD1	OP218235	*Providencia rettgeri*
AF2VD2	OP218236	*Cronobacter condimenti*
AF2VG	OP218237	*Escherichia fergusonii*
AH1LCF	OP217984	*Acinetobacter soli*
AH1LG1	--	*Escherichia fergusonii*
AH1LG2	OP204110	*Shigella flexneri*
AH1PCH1	OP204119	*Pseudomonas stutzeri*
AH1PCH2	--	*Pseudomonas stutzeri*
AH1PCH3	OP204120	*Pseudomonas guguanensis*
AH1PCI	OP204121	*Brucella intermedia*
AH1PCT	OP204122	*Pseudomonas nitrititolerans*
AH1PG1	OP204123	*Pseudomonas hibiscicola*
AH1PT	OP204125	*Enterobacter mori*
AH1VA1	OP204111	*Aeromonas caviae*
AH1VA2	OP204112	*Aeromonas caviae*
AH1VCF	OP204113	*Aeromonas caviae*
AH1VCH	OP204114	*Staphylococcus epidermidis*
AH1VCT	OP204115	*Staphylococcus epidermidis*
AH1VG	OP204116	*Enterococcus durans*
AH1VT1	OP204117	*Pseudomonas stutzeri*
AH1VT2	OP204118	*Pseudomonas guguanensis*
AH2LA1	OP217077	*Klebsiella variicola*
AH2LA2	OP217078	*Escherichia fergusonii*
AH2LCH	OP217079	*Lactococcus cremoris*
AH2LD	OP217080	*Enterococcus gallinarum*
AH2LG	OP217081	*Enterococcus mundtii*

Isolate ID	Acc. No.	Species
AH2LT2	OP217082	*Enterococcus casseliflavus*
AH2PCH	OP217083	*Acinetobacter pittii*
AH2PCI1	OP217084	*Acinetobacter johnsonii*
AH2PCI2	OP217085	*Enterococcus mundtii*
AH2PCT1	OP217086	*Stenotrophomonas maltophilia*
AH2PCT2	OP217087	*Kurthia populi*
AH2PG2	OP217088	*Stenotrophomonas maltophilia*
AH2VA2	--	*Enterobacter hormaechei*
AH2VCF	OP217089	*Pseudomonas taiwanensis*
AH2VCH	OP217090	*eschereichiea fergusonii*
AH2VCI	OP217091	*shigella flexneri*
AH2VD1	OP217092	*Aeromnonas caviae*
AM1LCF	OP177701	*Staphylococcus aureus*
AM1LG	OP177699	*Staphylococcus haemolyticus*
AM1PA1	OP177698	*Sphingobacterium humi*
AM1PCF	OP177700	*Staphylococcus haemolyticus*
AM1PCT	--	*Escherichia spp.*
AM2PA	OP218219	*Enterococcus mundtii*
AM2PCF	OP218220	*Comamonas jiangduensis*
AM2PD	OP218221	*Enterococcus mundtii*
AM3LA2	OP218198	*Stenotrophomonas maltophilia*
AM3LCT	OP218199	*Bacillus aerophilus*
AM3LG	OP218200	*Escherichia fergusonii*
AM3PA1	OP218201	*Stenotrophomonas maltophilia*
AM3PCI	OP218202	*Escherichia fergusonii*
AS1LCI	OP204126	*Enterobacter mori*
AS1LD	OP204127	*Bacillus safensis*
AS1PCF1	OP204128	*Bacillus australimaris*
AS1PCH1	OP204129	*Enterobacter mori*
AS1PCH2	OP204130	*Pseudomonas stutzeri*
AS1PG2	OP204131	*Pseudoxanthomonas suwonensis*
AS1VA	OP204132	*Brucella pseudintermedia*
AS1VCF	OP204133	*Brucella anthropi*
AS1VCT	OP204134	*Brucella pseudintermedia*
AS1VD	OP204135	*Aeromonas taiwanensis*
AS2LA1	OP204145	*Brucella pseudintermedia*
AS2LA2	OP204146	*Pseudomonas mendocina*
AS2LCF1	OP204147	*Stenotrophomonas terrae*
AS2LCF2	OP204148	*Ochrobactrum soli*
AS2LCH	OP204149	*Stenotrophomonas terrae*
AS2LCT	--	*Stenotrophomonas acidaminiphila*
AS2PCF2	OP217065	*Pseudomonas guguanensis*
AS2PCH	OP217066	*Pseudomonas taiwanensis*
AS2PCH	OP217066	*Pseudomonas taiwanensis*
AS2PCT1	OP217067	*Bacillus wiedmannii*
AS2PCT2	OP217068	*Bordetella petrii*
AS2PCT3	--	*Stenotrophomonas nitritireducens*
AS2PG2	OP217069	*Cupriavidus taiwanensis*
AS2PG3	OP217070	*Cupriavidus taiwanensis*
AS2VA	OP217071	*Aeromonas taiwanensis*
AS2VCF1	OP217072	*Brucella intermedia*
AS2VCF2	OP217073	*Agrobacterium fabrum*
AS2VCT	OP217074	*Agrobacterium fabrum*
AS2VD	OP217075	*Brucella intermedia*
AS2VT	OP217076	*Brucella pseudintermedia*
AS3LD	OP218187	*Providencia rettgeri*

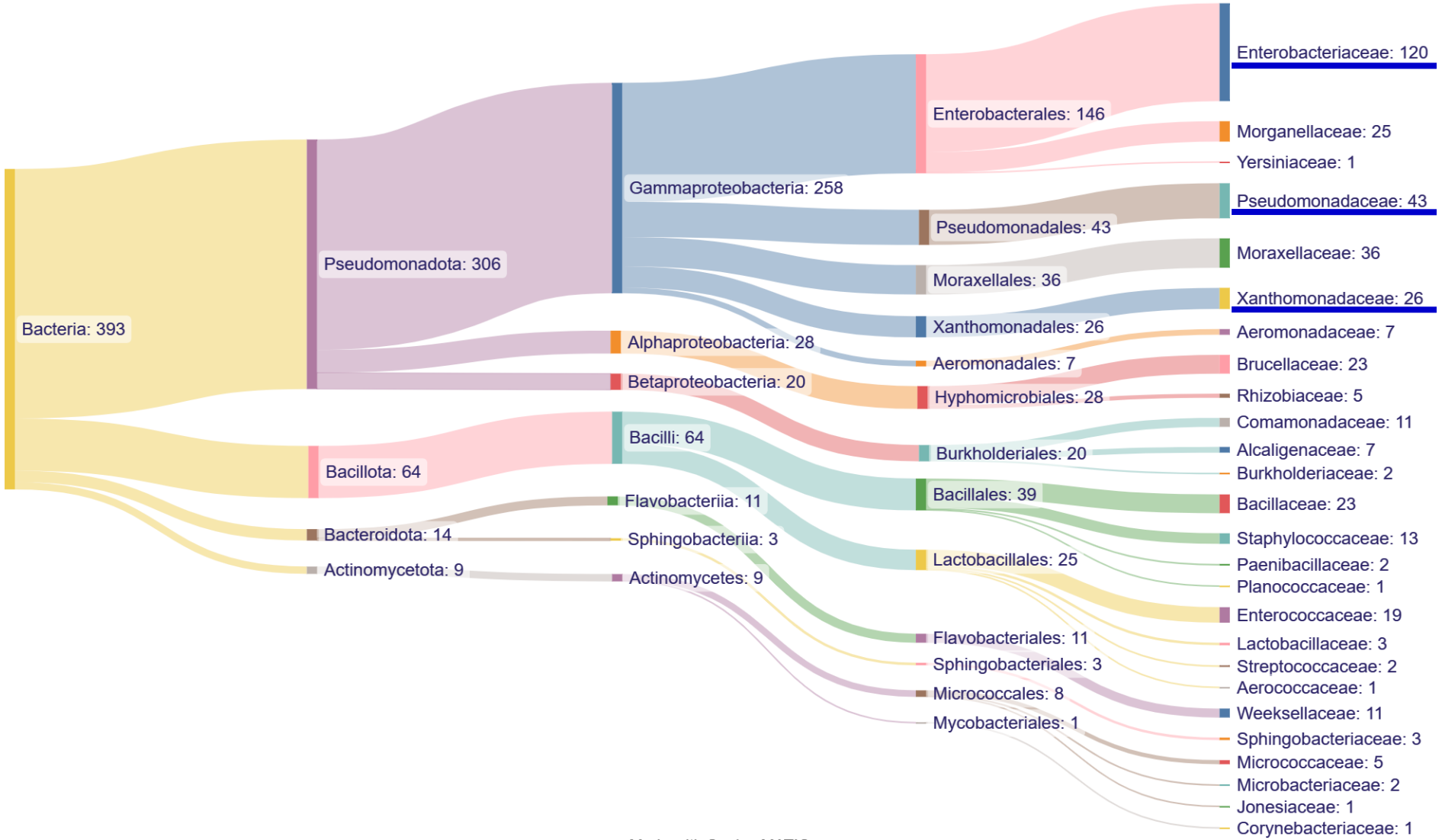
Isolate ID	Acc. No.	Species
AS3PA	OP218188	*Pseudomonas azotoformans*
AS3PCF	OP218189	*Providencia vermicola*
AS3PCH	OP218190	*Enterobacter mori*
AS3PCI2	OP218191	*Bacillus safensis*
AS3PCT	OP218192	*Providencia rettgeri*
AS3PD	OP218193	*Providencia rettgeri*
AS3VCF	OP218194	*Shigella flexneri*
AS3VCH	OP218195	*Escherichia fergusonii*
AS3VD	OP218196	*Pseudomonas taiwanensis*
AS3VG	OP218197	*Pseudomonas taiwanensis*
AW1LA	OP164575	*Aeromonas caviae*
AW1LCT2	OP164576	*Shigella flexneri*
AW1LD1	OP164577	*Stenotrophomonas pavanii*
AW1LG3	OP164579	*Enterococcus faecium*
AW1PA1	OP164586	*Escherichia marmotae*
AW1PA2	OP197929	*Shigella flexneri*
AW1PA3	OP198013	*Pseudomonas taiwanensis*
AW1PCF1	OP198014	*Shigella boydii*
AW1PCF2	OP215203	*Escherichia fergusonii*
AW1PCF3	OP198017	*Shigella flexneri*
AW1PCF4	--	*Escherichia fergusonii*
AW1PCH1	OP198031	*Klebsiella pneumoniae*
AW1PCH2	--	*Acinetobacter variabilis*
AW1PCH3	OP198032	*Acinetobacter variabilis*
AW1PCH4	OP198059	*Acinetobacter variabilis*
AW1PCI1	--	*Acinetobacter soli*
AW1PCI2	OP198060	*Acinetobacter soli*
AW1PCI3	--	*Acinetobacter pittii*
AW1PCT1	OP198061	*Acinetobacter pittii*
AW1PCT3	--	*Pseudomonas fulva*
AW1PD1	--	*Atlantibacter hermannii*
AW1PD3	OP198062	*Acinetobacter seohaensis*
AW1PD4	OP199050	*Denitrificimonas caeni*
AW1PG1	--	*Escherichia fergusonii*
AW1PG2	OP199051	*Stenotrophomonas maltophilia*
AW1PT1	OP199052	*Escherichia fergusonii*
AW1PT2	OP199053	*Psychrobacter pulmonis*
AW1PT3	OP199054	*Stenotrophomonas pavanii*
AW1VCF	OP164580	*Pseudomonas stutzeri*
AW1VCI	--	*Enterobacter cloacae*
AW1VCT1	OP164583	*Staphylococcus haemolyticus*
AW1VD3	OP164584	*Staphylococcus haemolyticus*
AW1VG	OP164585	*Kosakonia cowanii*
AW1VT	OP164586	*Escherichia fergusonii*
AW2LA1	OP217093	*empedobacter falsenii*
AW2LA2	OP217094	*eschereichiea fergusonii*
AW2LCF	OP217095	*enterococcus faecium*
AW2LCI	OP217096	*Acinetobacter johnsonii*
AW2LCT	OP217097	*Escherichia fergusonii*
AW2LD	--	*Empedobacter falsenii*
AW2LG	OP217981	*Empedobacter falsenii*
AW2LT	OP217982	*Escherichia coli*
AW2PA1	OP217983	*Bacillus cereus*
AW2PA2	OP217984	*Acinetobacter seohaensis*

Isolate ID	Acc. No.	Species
AW2PCF	OP217985	*Bacillus cereus*
AW2PCH	OP217987	*Acinetobacter seohaensis*
AW2PCH	OP217986	*Pseudomonas parafulva*
AW2PCI2	OP218203	*Acinetobacter seohaensis*
AW2PCT	OP218204	*Acinetobacter lwoffii*
AW2PD1	OP218205	*Pedobacter terrae*
AW2PD2	OP218206	*Acinetobacter seohaensis*
AW2PG1	OP218207	*Pedobacter terrae*
AW2PG1	OP218207	*Streptococcus suis*
AW2PG2	OP218208	*Escherichia fergusonii*
AW2PT1	OP218209	*Rhizobium pusense*
AW2PT2	OP218210	*Pseudomonas aeruginosa*
AW2VCF1	OP218211	*Klebsiella variicola*
AW2VCF2	OP218212	*Enterococcus gallinarum*
AW2VCI	OP218213	*Klebsiella quasipneumoniae*
AW2VCT	OP218214	*Enterococcus mundtii*
AW2VD1	OP218215	*Enterococcus mundtii*
AW2VD2	OP218216	*Shigella boydii*
AW2VT1	OP218217	*Enterococcus asini*
AW2VT2	OP218218	*Comamonas jiangduensis*
AW3LA	OP218170	*Citrobacter freundii*
AW3LCF	--	--
AW3LCH	--	*Brucella oryzae*
AW3LCI	OP218171	*Citrobacter europaeus*
AW3LCT	OP218172	*Shigella flexneri*
AW3LG	OP218173	*Shigella flexneri*
AW3LT	OP218174	*Weissella cibaria*
AW3PA	OP218183	*Providencia rettgeri*
AW3PCF	OP218184	*Acinetobacter johnsonii*
AW3PCH	--	*Acidovorax lacteus*
AW3PD1	OP218185	*Providencia rettgeri*
AW3PD2	OP218186	*Pseudomonas aeruginosa*
AW3VA	OP218175	*Escherichia fergusonii*
AW3VA2	OP218176	*Enterobacter mori*
AW3VCF	OP218177	*Shigella flexneri*
AW3VCH2	OP218178	*Shigella sonnei*
AW3VCI1	OP218179	*Shigella flexneri*
AW3VCI2	OP218180	*Escherichia fergusonii*
AW3VCT1	OP218181	*Escherichia fergusonii*
AW3VT2	OP218182	*Escherichia fergusonii*
BF1LA	MCC 50526	*Escherichia coli*
BF1LCF	--	--
BF1LCH	--	--
BF1LCI	MCC 50519	*Escherichia coli*
BF1LCT	MCC 50508	*Escherichia coli*
BF1LT	MCC 50534	*Escherichia coli*
BF1PA	MCC 50518	*Escherichia coli*
BF1PCF	MCC 50500	*Escherichia coli*
BF1PCI I	MCC 50550	*Escherichia coli*
BF1PCI II	MCC 50567	*Acinetobacter ursingii*
BF1PCT	MCC 50529	*Escherichia coli*
BF1PCT A	MCC 50513	*Escherichia coli*
BF1PD A	MCC 50569	*Acinetobacter ursingii*
BF1PD B	MCC 50570	*Paenibacillus favisporus*
BF1PG II A	MCC 50571	*Escherichia coli*
BF1PG II B	MCC 50572	*Escherichia coli*

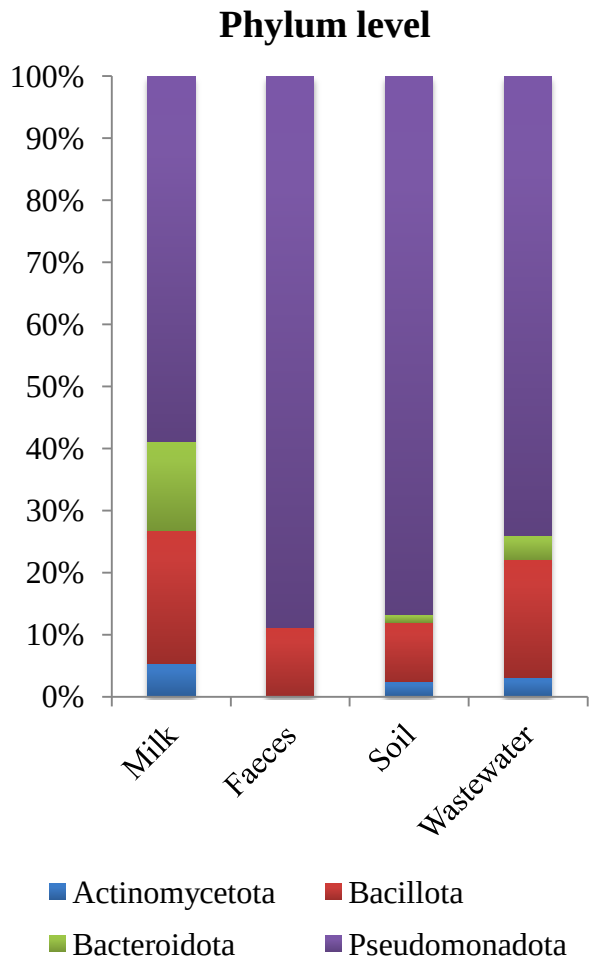
Isolates Submitted to Public Domain

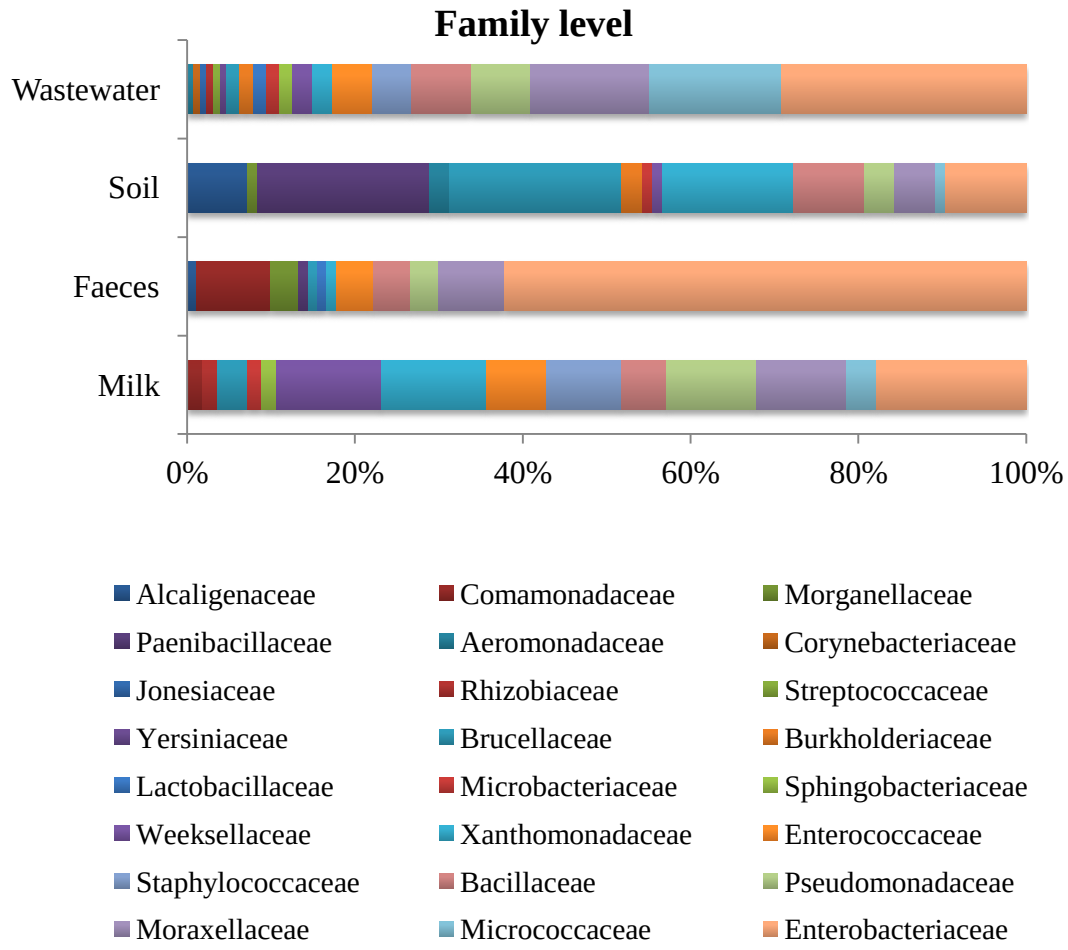
Isolate ID	Acc. No.	Species
BF1PT	MCC 50541	*Stenotrophomonas maltophilia*
BF1VA	MCC 50553	*Escherichia coli*
BF1VCI	--	--
BF1VCT	MCC 50559	*Escherichia coli*
BF1VG	MCC 50566	*Escherichia coli*
BF1VT I	MCC 50538	*Acinetobacter baumannii*
BF1VT II	MCC 50549	*Escherichia coli*
BF2LD	MCC 50545	*Escherichia coli*
BF2LT	MCC 50542	*Escherichia coli*
BF2PT A	MCC 50577	*Escherichia coli*
BF2PT B	MCC 50578	*Escherichia coli*
BF2VA I	MCC 50557	*Escherichia coli*
BF2VA II	MCC 50551	*Escherichia coli*
BF2VCF	MCC 50562	*Escherichia coli*
BF2VD	MCC 50540	*Escherichia coli*
BM1LA	--	--
BM1LCH I	MCC 50522	*Acinetobacter bereziniae*
BM1LCH II	MCC 50532	*Acinetobacter baumannii*
BM1LCI I A	MCC 50579	*Escherichia coli*
BM1LG	--	--
BM1LT	--	--
BM1PCF I	MCC 50516	*Acinetobacter ursingii*
BM1PCF II	MCC 50507	*Chryseobacterium contaminans*
BM1PCH I	MCC 50520	*Microbacterium resistens*
BM1PCH II	MCC 50506	*Acinetobacter baumannii*
BM1PCI I	MCC 50515	*Chryseobacterium contaminans*
BM1PCI II	MCC 50514	*Stenotrophomonas maltophilia*
BM1PCT I	MCC 50565	*Chryseobacterium contaminans*
BM1PCT I A	MCC 50512	*Staphylococcus warneri*
BM1PD II	MCC 50528	*Haematomicrobium sanguinis*
BM1PG I	MCC 50535	*Moraxella osloensis*
BM1PG II	MCC 50533	*Chryseobacterium contaminans*
BM1PT	MCC 50523	*Chryseobacterium joostei*
BM1VCF I A	MCC 50573	*Ochrobactrum intermedium*
BM1VCF I B	MCC 50574	*Ochrobactrum intermedium*
BM1VCF II	MCC 50511	*Stenotrophomonas maltophilia*
BM1VCH I	--	--
BM1VCT II	MCC 50537	*Stenotrophomonas maltophilia*
BM1VD	MCC 50531	*Stenotrophomonas maltophilia*
BM1VG	MCC 50536	*Stenotrophomonas maltophilia*
BM1VT II	--	--
BM2LCI	MCC 50555	*Kocuria salsicia*
BM2LG	--	--
BM2PA A	MCC 50581	*Escherichia coli*
BM2PA B	MCC 50582	*Escherichia coli*
BM2PCF	MCC 50563	*Chryseobacterium bovis*
BM2PCH	MCC 50539	*Escherichia coli*
BM2PCT	MCC 50561	*Chryseobacterium pennipullorum*
BM2PD	MCC 50543	*Escherichia coli*
BM2VCF	MCC 50556	*Rhizobium radiobacter*
BM2VCH	MCC 50548	*Pseudomonas fulva*
BS1LA	MCC 50527	*Stenotrophomonas maltophilia*
BS1LCF	MCC 50552	*Achromobacter spanius*
BS1LCH	MCC 50524	*Pseudomonas guariconensis*
BS1LCI	MCC 50501	*Stenotrophomonas maltophilia*
BS1LG	MCC 50525	*Microbacterium paraoxydans*
BS1LG A	MCC 50504	*Chryseobacterium bovis*
BS1LT	MCC 50505	*Achromobacter xylosoxidans*
BS1PA I	MCC 50499	*Stenotrophomonas maltophilia*
BS1PCT	MCC 50530	*Stenotrophomonas maltophilia*
BS1PD	MCC 50521	*Stenotrophomonas maltophilia*
BS1PG II	--	--
BS1PT	MCC 50503	*Stenotrophomonas maltophilia*
BS1VCH	MCC 50544	*Pseudomonas taiwanensis*
BS1VCT II	MCC 50517	*Achromobacter spanius*
BS1VD I	MCC 50510	*Ochrobactrum intermedium*
BS1VD II	MCC 50502	*Stenotrophomonas maltophilia*
BS1VD2	MCC 50502	*S. maltophilia*
BS2LCF	--	--
BS2LCT	--	--
BS2LD	MCC 50560	*Paenibacillus favisporus*
BS2PCF II	--	--
BS2PT	MCC 50554	*Achromobacter spanius*
BS2VA	MCC 50546	*Escherichia vulneris*
BS2VCF	MCC 50558	*Rhizobium radiobacter*
BW1LC(I)/BW1LCI A	MCC 50575	*Staphylococcus hominis*
BW1LC(I)/BW1LCI B	MCC 50576	*Escherichia coli*
BW1LCT	MCC 50547	*Acinetobacter indicus*
BW1PG	--	--
BW2PCI	--	--
BW2PT	--	--
BW2VA	MCC 50564	*Ochrobactrum intermedium*
CF1LA	MCC 50926	*Acinetobacter lwoffii*
CF1PA	--	--
CF1PCT	--	--
CF1PD	--	--
CF1PT2	MCC 50927	*Escherichia coli*
CF1VA	MCC 50928	*Escherichia coli*
CF1VCF	MCC 50929	*Escherichia coli*
CF1VCI	MCC 50930	*Escherichia coli*
CF1VT	MCC 50931	*Escherichia coli*
CF2LCF	--	--
CF2LCT2	--	--
CF2LG	MCC 50849	*Escherichia coli*
CF2PA	--	--
CF2PCF	--	--
CF2PCT	--	--
CF2PT	MCC 50932	*Escherichia coli*
CF2VA1	MCC 50850	*Pseudomonas aeruginosa*
CF2VCF	MCC 50933	*Ochrobactrum intermedium*
CF2VCF	MCC 50851	*Pseudomonas aeruginosa*
CF2VD	MCC 50934	*Pseudomonas aeruginosa*
CF2VT	MCC 50853	*Escherichia coli*
CM1LD2	MCC 50935	*Bacillus cereus*
CM1PCI	MCC 50936	*Bacillus pumilus*
CM1PG1	MCC 50854	*Macrococcus caseolyticus*
CM1PG1	MCC 50937	*Macrococcus caseolyticus*
CS1LA	MCC 50938	*Pseudomonas mosselii*
CS1LCF	MCC 50855	*Bacillus cereus*
CS1LT	--	--
CS1PCH	--	--
CS1PCI1	--	--
CS1PCI2	--	--
CS1PD1	--	--
CS1PD2	--	--
CS1VA	--	--
CS1VCF2	--	--
CS1VCH	--	--
CS1VD	MCC 50856	*Pseudomonas mosselii*
CS1VD	MCC 50939	*Pseudomonas mosselii*
CS1VG	MCC 50857	*Stenotrophomonas maltophilia*
CS1VT	MCC 50858	*Enterobacter kobei*
CS2LA	MCC 50859	*Pseudomonas putida*
CS2LCF	MCC 50940	*Pseudomonas monteilii*
CS2LCH	MCC 50860	*Pseudomonas aeruginosa*
CS2LCI	MCC 50942	*Paenarthrobacter ureafaciens*
CS2LT	--	--
CS2PA2	MCC 50943	*Pseudomonas aeruginosa*
CS2PCT	MCC 50944	*Ochrobactrum anthropi*
CW1LA	MCC 50861	*Bacillus cereus*
CW1LCF	MCC 50862	*Bacillus subtilis*
CW1LCI	--	--
CW1LCT	MCC 50945	*Enterobacter kobei*
CW1LG	MCC 50863	*Acinetobacter towneri*
CW1PA2	MCC 50864	*Jonesia denitrificans*
CW1PCF	MCC 50865	*Acinetobacter johnsonii*
CW1PCI	MCC 50866	*Corynebacterium xerosis*
CW1PD	MCC 50867	*Bacillus pumilus*
CW1PD	MCC 50947	*Glutamicibacter arilaitensis*
CW1PG	--	--
CW1PT1	MCC 50868	*Bacillus cereus*
CW1PT1	MCC 50948	*Bacillus cereus*
CW1PT2	MCC 50869	*Bacillus pumilus*
CW1VD	--	--
CW1VT2	MCC 50870	*Providencia rettgeri*
CW2LA	MCC 50871	*Staphylococcus warneri*
CW2LCI	MCC 50872	*Weisella cibaria*
CW2LD	MCC 50873	*Glutamicibacter protophormiae*
CW2PCF	MCC 50874	*Bacillus pumilus*
CW2VG	MCC 50875	*Providencia rettgeri*
CW2VT	MCC 50876	*Serratia rubidaea*
D_JUL_22_074	MCC 50580	*Escherichia coli*
DF1LA	MCC 50877	*Escherichia coli*
DF1LCF	--	--
DF1LCH	--	--
DF1LCT	MCC 50878	*Escherichia coli*
DF1LG	MCC 50879	*Bacillus pumilus*
DF1LT	MCC 50880	*Escherichia coli*
DF1PCT	--	--
DF1PD	MCC 50881	*Escherichia coli*
DF1PT	MCC 50882	*Escherichia coli*
DF1VA	MCC 50883	*Escherichia coli*
DF1VCF	MCC 50884	*Escherichia coli*
DF1VCH	MCC 50885	*Escherichia coli*
DF1VCI	MCC 50886	*Escherichia coli*
DF1VCT	MCC 50887	*Escherichia coli*
DF1VD	MCC 50888	*Escherichia coli*
DF1VT	MCC 50889	*Escherichia coli*
DF2LCT	--	--
DF2LT	MCC 50890	*Escherichia coli*
DF2PA1	MCC 50891	*Escherichia coli*
DF2PCF	--	--
DF2PCI	--	--
DF2PCT	MCC 50892	*Bacillus pumilus*
DF2PD	MCC 50893	*Bacillus pumilus*
DF2PT	MCC 50894	*Bacillus pumilus*
DF2VA	MCC 50895	*Escherichia coli*
DF2VCF	MCC 50896	*Escherichia coli*
DF2VCT	MCC 50897	*Escherichia coli*
DF2VT	MCC 50898	*Escherichia coli*
DM1LA	MCC 50899	*Klebsiella pneumoniae*
DM1LCH	MCC 50900	*Pseudomonas aeruginosa*
DM1LCT	--	--
DM1LT	MCC 50901	*Pseudomonas aeruginosa*
DM1PT	MCC 50902	*Enterococcus faecalis*
DM1VCF	--	--
DM1VCH	--	--
DM1VCT	MCC 50903	*Pseudomonas aeruginosa*
DM1VT	MCC 50904	*Klebsiella pneumoniae*
DM2LCH	MCC 50905	*Acinetobacter baumannii*
DM2LT	MCC 50906	*Pseudomonas aeruginosa*
DM2PCH	MCC 50907	*Pseudomonas aeruginosa*
DM2PT	MCC 50908	*Enterococcus faecalis*
DM2VCH	--	--
DS1LCF	MCC 50909	*Bacillus cereus*
DS1PA	--	--
DS1PCF	MCC 50950	*Ochrobactrum intermedium*
DS1PCF	MCC 50910	*Ochrobactrum tritici*
DS1PCH	--	--
DS1PCI	--	--
DS1PCT	MCC 50911	*Ochrobactrum anthropi*
DS1PCT	MCC 50951	*Ochrobactrum anthropi*
DS1PG	MCC 50912	*Pseudomonas aeruginosa*
DS1VCF	MCC 50913	*Ochrobactrum intermedium*
DS1VCF	MCC 50953	*Ochrobactrum intermedium*
DS1VCT	MCC 50914	*Ochrobactrum tritici*
DS2LCF	MCC 50915	*Bacillus cereus*
DS2PCF	--	--
DS2PCT	MCC 50916	*Escherichia coli*
DS2PD	--	--
DW1LA	MCC 50917	*Morganella morganii*
DW1LA	MCC 50955	*Morganella morganii*
DW1LCF	--	--
DW1PA	MCC 50956	*Pseudomonas mendocina*
DW1PA	MCC 50918	*Pseudomonas oleovorans*
DW1PCF	--	--
DW1PD	MCC 50957	*Providencia rettgeri*
DW1PT	MCC 50958	*Providencia rettgeri*
DW1VA	MCC 50959	*Providencia alcalifaciens*
DW2LA	MCC 50960	*Providencia alcalifaciens*
DW2LD	MCC 50922	*Escherichia coli*
DW2LG	MCC 50923	*Staphylococcus haemolyticus*
DW2PA	MCC 50963	*Providencia alcalifaciens*
DW2PCF	MCC 50964	*Providencia rettgeri*

Phylogeny and Distribution of Putative Antibiotic Resistant Bacteria



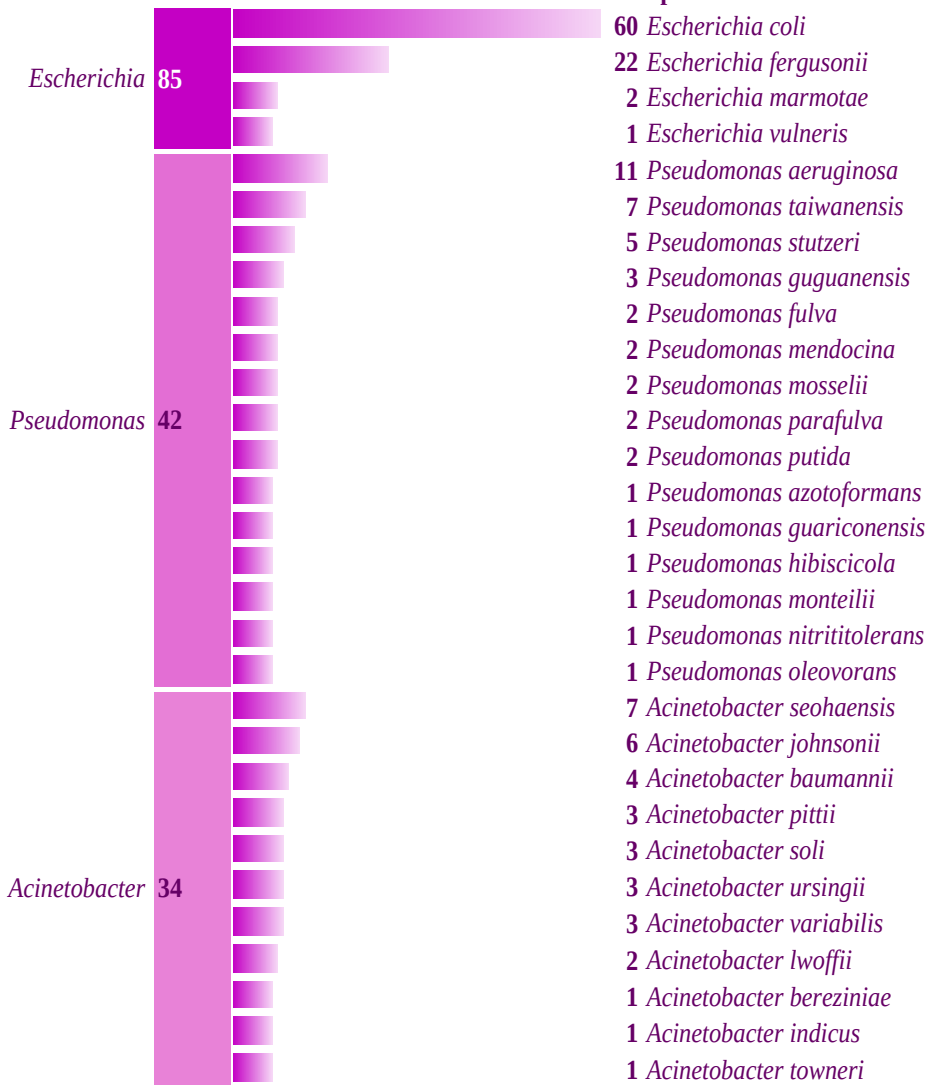
Potential Antibiotic Resistant Bacterial Community in Milk, Faeces, Soil and Wastewater



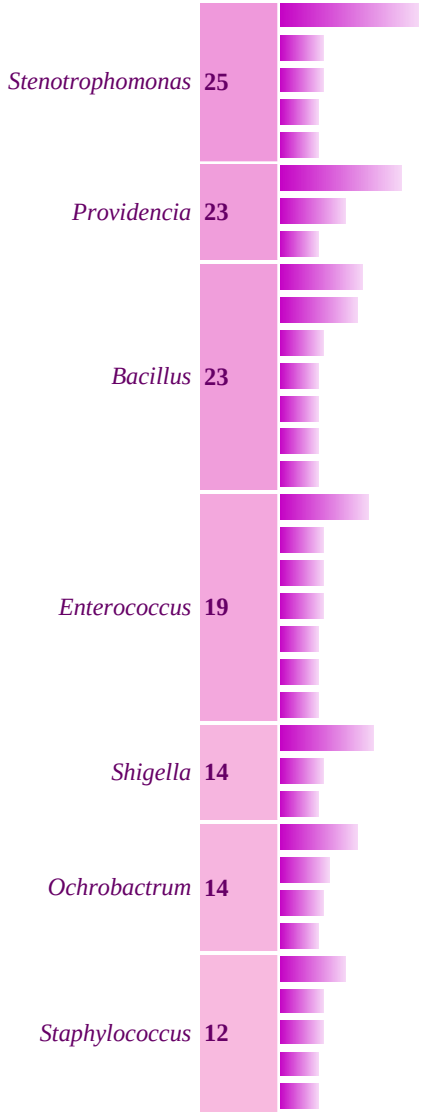


The length of color-coded bars represents the abundance.

Genus and Species Level Classification of Putative Antibiotic Resistant Bacteria



No.	Species
60	*Escherichia coli*
22	*Escherichia fergusonii*
2	*Escherichia marmotae*
1	*Escherichia vulneris*
11	*Pseudomonas aeruginosa*
7	*Pseudomonas taiwanensis*
5	*Pseudomonas stutzeri*
3	*Pseudomonas guguanensis*
2	*Pseudomonas fulva*
2	*Pseudomonas mendocina*
2	*Pseudomonas mosselii*
2	*Pseudomonas parafulva*
2	*Pseudomonas putida*
1	*Pseudomonas azotoformans*
1	*Pseudomonas guariconensis*
1	*Pseudomonas hibiscicola*
1	*Pseudomonas monteilii*
1	*Pseudomonas nitrititolerans*
1	*Pseudomonas oleovorans*
7	*Acinetobacter seohaensis*
6	*Acinetobacter johnsonii*
4	*Acinetobacter baumannii*
3	*Acinetobacter pittii*
3	*Acinetobacter soli*
3	*Acinetobacter ursingii*
3	*Acinetobacter variabilis*
2	*Acinetobacter lwoffii*
1	*Acinetobacter bereziniae*
1	*Acinetobacter indicus*
1	*Acinetobacter towneri*



No.	Species
19	*Stenotrophomonas maltophilia*
2	*Stenotrophomonas pavanii*
2	*Stenotrophomonas terrae*
1	*Stenotrophomonas acidaminiphila*
1	*Stenotrophomonas nitritireducens*
16	*Providencia rettgeri*
6	*Providencia alcalifaciens*
1	*Providencia vermicola*
9	*Bacillus cereus*
8	*Bacillus pumilus*
2	*Bacillus safensis*
1	*Bacillus aerophilus*
1	*Bacillus australimaris*
1	*Bacillus subtilis*
1	*Bacillus wiedmannii*
10	*Enterococcus mundtii*
2	*Enterococcus faecalis*
2	*Enterococcus faecium*
2	*Enterococcus gallinarum*
1	*Enterococcus asini*
1	*Enterococcus casseliflavus*
1	*Enterococcus durans*
11	*Shigella flexneri*
2	*Shigella boydii*
1	*Shigella sonnei*
8	*Ochrobactrum intermedium*
3	*Ochrobactrum anthropi*
2	*Ochrobactrum tritici*
1	*Ochrobactrum soli*
6	*Staphylococcus haemolyticus*
2	*Staphylococcus epidermidis*
2	*Staphylococcus warneri*
1	*Staphylococcus aureus*
1	*Staphylococcus hominis*

Genus and Species Level Classification of Putative Antibiotic Resistant Bacteria

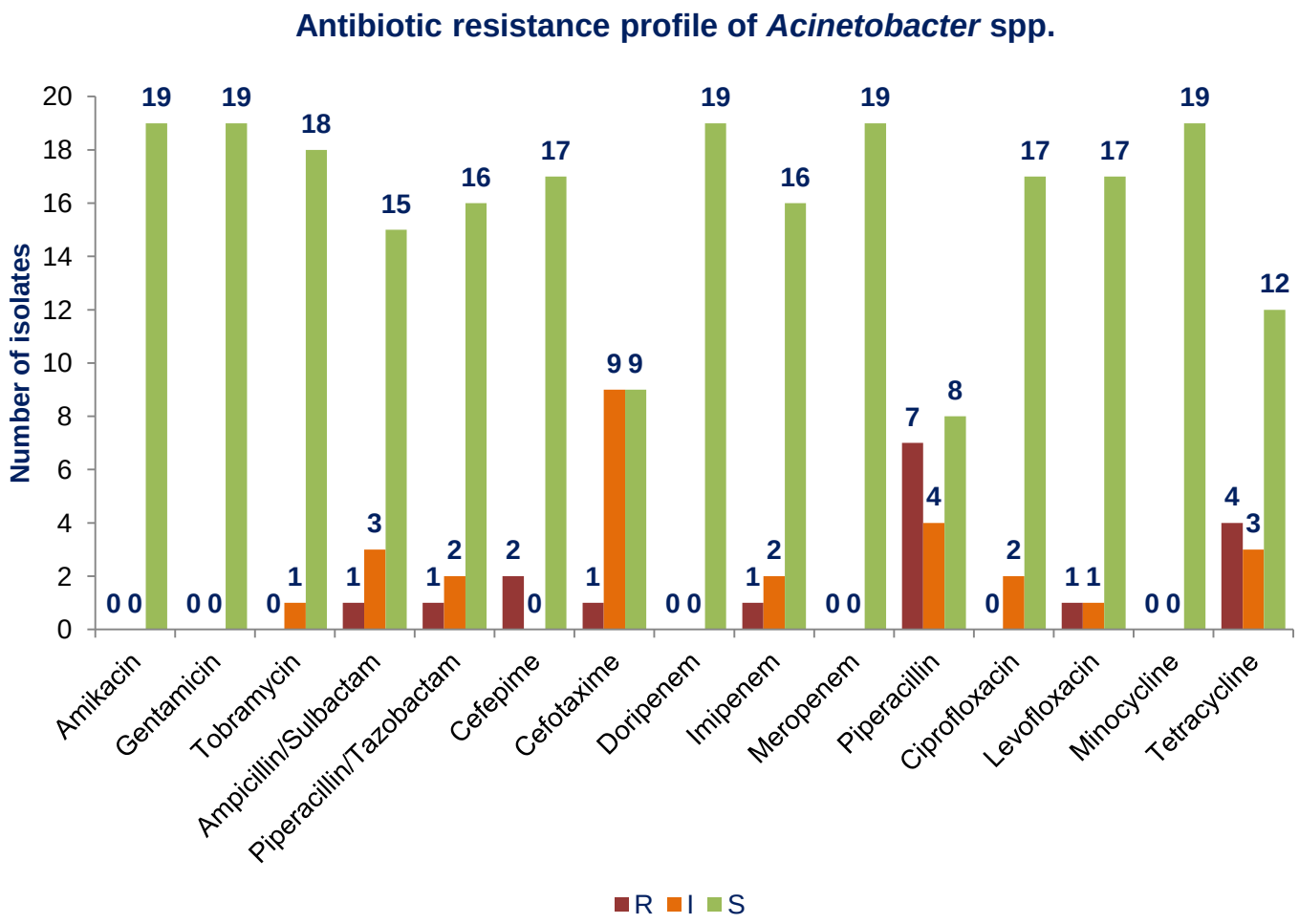
Continued...

Genus	No.	No.	Species
Comamonas	10	10	*Comamonas jiangduensis*
Brucella	9	4	*Brucella pseudintermedia*
		3	*Brucella intermedia*
		1	*Brucella anthropi*
		1	*Brucella oryzae*
Enterobacter	9	5	*Enterobacter mori*
		2	*Enterobacter kobei*
		1	*Enterobacter cloacae*
		1	*Enterobacter hormaechei*
Chryseobacterium	8	4	*Chryseobacterium contaminans*
		2	*Chryseobacterium bovis*
		1	*Chryseobacterium joostei*
		1	*Chryseobacterium pennipullorum*
Klebsiella	7	3	*Klebsiella pneumoniae*
		2	*Klebsiella variicola*
		1	*Klebsiella quasipneumoniae*
		1	*Klebsiella veriiicola*
Aeromonas	7	5	*Aeromonas caviae*
		2	*Aeromonas taiwanensis*
Achromobacter	6	3	*Achromobacter spanius*
		1	*Achromobacter piechaudii*
		1	*Achromobacter ruhlandii*
		1	*Achromobacter xylosoxidans*
Rhizobium	3	2	*Rhizobium radiobacter*
		1	*Rhizobium pusense*
Empedobacter	3	3	*Empedobacter falsenii*
Agrobacterium	2	2	*Agrobacterium fabrum*
Citrobacter	2	1	*Citrobacter europaeus*
		1	*Citrobacter freundii*
Cupriavidus	2	2	*Cupriavidus taiwanensis*
Glutamicibacter	2	1	*Glutamicibacter arilaitensis*
		1	*Glutamicibacter protophormiae*
Microbacterium	2	1	*Microbacterium paraoxydans*
		1	*Microbacterium resistens*
Morganella	2	2	*Morganella morganii*
Paenibacillus	2	2	*Paenibacillus favisporus*
Pedobacter	2	2	*Pedobacter terrae*
Weisella	2	2	*Weisella cibaria*
Acidovorax	1	1	*Acidovorax lacteus*
Aerococcus	1	1	*Aerococcus urinaeequi*
Atlantibacter	1	1	*Atlantibacter hermannii*
Bordetella	1	1	*Bordetella petrii*
Corynebacterium	1	1	*Corynebacterium xerosis*
Cronobacter	1	1	*Cronobacter condimenti*
Denitrificimonas	1	1	*Denitrificimonas caeni*
Haematomicrobium	1	1	*Haematomicrobium sanguinis*
Jonesia	1	1	*Jonesia denitrificans*
Kocuria	1	1	*Kocuria salsicia*
Kosakonia	1	1	*Kosakonia cowanii*
Kurthia	1	1	*Kurthia populi*
Lactococcus	1	1	*Lactococcus cremoris*
Leuconostoc	1	1	*Leuconostoc lactis*
Macrococcus	1	1	*Macrococcus caseolyticus*
Moraxella	1	1	*Moraxella osloensis*
Paenarthrobacter	1	1	*Paenarthrobacter ureafaciens*
Pseudoxanthomonas	1	1	*Pseudoxanthomonas suwonensis*
Psychrobacter	1	1	*Psychrobacter pulmonis*
Serratia	1	1	*Serratia rubidaea*
Sphingobacterium	1	1	*Sphingobacterium humi*
Streptococcus	1	1	*Streptococcus suis*

WHO Priority and Potential Public Healthcare Associated Pathogens in Organized Dairy Production System

S. No.	WHO priority/ healthcare pathogens		Closely related bacteria identified in dairy	No. of isolates	
	Priority level	Pathogen		Identified	Tested
1	Critical	*Acinetobacter baumannii*, carbapenem-resistant	*Acinetobacter* spp.	34	19
		Enterobacterales, carbapenem-resistant, third generation cephalosporin resistant	*Escherichia* spp.	85	58
			Providencia spp.	23	8
			Klebsiella spp.	7	2
			Enterobacter spp.	9	1
			Kosakonia spp.	1	
			Serratia spp.	1	1
2	High	*Enterococcus faecium*, vancomycin-resistant	*Enterococcus* spp.	19	7
		Pseudomonas aeruginosa, carbapenem-resistant	*Pseudomonas* spp.	42	26
		Shigella spp., fluoroquinolone-resistant	*Shigella* spp.	14	9
		Staphylococcus aureus, methicillin-resistant	*Staphylococcus* spp.	12	6
		Salmonella typhi & Non-typhoidal *Salmonella*, fluoroquinolone-resisitant	--		
		Neisseria gonorrhoeae, cephalosporin-resistant, fluoroquinolone-resistant	--		
3	Medium	*Streptococcus pneumoniae* macrolide-resistant, Group A Streptococci macrolide-resistant & Group B Streptococci penicillin-resistant	--		
		Haemophilus influenzae, ampicillin-resistant	--		
4	Other healthcare associated pathogens		*Morganella* spp.	2	1
			Stenotrophomonas maltophilia	19	14
		Total		**274**	**152**

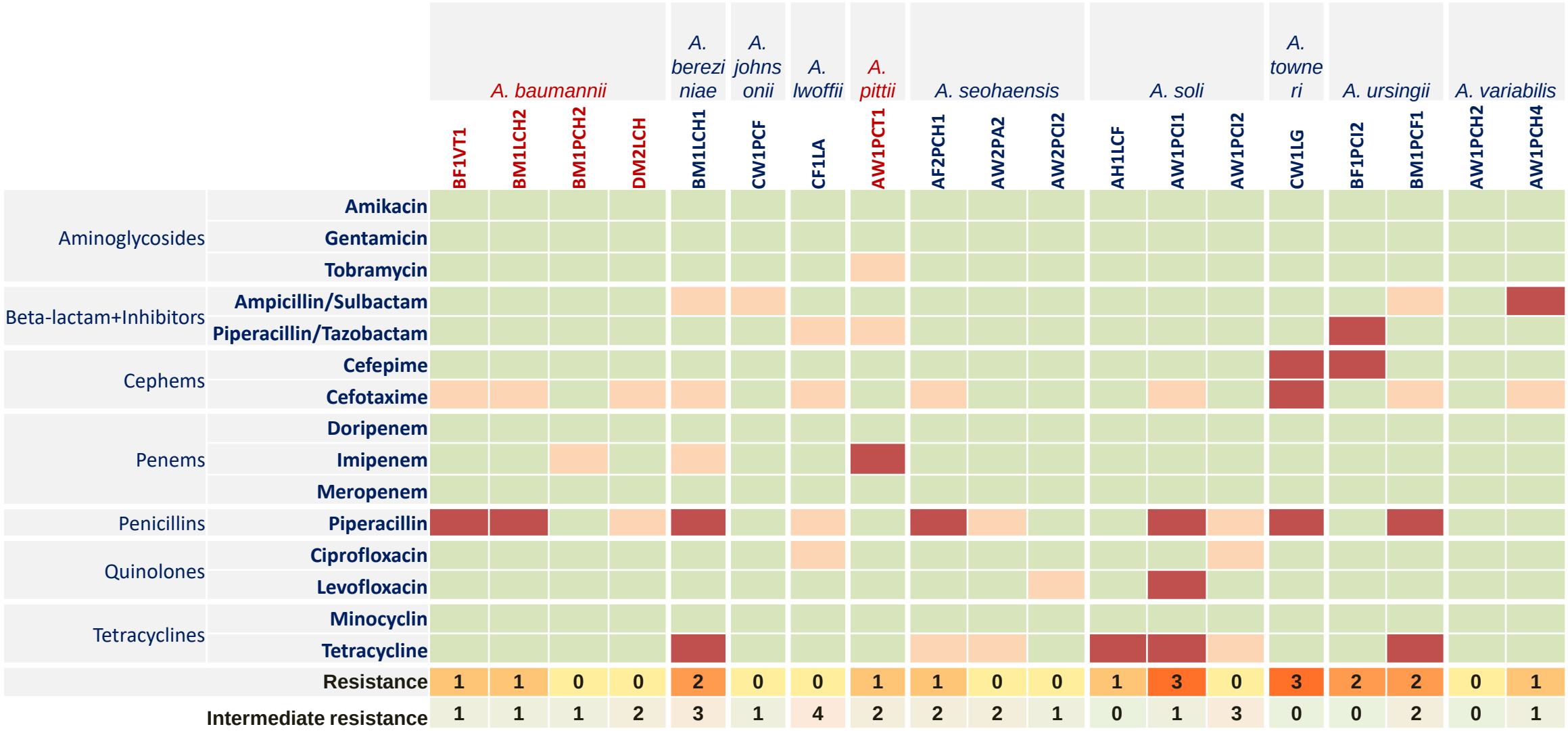
Antibiotic resistance profile of *Acinetobacter* spp.



R: Resistant; I: Intermediate resistant; S: Sensitive

S. No.	Isolate ID	Acc. No.	Species (10 No.)	Source
1	BF1VT1	MCC 50538	*Acinetobacter baumannii*	Faeces
2	BM1LCH2	MCC 50532		Milk
3	BM1PCH2	MCC 50506		Milk
4	DM2LCH	MCC 50905		Milk
5	BM1LCH1	MCC 50522	*A. bereziniae*	Milk
6	CW1PCF	MCC 50865	*A. johnsonii*	Wastewater
7	CF1LA	MCC 50926	*A. lwoffii*	Faeces
8	AW1PCT1	OP198061	*A. pittii*	Wastewater
9	AF2PCH1	OP218224	*A. seohaensis*	Faeces
10	AW2PA2	OP217984		Wastewater
11	AW2PCI2	OP218203		Wastewater
12	AH1LCF	OP217984	*A.soli*	Wastewater
13	AW1PCI1	--		Wastewater
14	AW1PCI2	OP198060		Wastewater
15	CW1LG	MCC 50863	*A.towneri*	Wastewater
16	BF1PCI2	MCC 50567	*A.ursingii*	Faeces
17	BM1PCF1	MCC 50516		Milk
18	AW1PCH2	--	*A.variabilis*	Wastewater
19	AW1PCH4	OP198059		Wastewater

Multi drug resistance pattern of *Acinetobacter* spp.

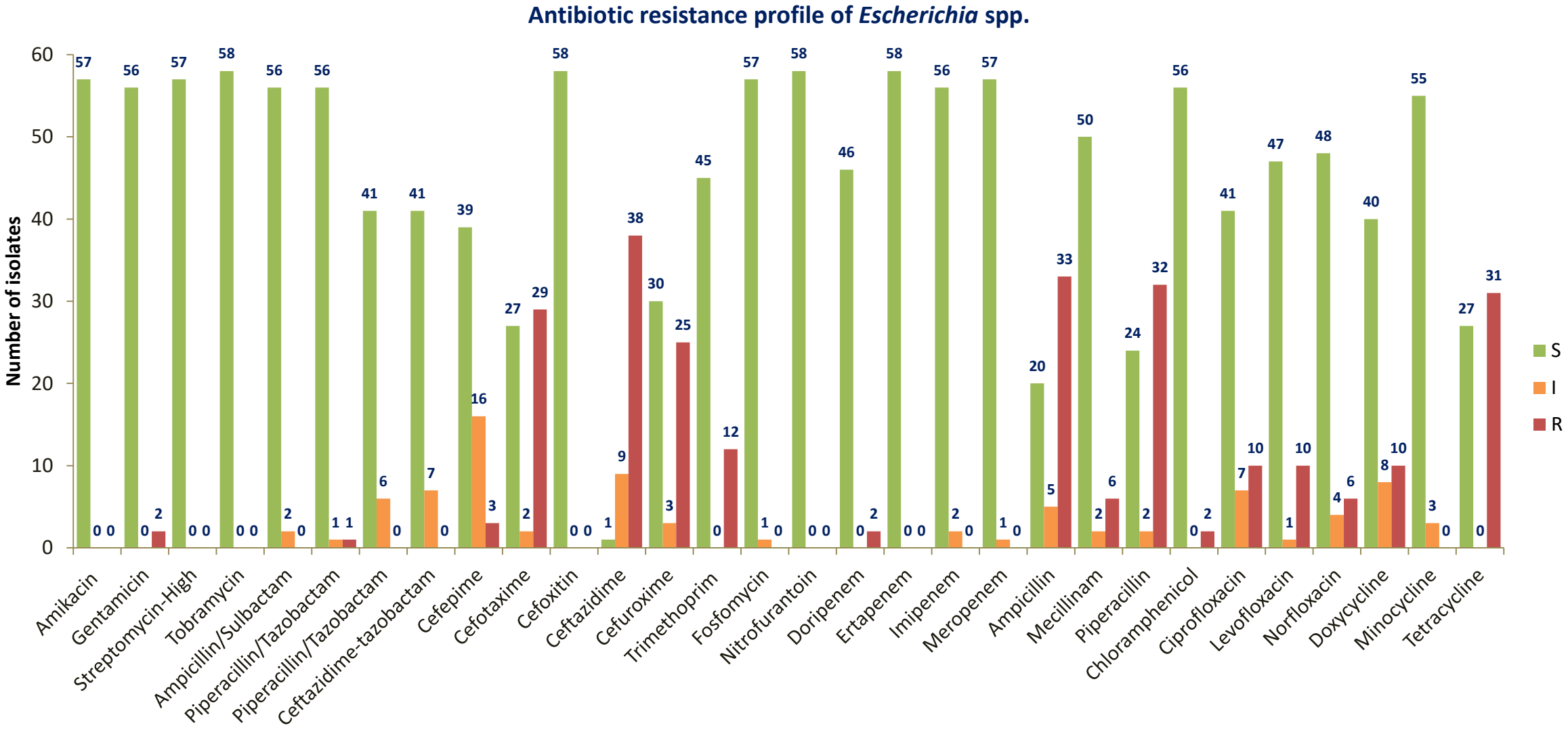


A. baumannii group: *A. baumannii*, *A. calcoaceticus*, *A. lactucae*, *A. nosocomialis*, *A. pittii* and *A. seifertii* (Carvalheira *et al.,* 2021)

Details of *Escherichia* spp.

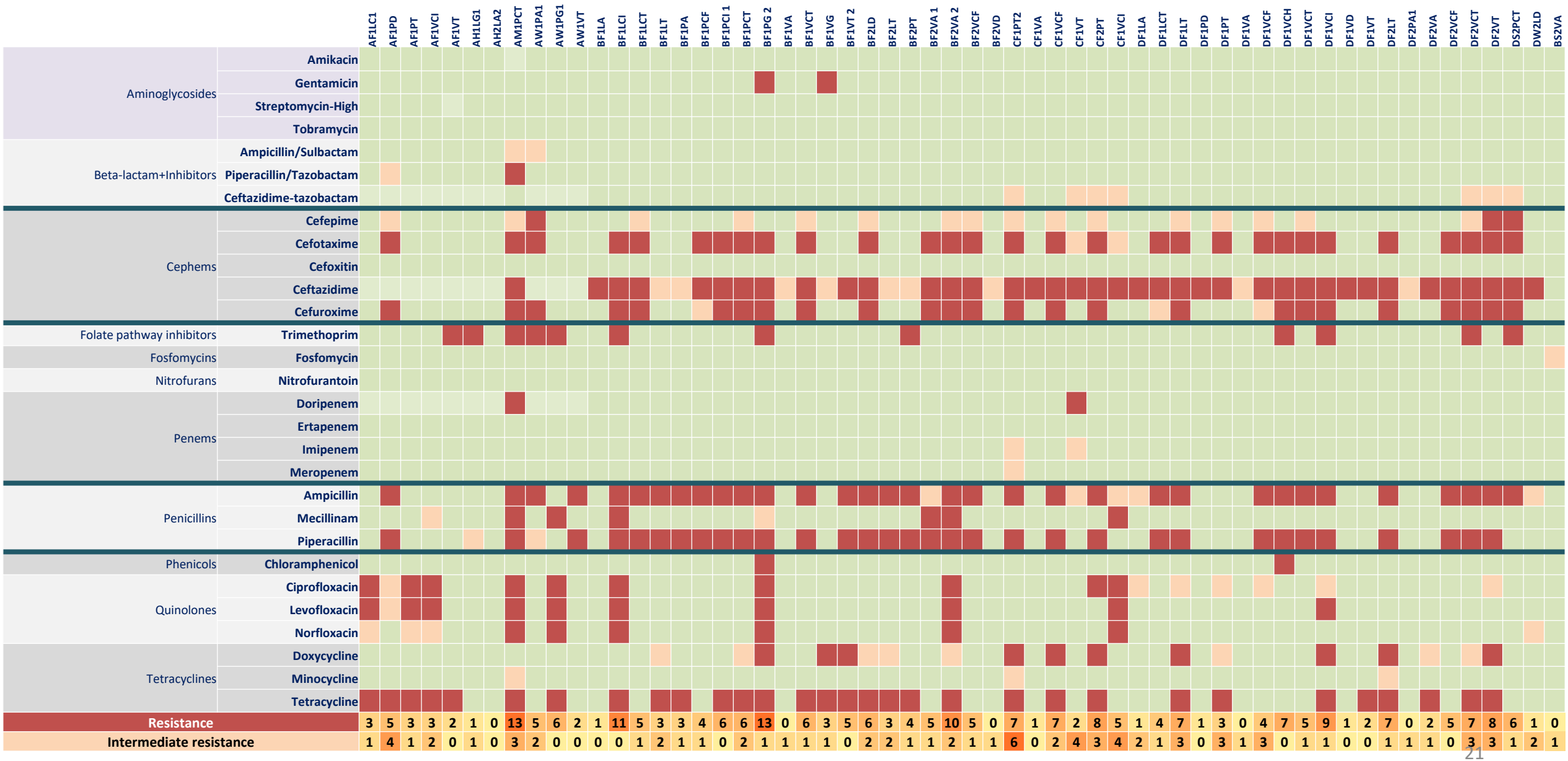
S. No.	Isolate ID	Acc. No.	Species (3 No.)	Source
1	**AF1LCI**	OP204138	*Escherichia coli*	Faeces
2	**AF1PT**	OP204142	*Escherichia coli*	Faeces
3	**AF1VCI**	OP204143	*Escherichia coli*	Faeces
4	**AF1VT**	OP204144	*Escherichia coli*	Faeces
5	**BF1LA**	MCC 50526	*Escherichia coli*	Faeces
6	**BF1LCI**	MCC 50519	*Escherichia coli*	Faeces
7	**BF1LCT**	MCC 50508	*Escherichia coli*	Faeces
8	**BF1LT**	MCC 50534	*Escherichia coli*	Faeces
9	**BF1PA**	MCC 50518	*Escherichia coli*	Faeces
10	**BF1PCF**	MCC 50500	*Escherichia coli*	Faeces
11	**BF1PCI 1**	MCC 50550	*Escherichia coli*	Faeces
12	**BF1PCT**	MCC 50529	*Escherichia coli*	Faeces
13	**BF1PG 2**	MCC 50571	*Escherichia coli*	Faeces
14	**BF1VA**	MCC 50553	*Escherichia coli*	Faeces
15	**BF1VCT**	MCC 50559	*Escherichia coli*	Faeces
16	**BF1VG**	MCC 50566	*Escherichia coli*	Faeces
17	**BF1VT 2**	MCC 50549	*Escherichia coli*	Faeces
18	**BF2LD**	MCC 50545	*Escherichia coli*	Faeces
19	**BF2LT**	MCC 50542	*Escherichia coli*	Faeces
20	**BF2PT**	MCC 50577	*Escherichia coli*	Faeces
21	**BF2VA 1**	MCC 50557	*Escherichia coli*	Faeces
22	**BF2VA 2**	MCC 50551	*Escherichia coli*	Faeces
23	**BF2VCF**	MCC 50562	*Escherichia coli*	Faeces
24	**BF2VD**	MCC 50540	*Escherichia coli*	Faeces
25	**CF1PT2**	MCC 50927	*Escherichia coli*	Faeces
26	**CF1VA**	MCC 50928	*Escherichia coli*	Faeces
27	**CF1VCF**	MCC 50929	*Escherichia coli*	Faeces
28	**CF1VCI**	MCC 50930	*Escherichia coli*	Faeces
29	**CF1VT**	MCC 50931	*Escherichia coli*	Faeces
30	**CF2PT**	MCC 50932	*Escherichia coli*	Faeces
31	**DF1LA**	MCC 50877	*Escherichia coli*	Faeces
32	**DF1LCT**	MCC 50878	*Escherichia coli*	Faeces
33	**DF1LT**	MCC 50880	*Escherichia coli*	Faeces
34	**DF1PD**	MCC 50881	*Escherichia coli*	Faeces
35	**DF1PT**	MCC 50882	*Escherichia coli*	Faeces
36	**DF1VA**	MCC 50883	*Escherichia coli*	Faeces
37	**DF1VCF**	MCC 50884	*Escherichia coli*	Faeces
38	**DF1VCH**	MCC 50885	*Escherichia coli*	Faeces
39	**DF1VCI**	MCC 50886	*Escherichia coli*	Faeces
40	**DF1VCT**	MCC 50887	*Escherichia coli*	Faeces
41	**DF1VD**	MCC 50888	*Escherichia coli*	Faeces
42	**DF1VT**	MCC 50889	*Escherichia coli*	Faeces
43	**DF2LT**	MCC 50890	*Escherichia coli*	Faeces
44	**DF2PA1**	MCC 50891	*Escherichia coli*	Faeces
45	**DF2VA**	MCC 50895	*Escherichia coli*	Faeces
46	**DF2VCF**	MCC 50896	*Escherichia coli*	Faeces
47	**DF2VCT**	MCC 50897	*Escherichia coli*	Faeces
48	**DF2VT**	MCC 50898	*Escherichia coli*	Faeces
49	**DS2PCT**	MCC 50916	*Escherichia coli*	Soil
50	**DW2LD**	MCC 50922	*Escherichia coli*	Wastewater
51	**AH2LA2**	OP217078	*Escherichia fergusonii*	Wastewater
52	**AW1PA1**	OP164586	*Escherichia fergusonii*	Wastewater
53	**AW1VT**	OP164586	*Escherichia fergusonii*	Wastewater
54	**AF1PD**	--	*Escherichia fergusonii*	Faeces
55	**AH1LG1**	--	*Escherichia fergusonii*	Wastewater
56	**AM1PCT**	--	*Escherichia* spp.	Milk
57	**AW1PG1**	--	*Escherichia fergusonii*	Wastewater
58	**BS2VA**	MCC 50546	*Escherichia vulneris*	Soil

Antibiotic resistance profile of *Escherichia* spp.

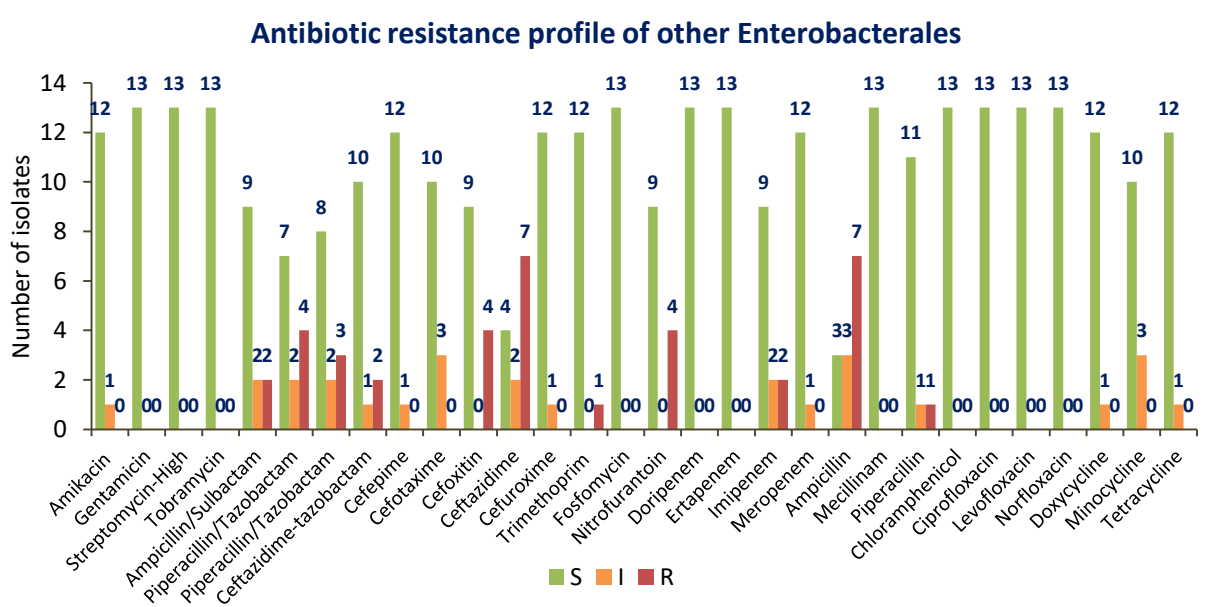


R: Resistant; I: Intermediate resistant; S: Sensitive

Multi drug resistance pattern of *Escherichia* spp.



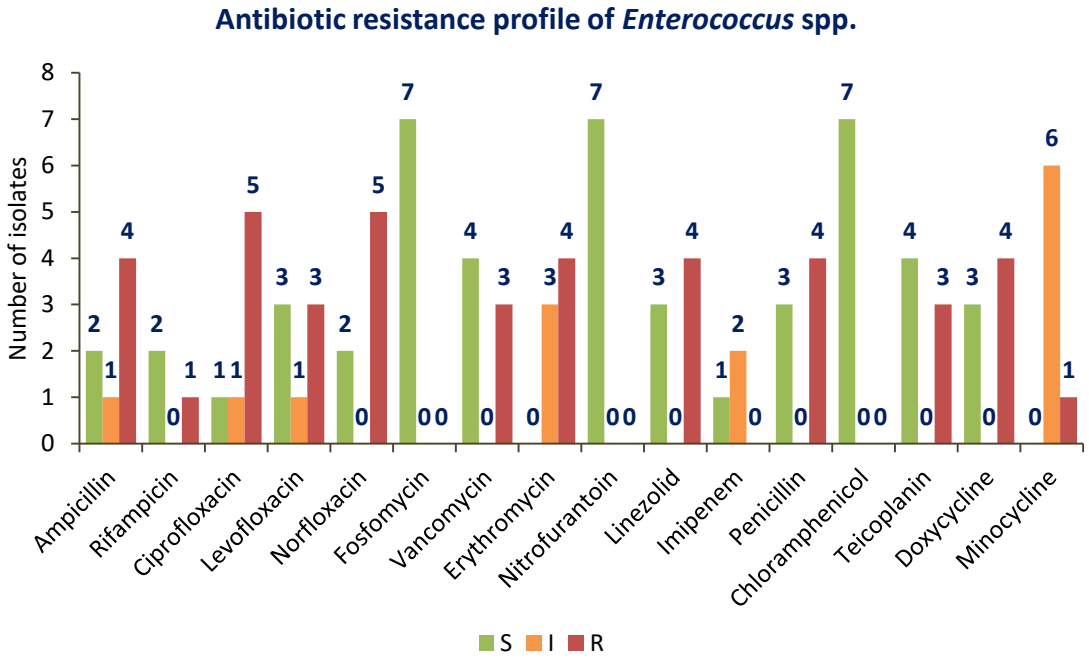
Antibiotic resistance profile of other Enterobacterales



R: Resistant; I: Intermediate resistant; S: Sensitive

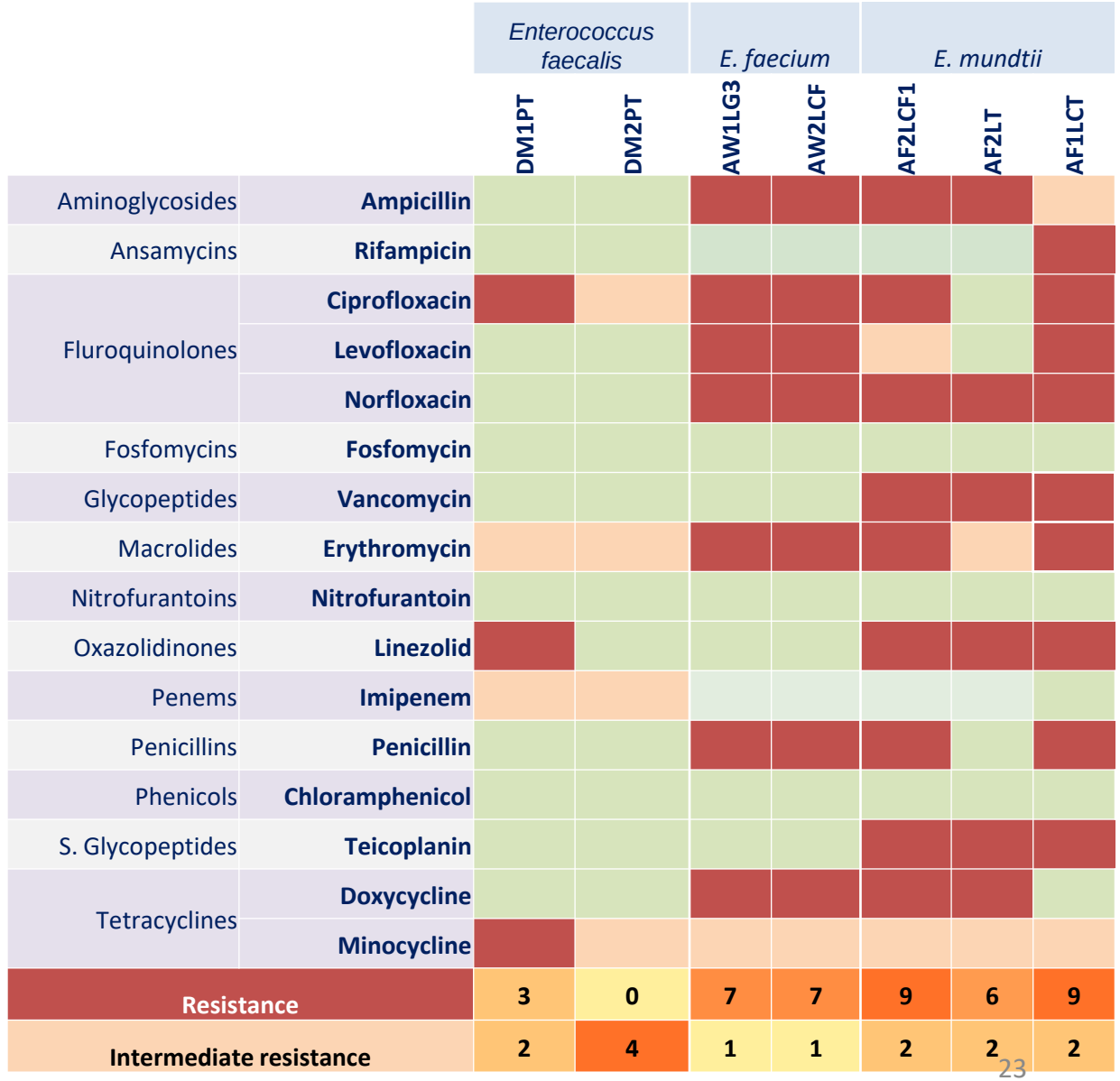
S. No.	Isolate ID	Acc. No.	Species (6 No.)	Source
1	CS1VT	MCC 50858	*Enterobacter kobei*	Soil
2	DM1LA	MCC 50899	*Klebsiella pneumoniae*	Milk
3	DM1VT	MCC 50904	*K. pneumoniae*	Milk
4	CW1VT2	MCC 50870	*Providencia rettgeri*	Wastewater
5	CW2VG	MCC 50875	*P. rettgeri*	Wastewater
6	DW1PD	MCC 50957	*P. rettgeri*	Wastewater
7	DW1PT	MCC 50958	*P. rettgeri*	Wastewater
8	DW1VA	MCC 50959	*P. alcalifaciens*	Wastewater
9	DW2LA	MCC 50960	*P. alcalifaciens*	Wastewater
10	DW2PA	MCC 50963	*P. alcalifaciens*	Wastewater
11	DW2PCF	MCC 50964	*P. rettgeri*	Wastewater
12	DW1LA	MCC 50955	*Morganella morganii*	Wastewater
13	CW2VT	MCC 50876	*Serratia rubidaea*	Wastewater

Antibiotic resistance profile of *Enterococcus* spp.

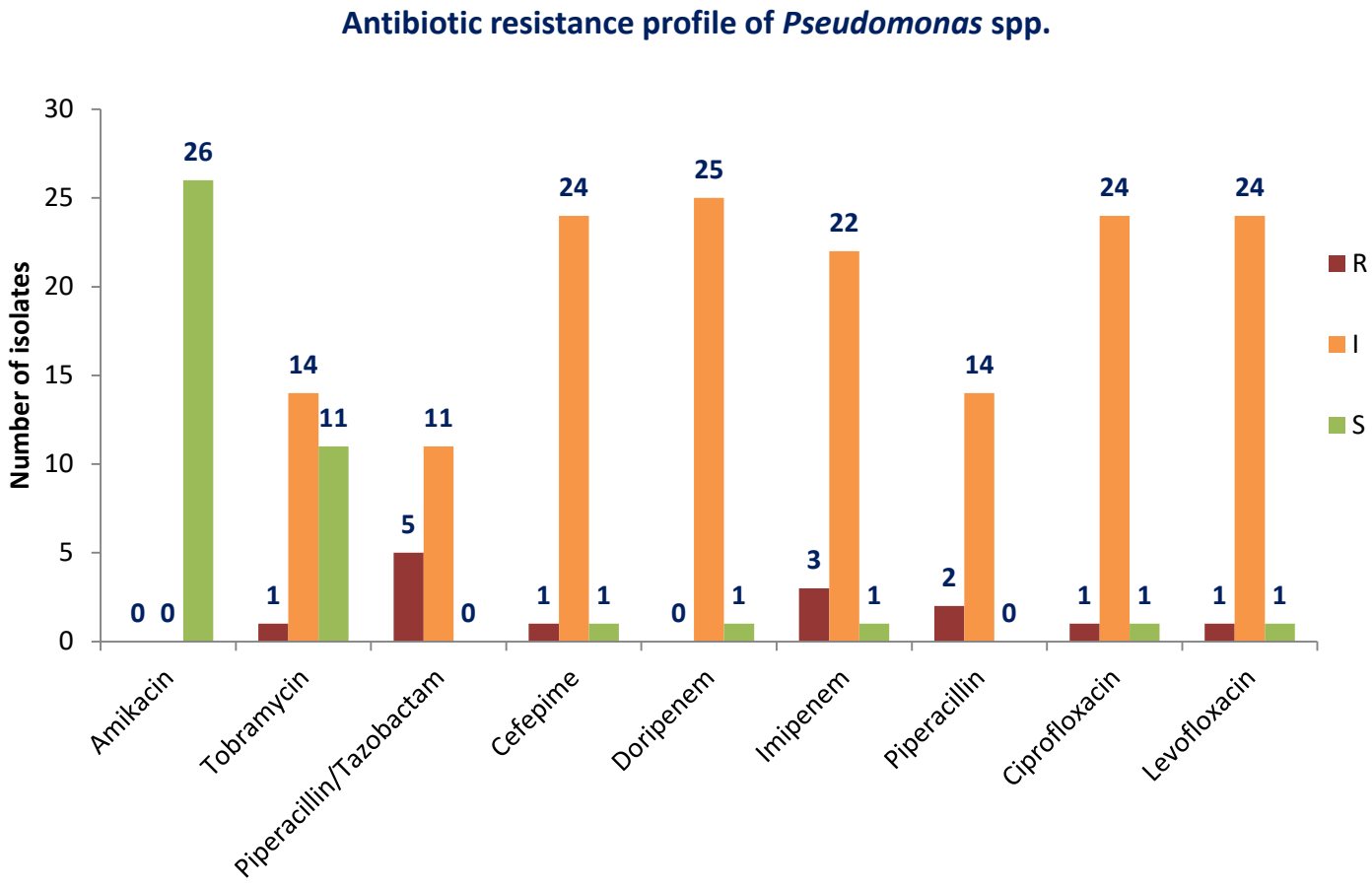


R: Resistant; I: Intermediate resistant; S: Sensitive

S. No.	Isolate ID	Acc. No.	Species (3 No.)	Source
1	**DM1PT**	MCC 50902	*Enterococcus faecalis*	Milk
2	**DM2PT**	MCC 50908	*E. faecalis*	Milk
3	**AW1LG3**	OP164579	*E. faecium*	Wastewater
4	**AW2LCF**	OP217095		Wastewater
5	**AF2LCF1**	--	*E. mundtii*	Faeces
6	**AF2LT**	--		Faeces
7	**AF1LCT**	OP204139		Faeces



Antibiotic resistance profile of *Pseudomonas* spp.



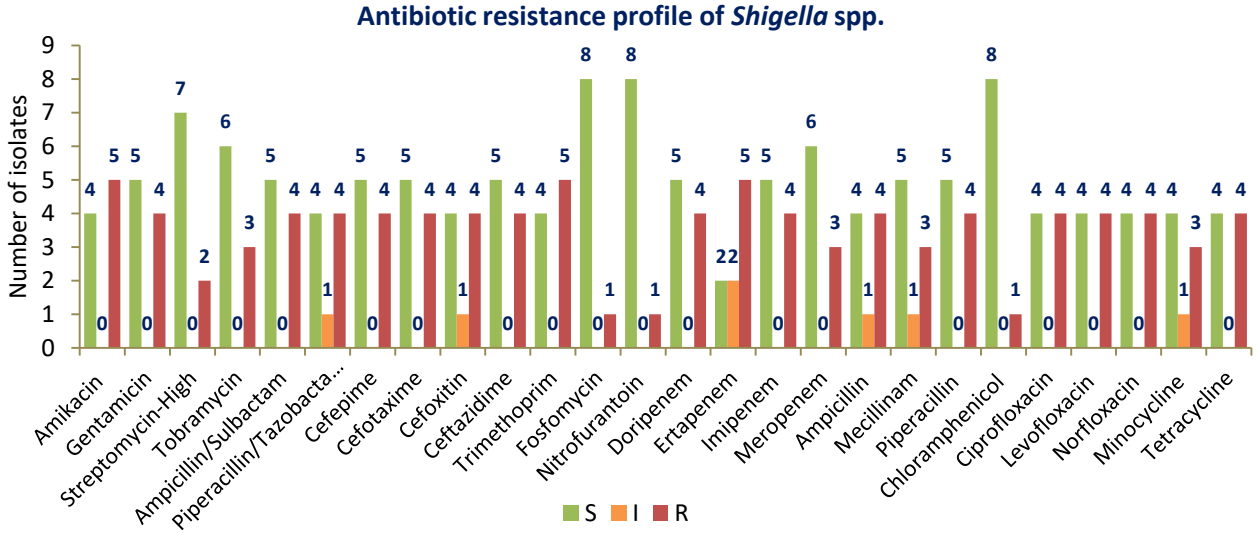
R: Resistant; I: Intermediate resistant; S: Sensitive

S. No.	Isolate ID	Acc. No.	Species (12 No.)	Source
1	CS2LCH	MCC 50860	*P. aeruginosa*	Soil
2	CF2VD	MCC 50934		Faeces
3	CS2PA2	MCC 50943		Soil
4	DM1LCH	MCC 50900		Milk
5	DM1LT	MCC 50901		Milk
6	DM2LT	MCC 50906		Milk
7	DM2PCH	MCC 50907		Milk
8	DS1PG	MCC 50912		Soil
9	BM2VCH	MCC 50548	*P. fulva*	Milk
10	BS1LCI	--	*P. geniculata*	Soil
11	BS1VD2	--		Soil
12	BS1LCH	MCC 50524	*P. guariconensis*	Soil
13	AS2PCF2	OP217065	*P. guguanensis*	Soil
14	AH1VT2	OP204118		Wastewater
15	AH1PG1	OP204123	*P. hibiscicola*	Wastewater
16	AS2LA2	OP204146	*P. mendocina*	Soil
17	CS2LCF	MCC 50940	*P. monteilii*	Soil
18	CS1LA	MCC 50938		Soil
19	AH1PCT	OP204122	*P. nitrititolerans*	Wastewater
20	CS2LA	MCC 50859	*P. putida*	Soil
21	AS1PCH2	OP204130	*P. stutzeri*	Soil
22	AW1VCF	OP164580		Wastewater
23	AH1PCH1	OP204119		Wastewater
24	BS1VCH	MCC 50544	*P. taiwanensis*	Soil
25	AS2PCH2	OP217066		Soil
26	AH2VCF	OP217089		Wastewater

Multi drug resistance pattern of *Pseudomonas* spp.

		Pseudomonas fulva	*P. guariconensis*	*P. aeruginosa*								*P. geniculata*		*P. guguanensis*		*P. hibiscicola*	*P. mendocina*	*P. monteilii*	*P. mosseliii*	*P. nitrititolerans*	*P. putida*	*P. stutzeri*			*P. taiwanensis*		
		BM2VCH	BS1LCH	CF2VD	CS2LCH	CS2PA2	DM1LCH	DM1LT	DM2LT	DM2PCH	DS1PG	BS1LCI	BS1VD2	AS2PCF2	AH1VT2	AH1PG1	AS2LA2	CS2LCF	CS1LA	AH1PCT	CS2LA	AS1PCH2	AW1VCF	AH1PCH1	BS1VCH	AS2PCH2	AH2VCF
Aminoglycosides	**Amikacin**																										
	Tobramycin																										
Beta-lactam+Inhibitors	**Piperacillin/Tazobactam**																										
Cephems	**Cefepime**																										
Penems	**Doripenem**																										
	Imipenem																										
Penicillins	**Piperacillin**																										
Quinolones	**Ciprofloxacin**																										
	Levofloxacin																										
Resistance		0	0	2	1	0	0	0	1	0	0	2	2	0	0	0	0	1	0	4	1	0	0	0	0	0	0
Intermediate resistance		7	7	6	7	8	8	8	7	8	8	6	6	5	5	5	5	7	8	2	7	5	5	0	8	5	5

Antibiotic resistance profile of *Shigella* spp.

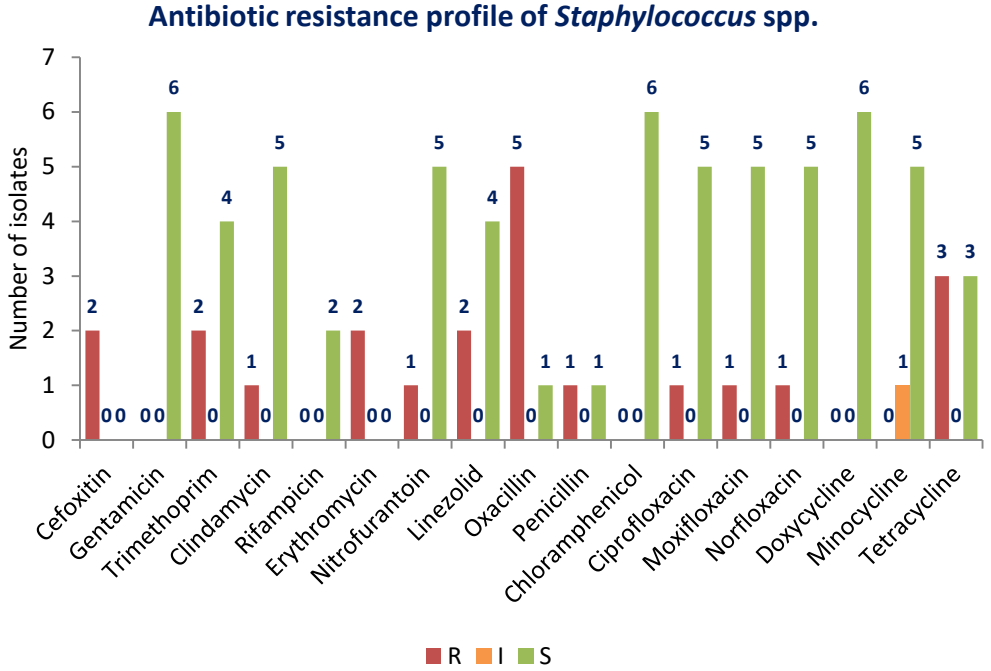


R: Resistant; I: Intermediate resistant; S: Sensitive

S. No.	Isolate ID	Acc. No.	Species (4 No.)	Source
1	**AF1LA**	OP204136	*Shigella flexneri*	Faeces
2	**AS3VCF**	OP218194		Soil
3	**AW1PA2**	OP197929		Wastewater
4	**AW3LCT**	OP218172		Wastewater
5	**AW3LG**	OP218173		Wastewater
6	**AW3VCF**	OP218177		Wastewater
7	**AW1PCF1**	OP198014	*Shigella boydii*	Wastewater
8	**AW3VCH2**	OP218178	*Shigella sonnei*	Wastewater
9	**AF2LCH**	NA	*Shigella* spp.	Faeces

Class of antibiotics	Antibiotics	AW3LCT	AW3LG	AW1PA2	AW3VCF	AW1PCF1	AW3VCH2	AF1LA	AF2LCH	AS3VCF
Aminoglycosides	Amikacin	R			R		R	R	R	
	Gentamicin	R			R		R			R
	Streptomycin-High						R			R
	Tobramycin	R			R		R			
Beta-lactam+Inhibitors	Ampicillin/Sulbactam	R			R		R			R
	Piperacillin/Tazobactam	R			R		R		I	R
Cephems	Cefepime	R			R		R			R
	Cefotaxime	R			R	I	R			R
	Cefoxitin	R			R		R		I	R
	Ceftazidime	R			R		R			R
Folate pathway inhibitors	Trimethoprim	R			R		R	R		R
Fosfomycins	Fosfomycin			R						
Nitrofurans	Nitrofurantoin					R				
Penems	Doripenem	R			R		R			R
	Ertapenem	R			R	I	R	R	I	R
	Imipenem	R			R		R			R
	Meropenem	R			R					R
Penicillins	Ampicillin	R			R		R		I	R
	Mecillinam	I			R		R			R
	Piperacillin	R			R		R			R
Phenicols	Chloramphenicol									R
Quinolones	Ciprofloxacin	R			R		R			R
	Levofloxacin	R			R		R			R
	Norfloxacin	R			R		R			R
Tetracyclines	Minocycline	R			R		R		I	
	Tetracycline	R			R		R	R		
Resistance		**21**	**0**	**1**	**22**	**1**	**22**	**4**	**1**	**20**
Intermediate resistance		**1**	**0**	**0**	**0**	**2**	**0**	**0**	**5**	**0**

Antibiotic resistance profile of *Staphylococcus* spp.

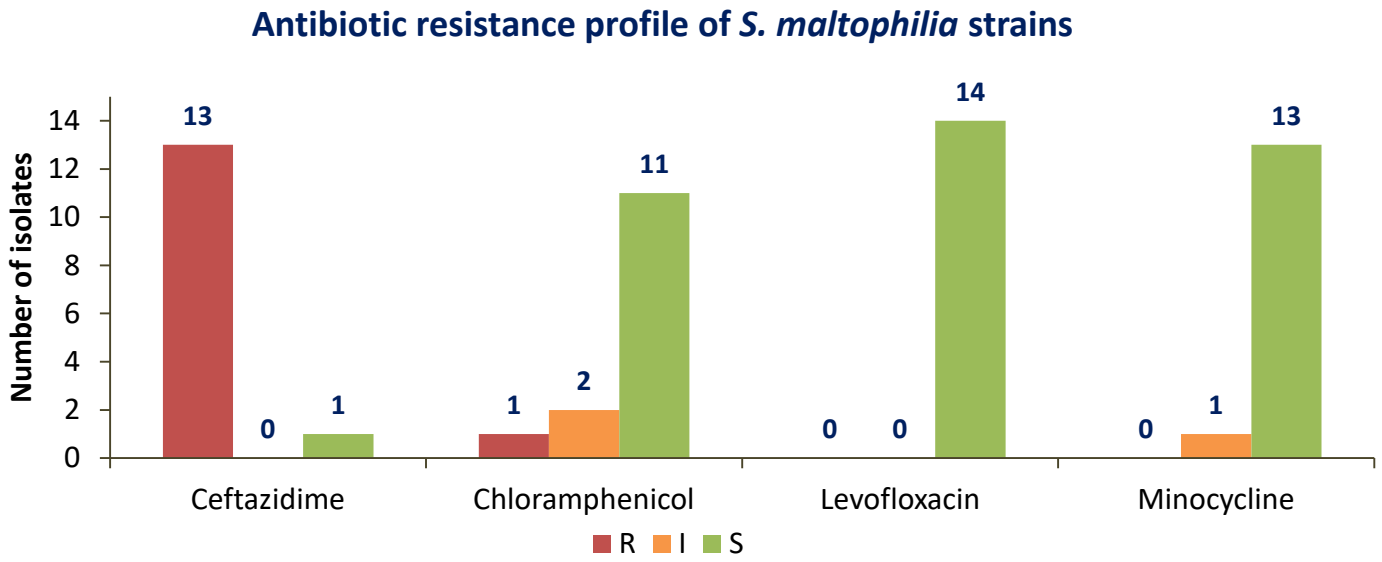


R: Resistant; I: Intermediate resistant; S: Sensitive

S. No.	Isolate ID	Acc. No.	Species (3 No.)	Source
1	**AM1LCF**	OP177701	*S. aureus*	Milk
2	**AM1LG**	OP177699	*S. haemolyticus*	Milk
3	**AM1PCF**	OP177700		Milk
4	**AW1VCT1**	OP164583		Wastewater
5	**DW2LG**	MCC 50923		Wastewater
6	**CW2LA**	MCC 50871	*S. warneri*	Wastewater

		S. aureus	*S. haemolyticus*				*S. warneri*
		AM1LCF	**AM1LG**	**AM1PCF**	**AW1VCT1**	**DW2LG**	**CW2LA**
Cephems	**Cefoxitin**					R	R
Aminoglycosides	**Gentamicin**						
Folate pathway inhibitors	**Trimethoprim**			R	R		
Lincosamides	**Clindamycin**				R		
Macrolactams	**Rifampicin**						
Macrolides	**Erythromycin**					R	R
Nitrofurans	**Nitrofurantoin**			R			
Oxazolidinone	**Linezolid**				R	R	
Penicillins	**Oxacillin**	R	R	R	R	R	
	Penicillin						R
Phenicols	**Chloramphenicol**						
Quinolones	**Ciprofloxacin**				R		
	Moxifloxacin				R		
	Norfloxacin				R		
Tetracyclines	**Doxycycline**						
	Minocycline				I		
	Tetracycline	R	R		R		
Resistance		**2**	**2**	**3**	**8**	**4**	**3**
Intermediate resistance		**0**	**0**	**0**	**1**	**0**	**0**

Antibiotic resistance profile of *Stenotrophomonas maltophilia*

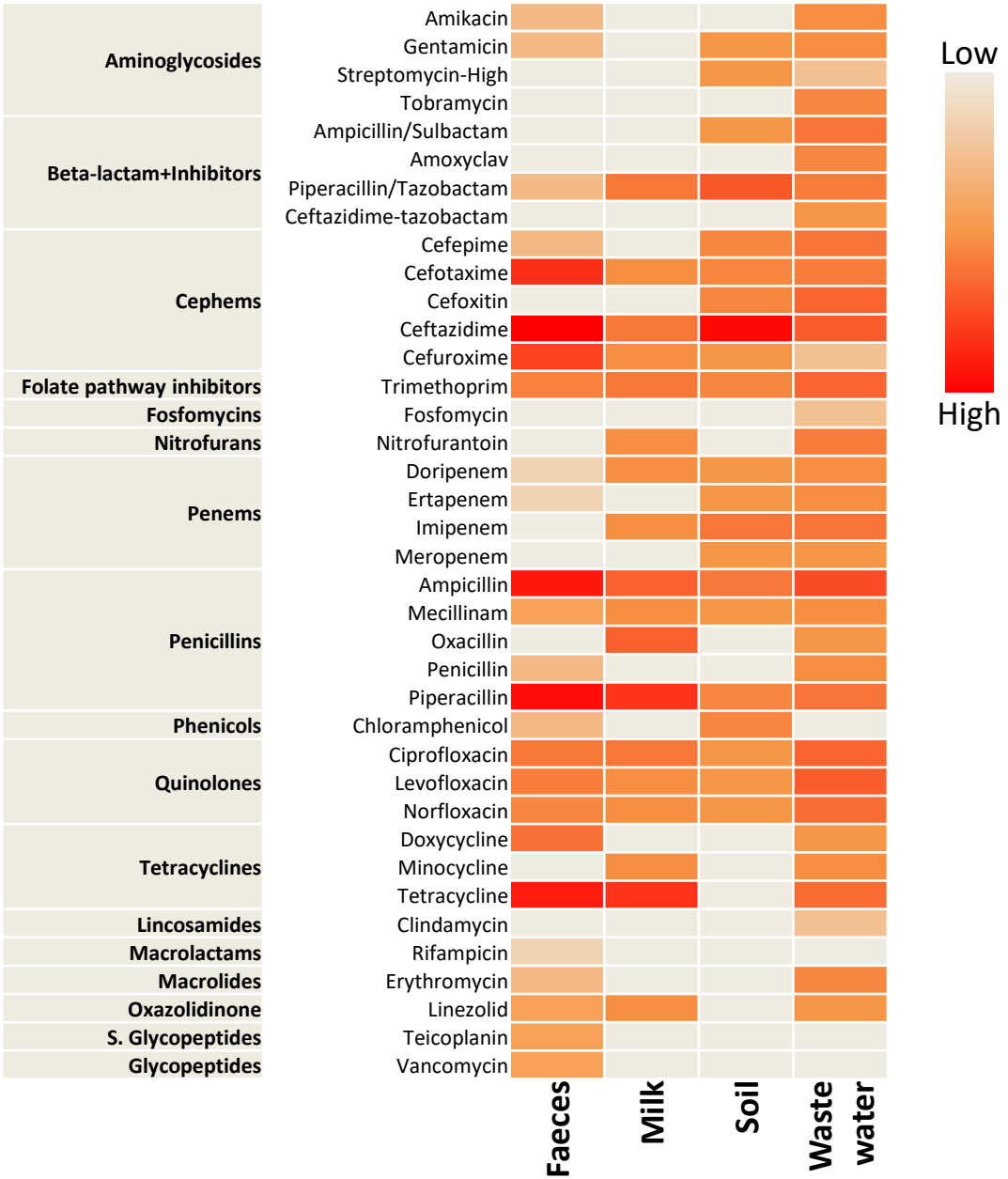


R: Resistant; I: Intermediate resistant; S: Sensitive

		BF1PT	BM1PCI 2	BM1VCF2	BM1VCT2	BM1VD	BM1VG	BS1LA	BS1LCI	BS1PA1	BS1PCT	BS1PD	BS1PT	BS1VD2	CS1VG
Cephems	**Ceftazidime**														
Phenicols	**Chloramphenicol**														
Quinolones	**Levofloxacin**														
Tetracyclines	**Minocycline**														
Resistance		1	1	1	1	1	1	1	1	1	1	1	1	1	1
Intermediate resistance		1	0	0	1	0	1	0	0	0	0	0	0	0	0

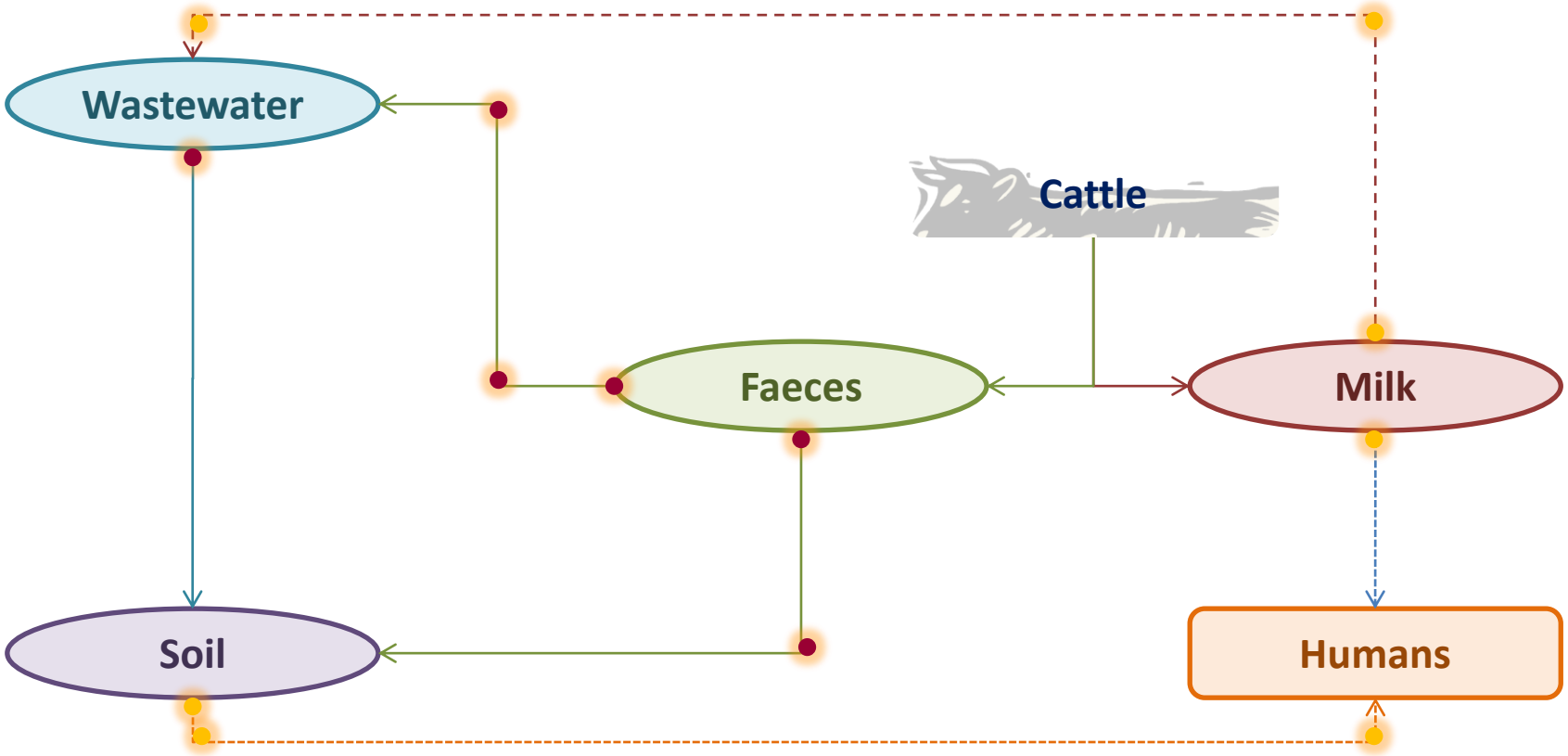
S. No.	Isolate ID	Acc. No.	Species (1 No.)	Source
1	**BF1PT**	MCC 50503	*S. maltophilia*	Faeces
2	**BM1PCI 2**	MCC 50514	*S. maltophilia*	Milk
3	**BM1VCF2**	MCC 50511	*S. maltophilia*	Milk
4	**BM1VCT2**	MCC 50537	*S. maltophilia*	Milk
5	**BM1VD**	MCC 50531	*S. maltophilia*	Milk
6	**BM1VG**	MCC 50536	*S. maltophilia*	Milk
7	**BS1LA**	MCC 50527	*S. maltophilia*	Soil
8	**BS1LCI**	MCC 50501	*S. maltophilia*	Soil
9	**BS1PA1**	MCC 50499	*S. maltophilia*	Soil
10	**BS1PCT**	MCC 50530	*S. maltophilia*	Soil
11	**BS1PD**	MCC 50521	*S. maltophilia*	Soil
12	**BS1PT**	MCC 50541	*S. maltophilia*	Soil
13	**BS1VD2**	MCC 50502	*S. maltophilia*	Soil
14	**CS1VG**	MCC 50857	*S. maltophilia*	Soil

Prevalent and Predominant Antibiotic Resistant Bacteria in Faeces, Milk, Soil and Wastewater



- ✓ **Beta lactam and tetracycline resistant bacteria** were most abundant in organized dairy production system
- ✓ Out of 151 isolates, 63 (**41%**) were identified as **multidrug resistant bacteria**, obtained from faeces (40, 26%), milk (4, 3%), soil (3, 2%) and wastewater (16, 10%)

Summary and Conclusions



In the organized dairy production system, wastewater is the major hotspot of antibiotic resistant bacteria and faeces might be acting as a vector to transfer antibiotic resistant bacteria within the dairy environment

Acknowledgement

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NCCS
National Centre for Cell Science


Thank you