

Supplementary Materials

Table S1. Experimental conditions applied in redox potential (RP) measurements (Reichart et al., 2007; Szakmár et al., 2014; Yakdhane et al., 2024)

Parameter	Value	Description
Detection criterion (DC)	0.5 mV·min ⁻¹	Threshold for time to detection (TTD) determination
Incubation volume	1 mL / 9 mL medium	Final volume: 10 mL per test cell
Evaluated time frame	From start to 10 h after TTD	Cut out the specific shape, including the decline around TTD
Bacterial concentration	6~7 log CFU/mL	The maximum determination level
Temperature	37 °C	Maintained in a thermostatic bath

Table S2. Measuring time required to reach the time-to-detection (TTD) corresponding to an initial inoculum of 1 colony-forming unit (CFU) per test cell, based on redox potential measurements for each bacterial strain.

Bacteria	TTD (h)	Safe detection time (h)	Measuring time (h)
<i>Escherichia coli</i>	13.43	14.86	15
<i>Enterococcus faecalis</i>	15.13	16.7	17
<i>Citrobacter freundii</i>	17.0	18.7	19
<i>Enterobacter aerogenes</i>	12.90	14.25	15
<i>Klebsiella oxytoca</i>	14.26	15.73	16

Table S3. Studied microorganisms and culture media used in the Redox Potential measurements

Microorganisms	Medium selected for RP measurements
<i>Enterococcus faecalis</i>	TSB
<i>Escherichia coli</i>	BBL
<i>Citrobacter freundii</i>	BBL
<i>Enterobacter aerogenes</i>	BBL
<i>Klebsiella oxytoca</i>	BBL

TSB: tryptone soy broth; BBL: brilliant green bile broth.

Table S4. Class-specific performance of classifiers for individual bacterial strains for the discrimination of faecal indicators and coliforms

Class	Strain	Metric	Support vector machine (SVM) (First- order)	SVM (Gompertz)	Linear discriminant analysis (LDA) (First-order)	LDA (Gompertz)	Quadratic discriminant analysis (QDA) (First-order)	QDA (Gompertz)
1	<i>Enterococcus faecalis</i>	Selectivity	0.967	0.960	0.930	0.848	0.989	0.902
		Sensitivity	0.999	0.941	0.972	0.831	0.987	0.886
		F1-score	0.983	0.950	0.950	0.840	0.988	0.894
2	<i>Escherichia coli</i>	Selectivity	0.992	0.902	0.929	0.806	0.992	0.804
		Sensitivity	0.977	0.853	0.947	0.659	0.949	0.717
		F1-score	0.984	0.877	0.938	0.725	0.970	0.758
3	<i>Citrobacter freundii</i>	Selectivity	0.987	0.903	0.785	0.603	0.865	0.699
		Sensitivity	0.856	0.845	0.742	0.588	0.841	0.704
		F1-score	0.917	0.873	0.763	0.595	0.852	0.702
4	<i>Enterobacter aerogenes</i>	Selectivity	0.814	0.790	0.763	0.568	0.797	0.682
		Sensitivity	0.981	0.927	0.747	0.794	0.842	0.816
		F1-score	0.890	0.853	0.755	0.662	0.819	0.743
5	<i>Klebsiella oxytoca</i>	Selectivity	0.952	0.909	0.899	0.873	0.903	0.907
		Sensitivity	0.984	0.948	0.966	0.896	0.965	0.871
		F1-score	0.968	0.928	0.931	0.884	0.933	0.889
Overall accuracy (%)			94.5	89.1	85.2	71.7	90.6	77.9

Selectivity (true negative rate), sensitivity (recall; true positive rate), and F1-score (harmonic mean of precision and recall) were used as class-specific performance metrics.

REFERENCES

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