Evaluating the KU F600 Automated Fecal Analyser for Parasite Detection in a Hong Kong Clinical Laboratory

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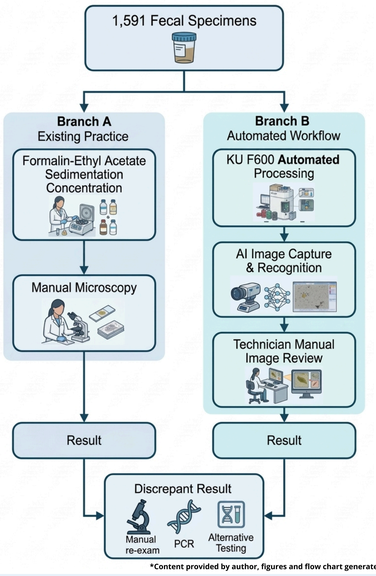
INTRODUCTION

- **The Clinical Bottleneck**: Traditional fecal parasite detection relies on manual microscopy. This workflow is time-consuming, operator-dependent, and highly labor-intensive.
- **The AI Intervention**: The KU F600 (Zhuhai Keyu Biological Engineering Co., Ltd., China) is an automated fecal analyser utilizing integrated digital microscopy and artificial intelligence (AI) image recognition to streamline workflows.
- **Aim of the study**: To evaluate the diagnostic performance and operational feasibility of the KU F600 compared to existing manual microscopy within a high-volume clinical laboratory serving a regional hospital in Hong Kong.

METHODOLOGY

- **Study Period & Volume:** 1,591 clinical fecal specimens received over a 7-month period (October 2025 – May 2026).
- **Study Design**: Parallel processing of all specimens by manual microscopy and KU F600 automated analyzer (with manual image review). Discrepant results were verified by manual re-examination, PCR or other methods.



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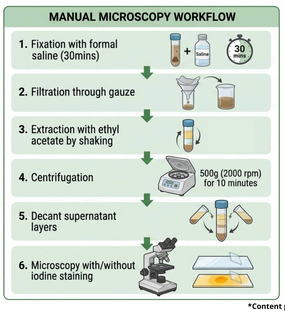
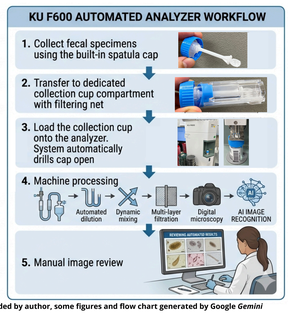
WORKFLOW COMPARISON





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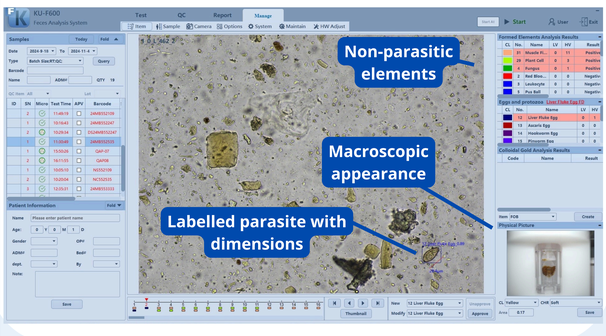
User interface



CONCLUSION

1. The KU F600 Automated Fecal Analyzer demonstrated a clear clinical utility in capturing positive samples bypassed manual microscopy.
2. Use of KU F600 as a screening tool potentially decreases microscope fatigue by technicians, shifting the role of technicians from exhaustive slide scanning to definitive targeted visual verification.
3. Total replacement of human expertise is currently restricted by the high false-alarm rate of the AI model.
4. It offers a pragmatic solution for clinical laboratories in Hong Kong and similar urban hubs with low positive rate seeking to optimize turnaround times, maintain stringent biosafety standards, and address shortages in skilled laboratory labor.

RESULTS

Table 1. Diagnostic Performance Comparison (First-attempt)

	Manual Microscopy Positive	Manual Microscopy Negative	Total
KU F600 Positive	6 (0.38%)	3 (0.19%)	9 (0.57%)
KU F600 Negative	1 (0.06%)	1581 (99.37%)	1582 (99.43%)
Total	7 (0.44%)	1584 (99.56%)	1591 (100%)

Table 2. Comparison of automated analyzer flag-positives and true positives confirmed by image review.

Flagged positive before manual review: n = 467	True positive after manual review: n = 9
Hookworm egg, Liver fluke egg, *Blastocystis Hominis*, Amoeba, *Endolimax Nana*, *Giardia Lamblia*, *Entamoeba coli*, Whipworm egg, *Ascaris* egg, Tapeworm egg etc.	Liver Fluke Egg x 8 *Ascaris* Egg x 1

Table 3. List of the 10 positive samples (discrepant results highlighted)

Sample	Confirmed result	Manual Microscopy (1st attempt)	Manual Microscopy (2nd attempt)	KEYU F600 (Flagged positive before review)	KEYU F600 (After manual review)
1	*Clonorchis* ova	No Ova and Cysts seen	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg
2	*Clonorchis* ova	Clonorchis ova	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg
3	Ascaris lumbricoides ova	No Ova and Cysts seen	*Ascaris lumbricoides* ova	Amoeba, *Ascaris* Egg, *Endolimax Nana*, Liver Fluke Egg	*Ascaris* Egg
4	*Clonorchis* ova	No Ova and Cysts seen	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg
5	*Clonorchis* ova	*Clonorchis* ova	*Clonorchis* ova	Amoeba, *Entamoeba Coli*, Liver Fluke Egg	Liver Fluke Egg
6	*Clonorchis* ova	*Clonorchis* ova	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg
7	*Strongyloides* larvae	*Strongyloides* larvae	*Strongyloides* larvae	No Ova and Cysts seen	No Ova and Cysts seen (Also negative in 2nd attempt)
8	*Clonorchis* ova	*Clonorchis* ova	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg
9	*Clonorchis* ova	*Clonorchis* ova	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg
10	*Clonorchis* ova	*Clonorchis* ova	*Clonorchis* ova	Liver Fluke Egg	Liver Fluke Egg

Table 4. Sensitivity and Specificity

Manual Microscopy	KU F600 (WITHOUT manual review)	KU F600 (WITH manual review)
Sensitivity: 70% Specificity: 100%	Sensitivity: 90% Specificity: 70.5%	Sensitivity: 90% Specificity: 100%

Table 5. Processing Time

Manual Microscopy	KU F600
10 mins hands-on time + 30 mins fixation + 10 mins centrifugation	1 min transfer + loading + 10-15 mins machine processing + 5 mins image review

DISCUSSION

✅ KU F600 fecal analyzer

- Capture parasitic ova and cysts missed by manual microscopy, likely attributable to its systematic image capture.
- Shorter processing time 15-20 mins VS 40 mins.
- Enhanced lab safety: machine-drilled, enclosed processing cap.
- Filtered out 70.5% (1114/1581) of negative samples. Suitable for urban diagnostic landscape characterized by remarkably low positive rate (0.63%) like Hong Kong.
- Reduce microscope fatigue and reserve skilled manpower by shifting the workflow toward an automated screening followed by manual confirmation.

❌ KU F600 fecal analyzer

- Unable to pick up the *Strongyloides* larvae even with repeat testing. A possible explanation would be due to sampling bias in sample with low parasite load.
- May not pick up parasites that was not "taught" to the AI model.
- Direct reporting of KU F600 analyzer results not feasible: large number 467/476 (98.1%) of "false alarms" (e.g. undigested plant fibers or pollen) that require manual review. Further training of the AI model may improve the accuracy.

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