

## Colorimetric Paper Strip Sensor for Detection of Microbial Quality of Raw Milk

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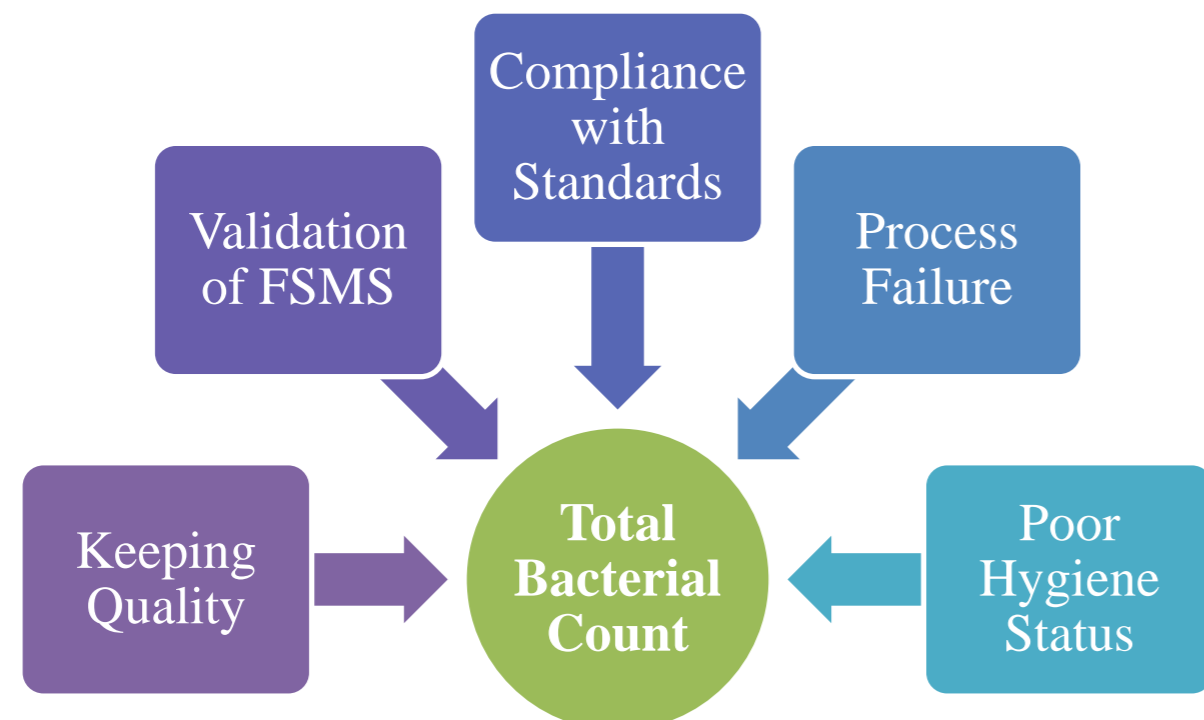
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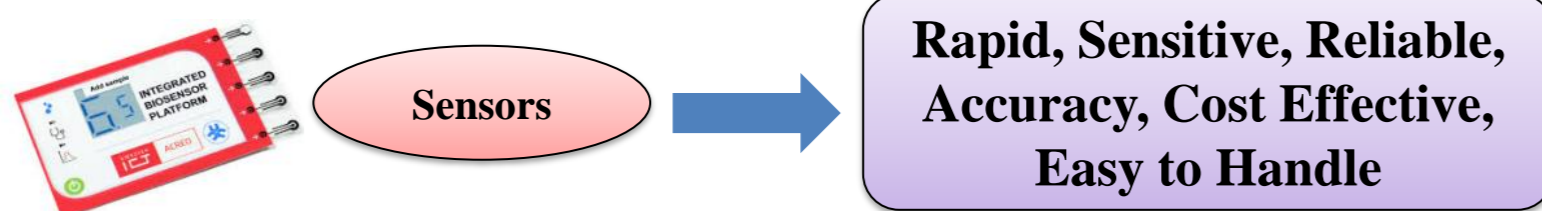
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### INTRODUCTION & AIM

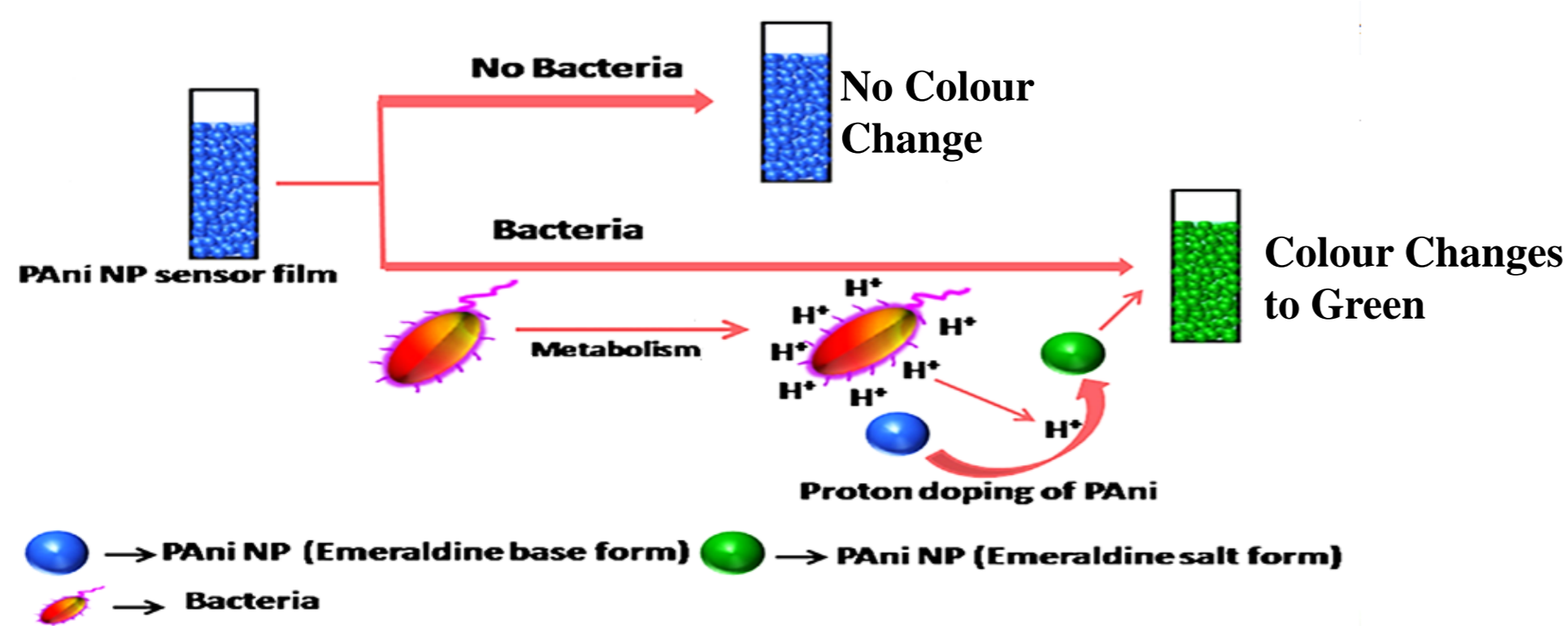
- Assessment of microbial load serves as a useful tool to ensure the quality and safety of milk.
- Total Bacterial Count in Milk - It is the enumeration of aerobic, mesophilic organisms that grow at moderate temperature between 20°C to 35°C.



- Need of the Hour ????

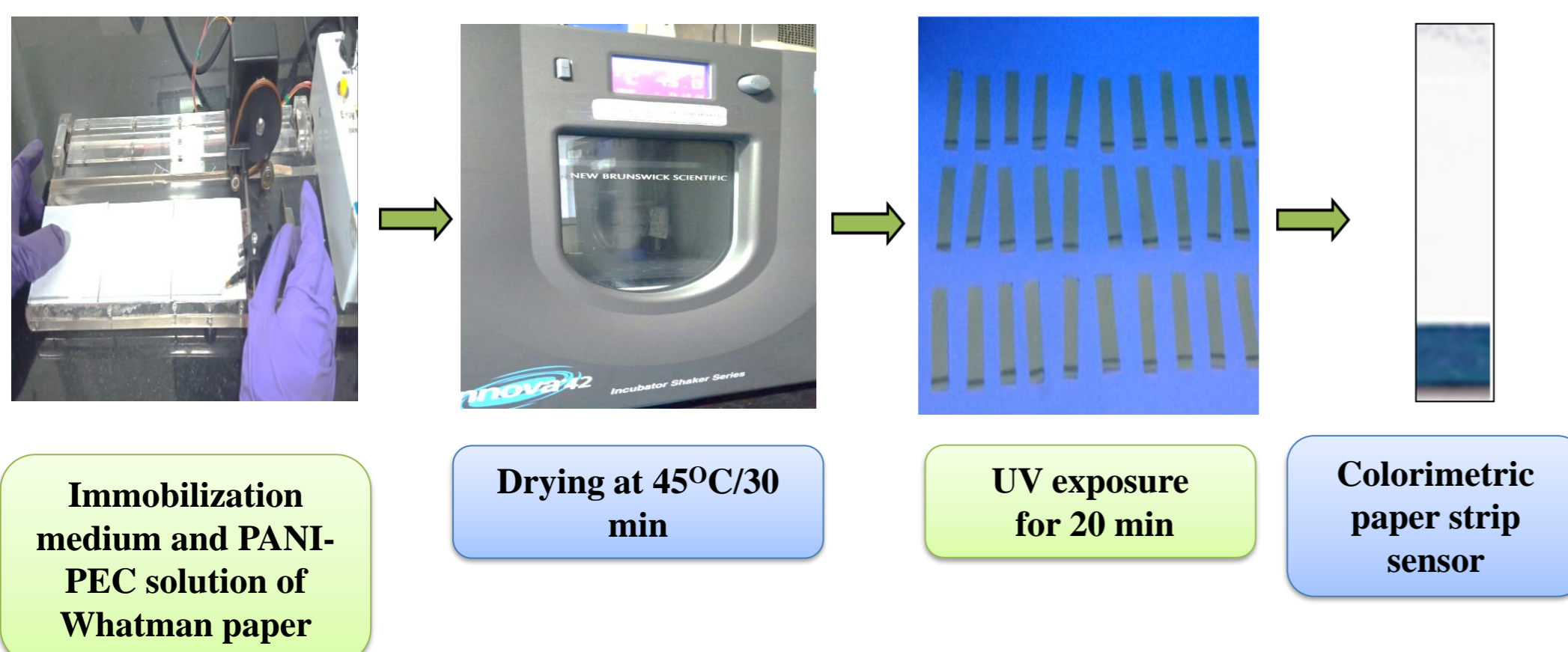


- Principle of Assay

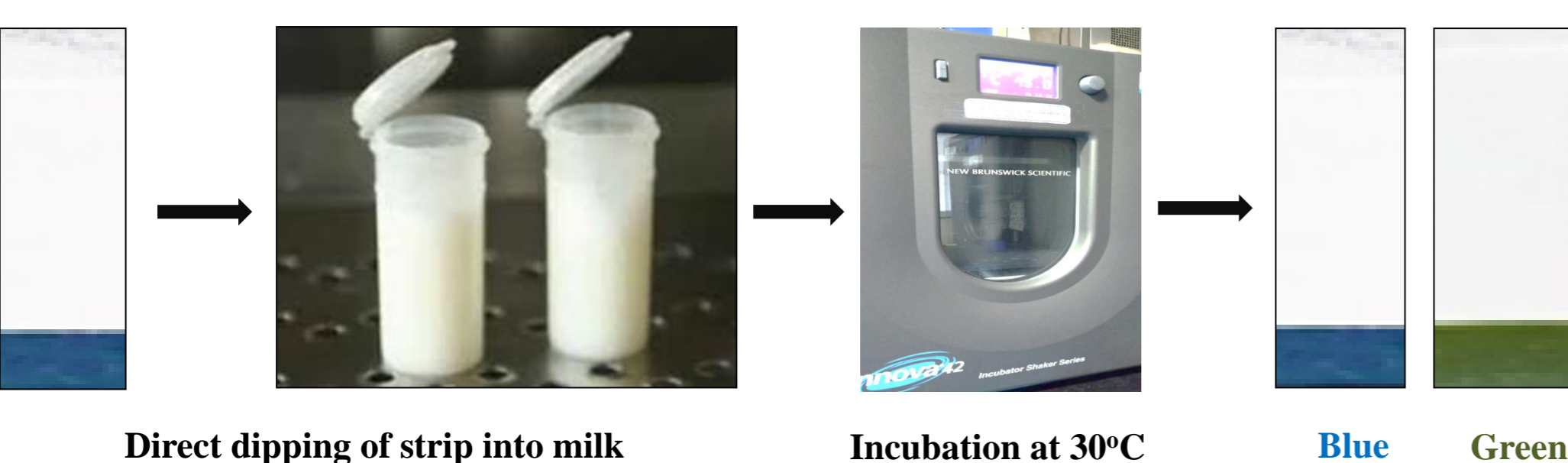


### METHOD

#### 1. Preparation of modified colorimetric paper strip sensor

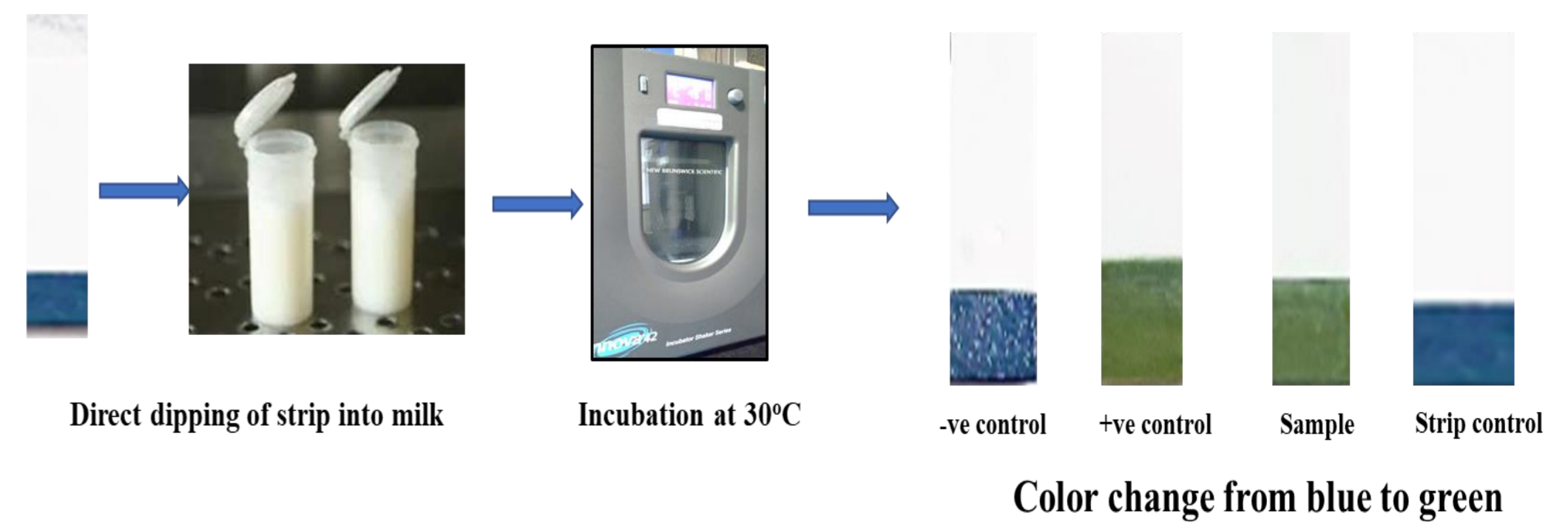


#### 2. Paper strip sensor for raw milk quality evaluation



Blue to green color with in 20 min indicates high bacterial load (~ 10<sup>8</sup> CFU/mL) in raw milk

### RESULTS & DISCUSSION



-Ve Control - Sterilized Milk

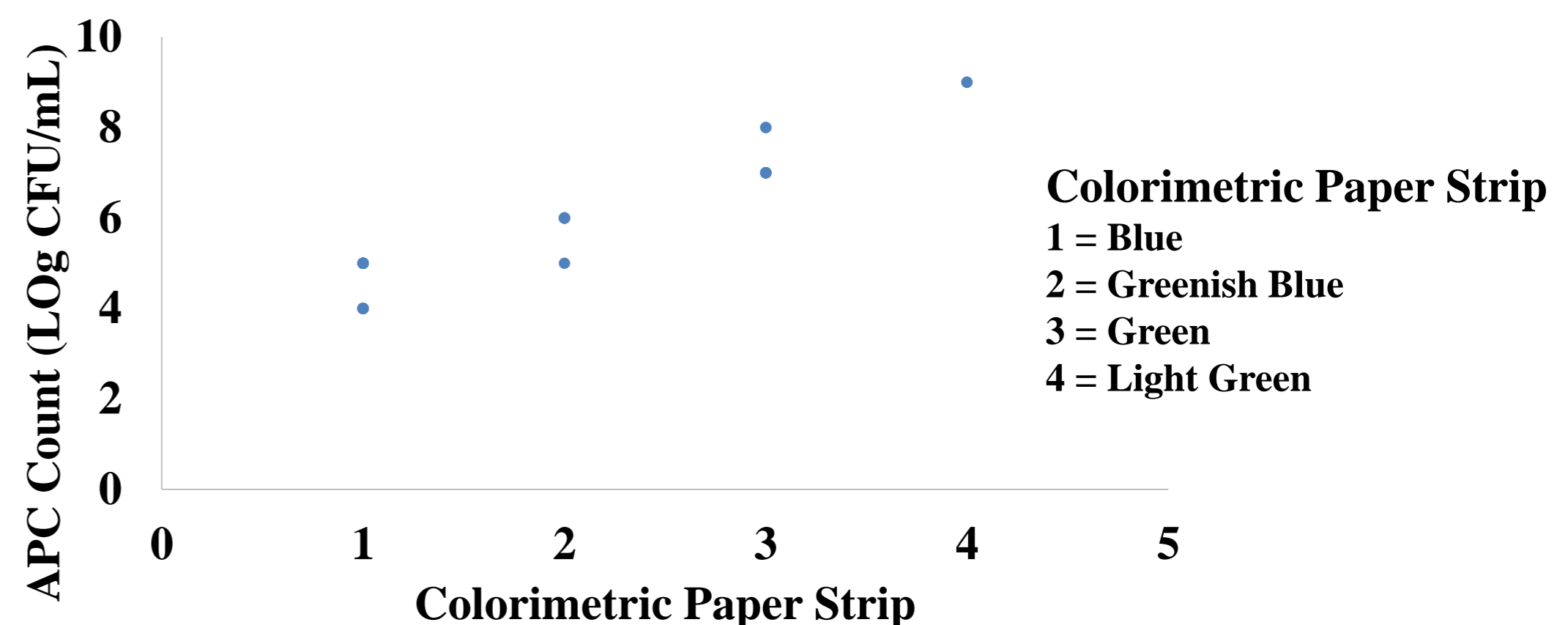
+Ve Control – Spiked Milk Samples

#### Interpretation based on Color Change on Strips

Color	Grading	Aerobic Plate Count (CFU/mL)	MBRT
Blue	Very good	< 10 <sup>5</sup>	5 hours and above
Greenish Blue	Good	10 <sup>5</sup> -10 <sup>6</sup>	2 hours to 5 hours
Green	Fair	10 <sup>7</sup> -10 <sup>8</sup>	30 minutes to 2 hours
Light Green	Poor	> 10 <sup>8</sup>	Less than 30 minutes

Colorimetric paper strip assay can rapidly detects and shows green color on paper strip in milk with higher bacterial counts (≥ 8.0 log CFU/mL) and blue color for 4 log CFU/mL in milk in just 15-20 minutes. Traditional plate count method requires 3 days time incubation at 30°C for detection as per IS/ ISO methods.

#### Colorimetric Paper Strip Vs APC



### CONCLUSION

- This colorimetric paper strip-based sensor offers a sensitive, cost-effective, and user-friendly approach for qualitatively assessing bacterial counts in milk.
- It provides a viable alternative to the conventional plate count method for routine, real-time monitoring of milk's microbiological quality.

### FUTURE WORK / REFERENCES

- Thakur, B., Amarnath, C. A., & Sawant, S. N. (2014). Pectin coated polyaniline nanoparticles for an amperometric glucose biosensor. *RSC Advances*, 4(77), 40917–40923.
- Anjali, M. K., Bharath, G., Rashmi, H. M., Avinash, J., Naresh, K., Raju, P. N., & Raghu, H. V. (2022). Polyaniline-Pectin nanoparticles immobilized paper based colorimetric sensor for detection of Escherichia coli in milk and milk products. *Current Research in Food Science*, 5, 823–834.