11th National Summit of Health and Population Scientists
Nepal Health Research Council (NHRC)

Antibiotic Resistance Profiles of Lactic acid bacteria(LABs) and *Bacillus* spp isolated from traditional fermented foods and beverages in Nepal

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Dr. Shrijana Shakya, PhD Microbiology, Scientist

Poster:
Characterizing the Microbiomes of Nepali Fermented Foods: Implications of the KiKha Microbiome Project for Health, Nutrition, and Food Security

Aashish Gyawali, Research Associate

Currently, he is exploring the genetic diversity and adaptations of populations across the Himalayan range, aiming to uncover unique evolutionary patterns in this region.

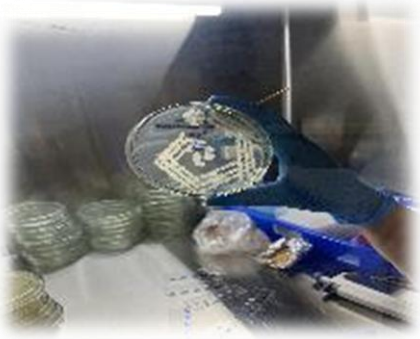
Sandesh Ghimire, Research Associate

Poster:
Antipathogenic Activity of *Bacillus* Species from Nepali Fermented Foods

Arya Gautam, Research Assistant

Oral:
Ecological factors that drive microbial communities in culturally diverse fermented foods

Established scientists and Early career researchers



We are providing opportunities for cutting-edge scientific research to early career researchers and established scientists in Nepal

High school students

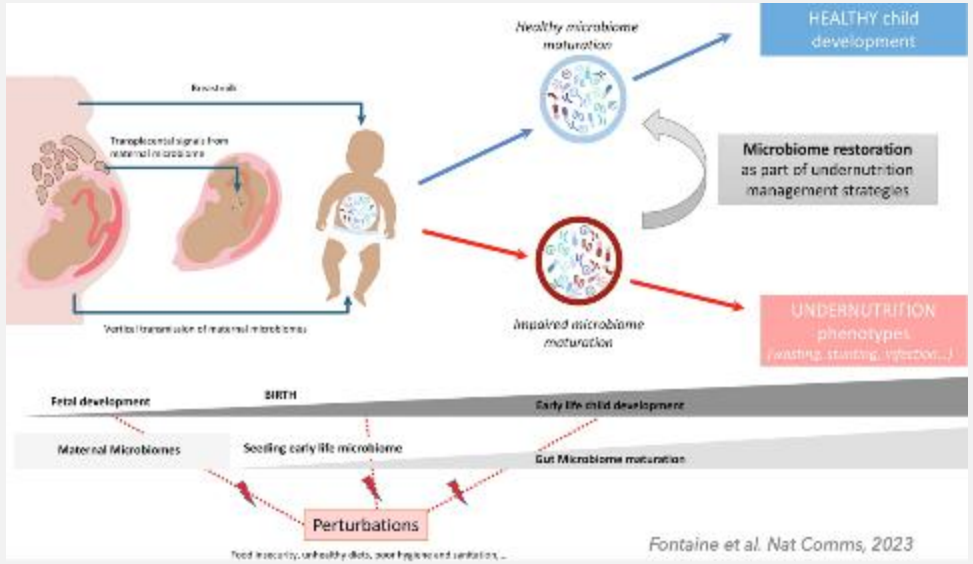
We designed a monthly curriculum for high school students to reinforce STEM education, and trained our program officers (POs) to lead these workshops

Adults in the community (mothers, healthcare workers)

Ongoing projects

"NeMaSiMa"
Nepal Maternal and Infant Gut Microbiome Study

- To understand infant gut microbiome across lifestyles, from pregnancy to 3 years of life

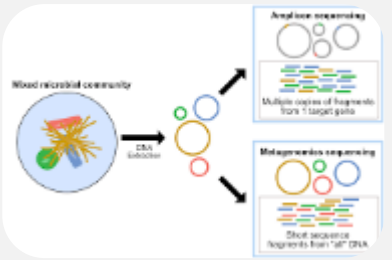


"KiKha 1000"
Nepali Fermented Food Study

- *Ki from "*Fermented" in Limbu, *Kha* from "Khana" in Nepali

Microbial isolation

Metagenomics

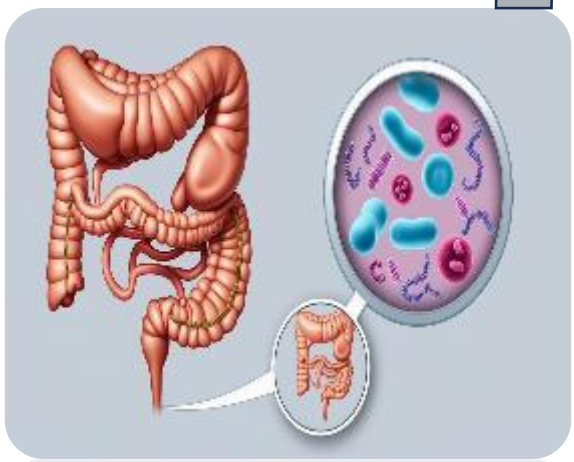


Background

Contain beneficial microorganism such as LAB, *Bacillus*, Yeast

Microbial metabolite

Bioactive and nutritional compounds



However, previous studies have shown that these microorganisms can harbor antibiotic resistance genes (ARGs) and potentially transfer them to commensal bacteria and food-associated pathogens (Mathur & Singh, 2005).

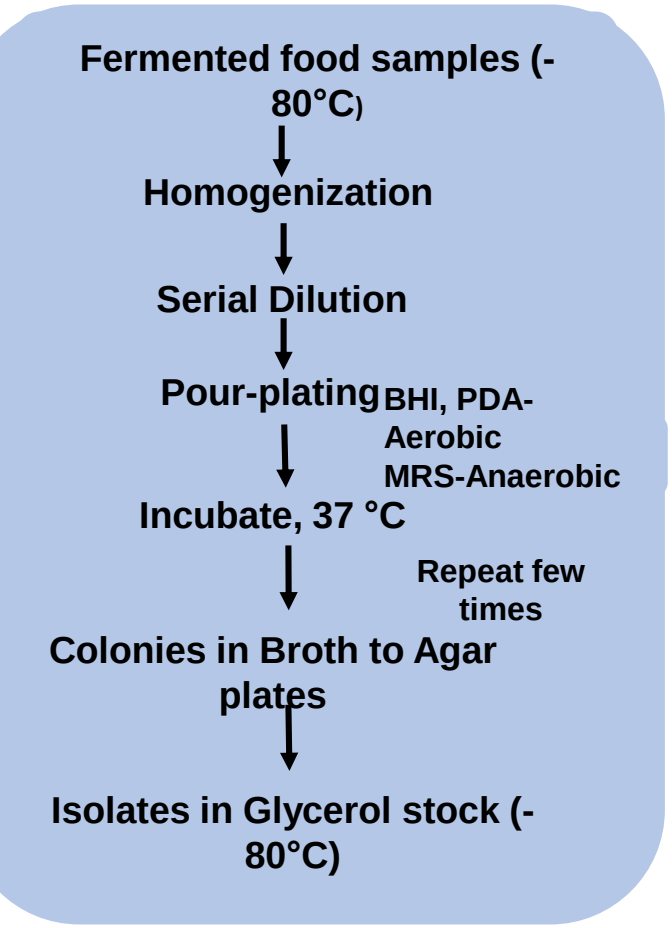
Objectives

Specifics objectives

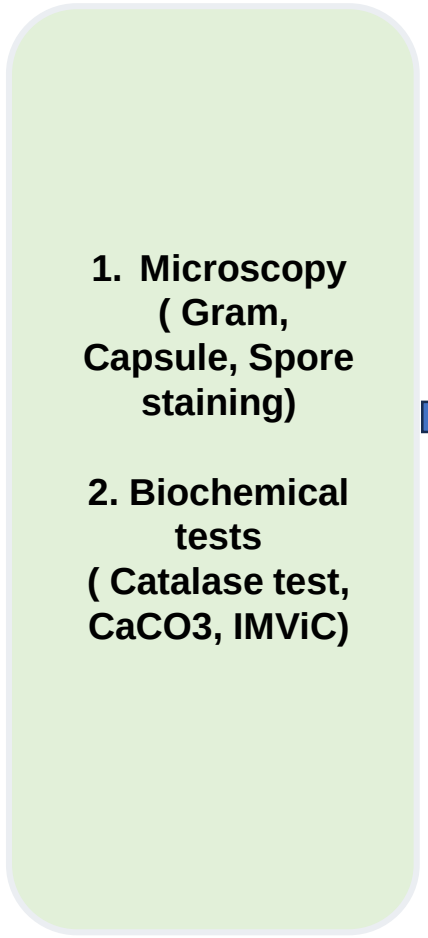
- Shotgun metagenomics sequencing and long-read sequencing to identify microbial community and (ARGs).

- Antibiotic resistance profiles using the Kirby-Bauer disc diffusion method.

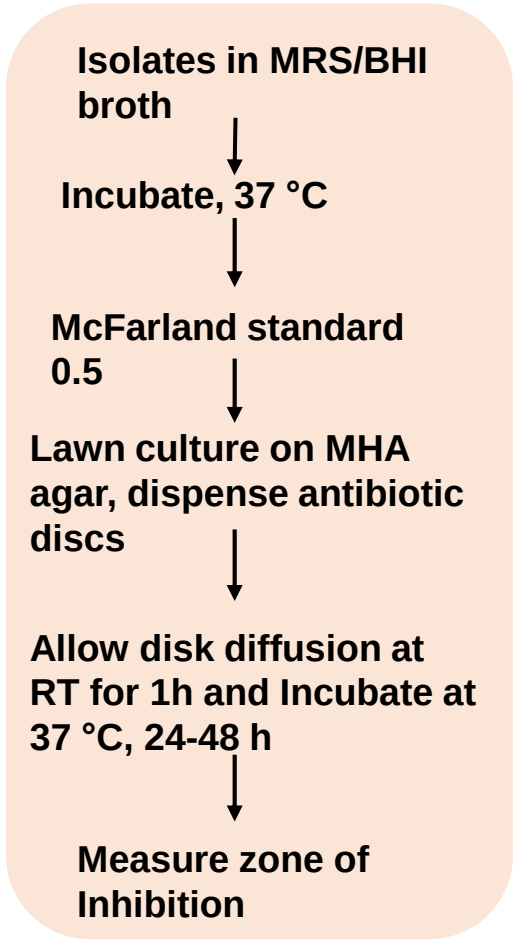
Methodology



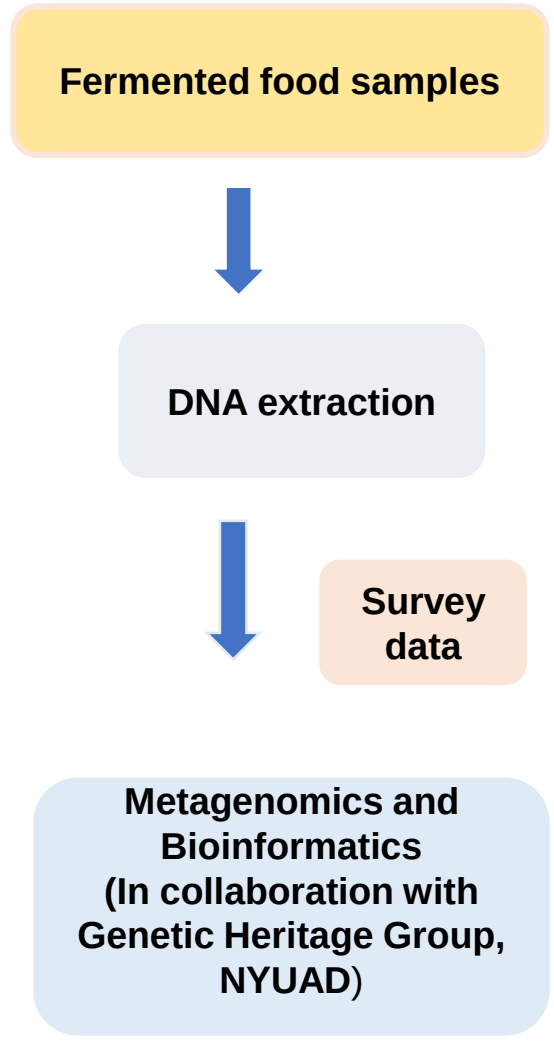
Microbial Isolation



Phenotypic identification



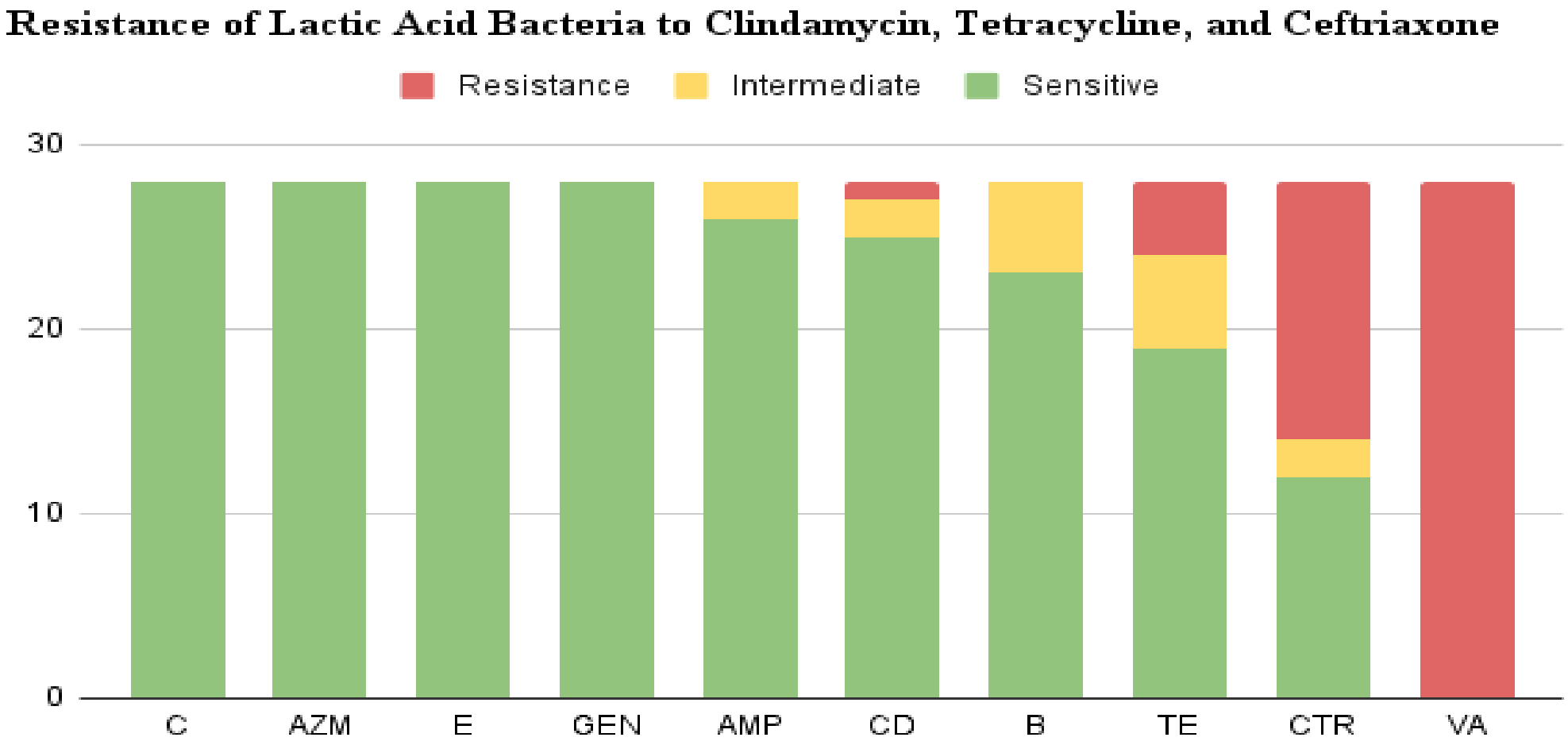
Antibiotic susceptibility Test



Metagenomics Workflow

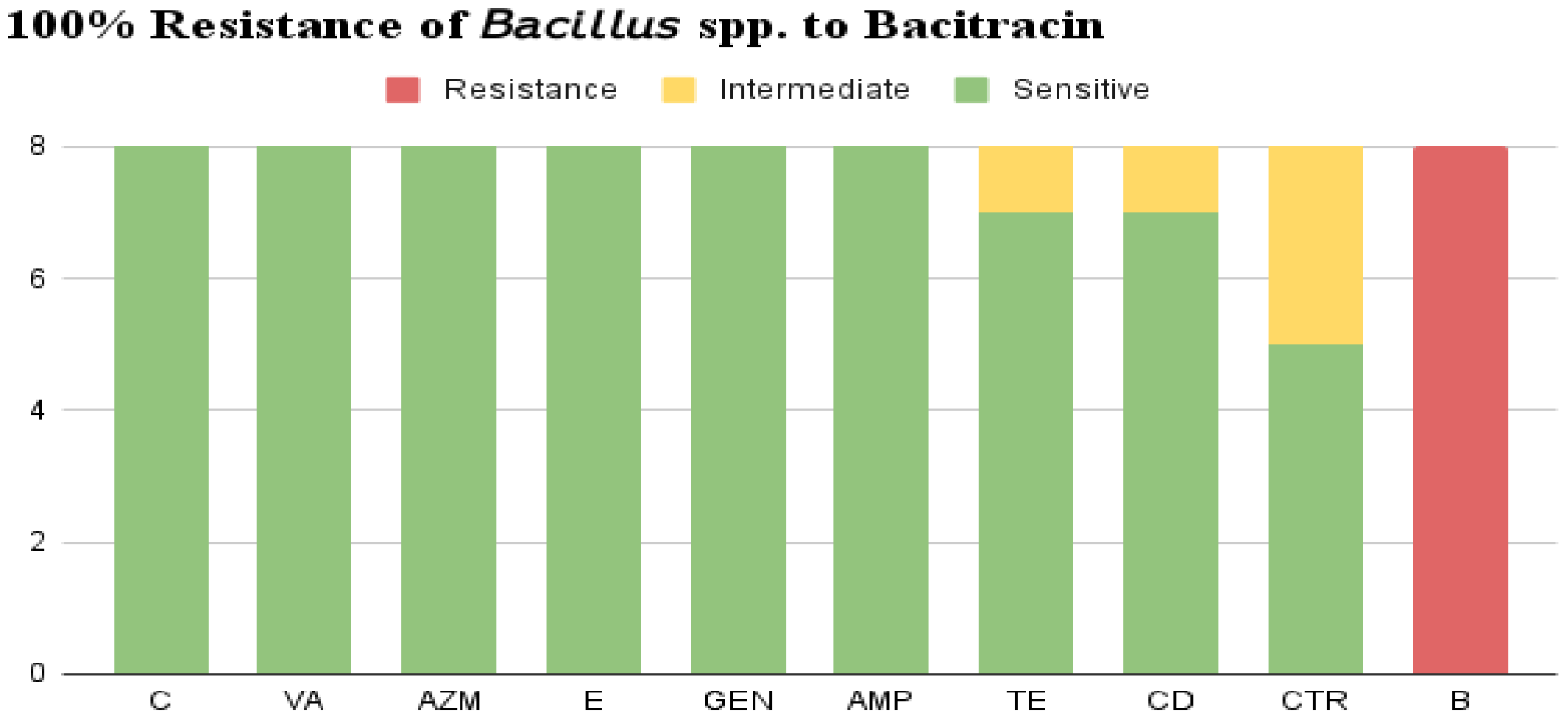
Microbial Isolation Workflow

Result



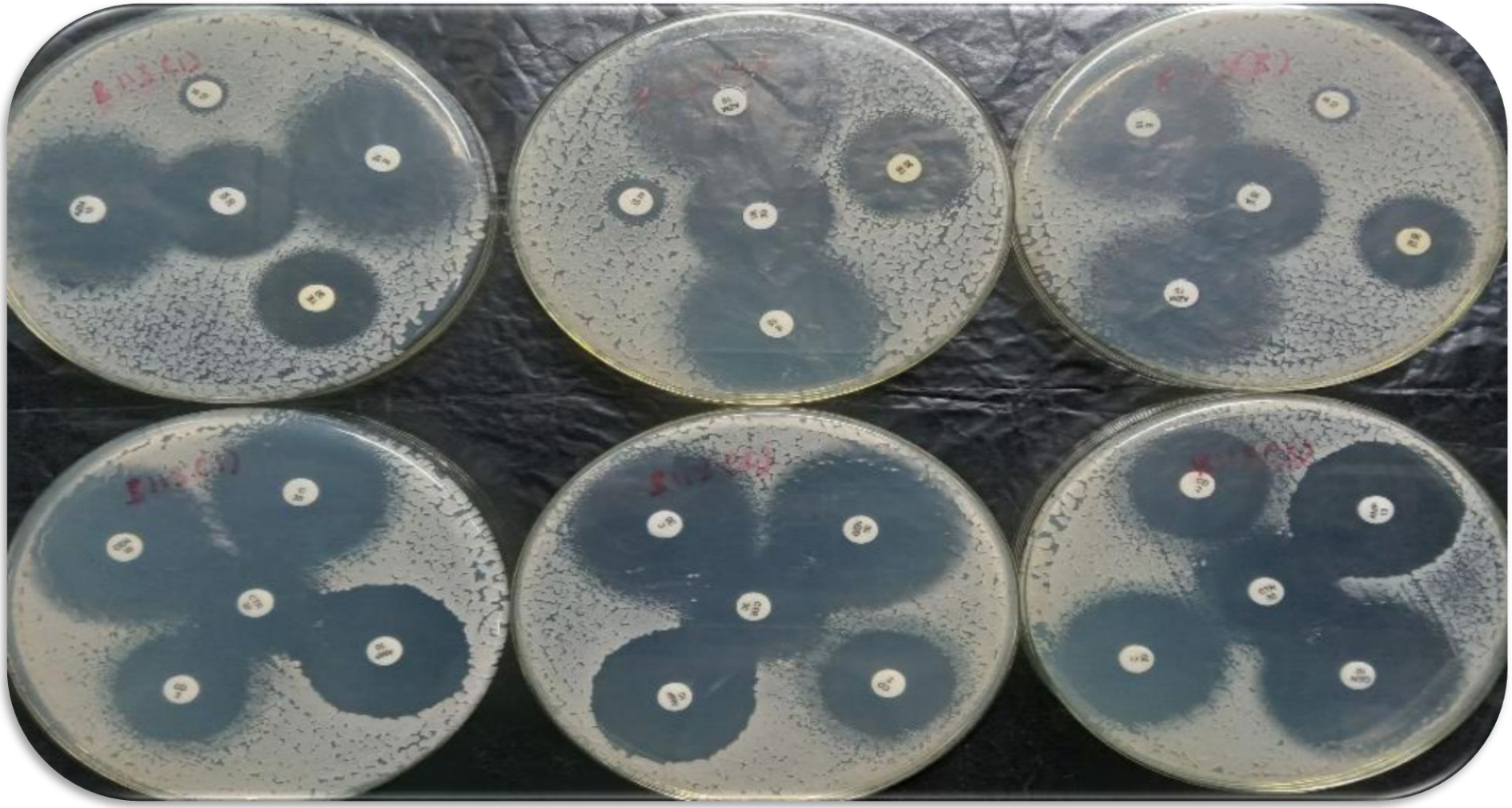
1. Antibiotic susceptibility test of 28 selected lactic Acid Bacteria.

Result



2. Antibiotic susceptibility test of 8 selected *Bacillus* spp.

Result



1. Photograph showing antibiotic resistance test via disk diffusion method for *Bacillus* Spp. (result in triplicate)

Conclusion

- The antibiotics tested are commonly used to treat infections in clinics.

- The observed resistance to clinical antibiotics in naturally existing fermented food microbes underscores the pervasiveness of antimicrobial resistance in Nepal.
- Our results indicate better regulations and safety measures to address antimicrobial resistance are needed in Nepal.

Acknowledgements

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- Dr. Shrijana Shakya, Sabitri Sciences, Bhaktapur, Nepal
- Entire team of Sabitri Sciences Pvt. Ltd.
- Participants for providing valuable sample and survey data

THANK YOU!

Please visit Poster Session:

- **Antipathogenic Activity of *Bacillus* Species from Nepali Fermented Foods: Sandesh Ghimire**
- **Identification Of Probiotic Microbes For Gut Health Restoration Using Metagenomics And Functional Profiling Of Nepali Fermented Foods From The *Kikha* 1000 Project: Shrijana Shakya**

Name: Kusha Gurung
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Kusha Gurung earned her bachelor's degree in Microbiology from Tribhuvan University. Her academic and professional journey is driven by her ambition to become a research scientist in the field of Medical Microbiology. She is currently working as a Research Assistant at Sabitri Sciences, a research institute in Nepal, where her current research focuses on characterizing microbial communities in traditional Nepali fermented foods using a multi-omics approach.