MICROBIAL ANALYSIS OF NATIVE HIMACHALI FOOD PRODUCTS FOR ISOLATION OF BACTERIAL STRAINS

Dissertation submitted in partial fulfillment of the requirement for the degree of

Master of Science

In

Microbiology

By

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Under the supervision

of

Dr. Rahul Shrivastava

To

Department of Biotechnology & Bioinformatics

Jaypee University of Information Technology Waknaghat

Solan- 173234, Himachal Pradesh

DECLARATION

I hereby declare that the work presented in this report entitled "**Microbial Analysis of Native Himachali Food Products for Isolation of Bacterial Strains**" in partial fulfillment of the requirements for the award of the degree of **Master of Science in Microbiology** submitted in the **Department of Biotechnology & Bioinformatics**, Jaypee University of Information Technology, Waknaghat is an authentic record of my own work carried out over a period from July 2024 to May 2025 under the supervision of **Prof. Dr. Rahul Shrivastava** Professor, Department of Biotechnology and Bioinformatics, Jaypee University of Information Technology, Solan, Himachal Pradesh.

I also authenticate that I have carried out the above mentioned project work under the proeficiency stream

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Chinmay Sharma (Enrolment No. 235112002)

This is to certify that the above statement made by the candidate is true to the best of my knowledge.

Prof. Dr. Rahul Shrivastava

Professor

Department of Biotechnology and Bioinformatics

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CERTIFICATE

This is to certify that the work reported in the M.Sc. Microbiology thesis entitled "**Microbial Analysis of Native Himachali Food Products for Isolation of Bacterial Strains**" which is being submitted by **Chinmay Sharma (235112002)** in fulfillment for the award of Masters of Science in Microbiology by the Jaypee University of Information Technology, is the record of candidate's own work carried out by her under my supervision. This work is original and has not been submitted partially or fully anywhere else for any other degree or diploma.

Prof. Dr. Rahul Shrivastava
Professor

Department of Biotechnology and Bioinformatics

Jaypee University of Information Technology

Place: Solan, Himachal Pradesh

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Last but not least I would like to thank my Parents whose unwavering love and support provided a constant source of strength throughout this journey.

Thank you all !

Chinmay Sharma

235112002

Table of Contents

List Of Abbreviation

E. coli	*Escherichia coli*
B. subtilis	*Bacillus subtilis*
M. smegmatis	*Mycobacterium smegmatis*
g	Gram
mg	Milligram
℃	Degree Celcicus
µl	Microliter
ml	Mililiter
EPub	Electronic Publication
DOI	Digital object identifier
OJS	Open Journal System
APC	Article Processing Charges
PDF	print-compatible
FTP	File Transfer Protocol

List of figures

List of Tables

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Abstract

Microbial investigation of traditional Himachali cuisines such as Siddu and Lugri is essential to understand the sorts of microorganisms found in these foods. These meals are an important part of Himachal Pradesh's culture, and their preparation frequently includes fermentation, which can promote the growth of specific microbial populations. The goal of this study was to identify the bacteria present in these meals and investigate their potential roles in food preservation, fermentation, and safety. We gathered Siddu samples from local households and food merchants in Himachal Pradesh. The samples were tested in the lab using serial dilution and plating techniques to cultivate bacteria. The bacterial strains were then studied for their structure, behavior, and genetic makeup, with bacterial species being identified using the 16S rRNA gene sequencing. Our early findings revealed a wide range of bacterial species, with Lactobacillus, Bifidobacterium, and Enterococcus being the most prevalent. These bacteria are recognized to have beneficial benefits, including as aiding in fermentation and possibly influencing the flavor and texture of foods. The presence of Lactobacillus shows that fermenting Siddu and Lugri may provide some health benefits. We also discovered that dangerous germs such as Salmonella and Escherichia coli were at extremely low concentrations, indicating that these foods are normally safe if properly prepared and kept. According to this study, traditional Himachali diets are abundant in healthy microorganisms. These results create the possibility of employing indigenous bacterial strains to improve the meals' safety, quality, and shelf life. The health advantages of these strains could be the subject of future studies, which could improve the nutritional content of Himachali food items.

Keywords: Siddu, Lugri, Himachali cuisine, fermentation, Lactobacillus, 16SrRNA sequencing, food microbiology, indigenous bacteria.

CHAPTER 1

INTRODUCTION

1.1 IntroductIon

The Indian Himalayan state of Himachal Pradesh is famous for its delicious and authentic sssof many unique foods. They are recognized for their special preparation methods their scrumptious taste, and high nutritional value. Their ingredients are grains, pulses, and other food products that are grown close to home representing the local agricultural supplied and cooking traditions. The people of Himachal Pradesh, have a special place in their heart for Siddu and Lugri. Over the years, Siddu and Lugri have been passed on from generation to generation. Despite their prominence and role in traditional diets, little is known about the types of microbes present in these foods. As stated previously in food preparation the role of microorganisms, including bacteria, in aspects such as fermentation, preservation, and flavour, are of utmost importance. In studying the microbes isolated from Siddu and Lugri we can learn about the types of bacteria present and their implications for the safety, flavour, and quality of these foods. These bacteria may provide health benefits through probiotic properties or through their role in the natural preservation of foods. This study aims to investigate and gain an understanding of the microorganisms associated with Lugri and Siddu. Our objective is to isolate and characterize the bacteria from these foods with microbial techniques that meet modern standards. A primary goal is to understand how some microorganisms function during food preparation, their potential functional properties, and, possibly, potential applications to improve food safety, extend shelf life, and increase the nutrition of these traditional foods. This study intends to improve our understanding of the microbial diversity presented by Himachali cuisine. Also, this discovery may provide entirely new uses for these bacteria in the field of biotechnology that can lead to improvements in food preservations, probiotic production, and food quality improvements. Ultimately, the findings of the research will help to preserve traditional eating practices and provide innovative ideas to make food in Himachal, and anywhere else, more sustainable and nutritional.

Aims and objective

At JUIT, Solan

a) Aim

- To analyze the microbes in traditional Himachali food products and isolate different types of bacteria, to understand their role in food safety, fermentation, and health benefits.

b) Objectives:

- To collect and examine samples of native Himachali foods for microbial analysis.
- To isolate bacterial strains from these food products using standard microbiological methods.
- To identify the isolated bacteria using basic tests and advanced techniques.
- To determine the variety and frequency of bacteria in different food products.
- To explore the role of these bacteria in food preservation and health benefits.
- To assess the safety and quality of Himachali foods based on the bacterial strains found.

Worked as an Editorial Assistant at EPub Publication, assisting in proofreading, formatting, and coordinating academic manuscripts.

CHAPTER 2

REVIEW OF LITERATURE

2. Review of Literature

Microbiologists found there to be supporting microflora or flora in healthy people's gastrointestinal (GI) tracts that differentiated for ill individuals in the late nineteenth century. These microflora are known to create a healthy human habitat, also referred to as probiotics (meaning "for life") [5]. The term probiotics, itself literally means "live microbial feed supplement which will benefit the host by improving microbial balance"[7]. Probiotic bacteria can produce a variety of substances, like organic acids (acetic acid and lactic acid), reuterin, and bacteriocin. Organic acids not only acidify or reduce the pH to below 7, but also will include the growth of certain pathogenic microorganisms [10]. As such, this microbial investigation into local Himachali food products, including siddu and lugri, reveals that they are the product of complicated and unique fermentation processes. These meals are not only culturally significant in Himachal Pradesh, but also provide numerous nutritional and physiological benefits. The following expanded sections go deeply into the microbial diversity, fermentation properties, health benefits, and cultural importance of these traditional meals. The majority of microorganisms used as probiotics are Lactic acid bacteria (LAB) and Bifidobacterium. In recent decades, there has been wide-ranging research into Lactic acid bacteria (LAB), with respect to their possible effects on human health that make them produce a good microflora of the gastrointestinal tract (GIT) and their general classification as non-pathogenic. The Lactobacillus species, in particular, has been the most widely used type of microorganism, proven as a potential probiotic.

Microbial Diversity in Siddu and Lugri

The fermentation of siddu and lugri is a complex process involving a wide variety of microbes contributing to food texture, flavor and shelf life. The variety and diversity of the microbial community associated with these and other traditional food products contribute significantly to their unique properties.

Dominant microorganisms:

The fermentation of siddu and lugri includes a diversity of bacterial and yeast species, with *Saccharomyces cerevisiae*, *Lactobacillus*, and *Leuconostoc* being the most common.

Saccharomyces cerevisiae:

This yeast is critical in the fermentation of dough in siddu and lugri. It ferments sugars in the dough and releases carbon dioxide and ethanol, which will leaven the dough and help give it a light, airy texture. The carbon dioxide production also leads to the dough rising, which is a required step in giving siddu fluffiness.

Lactobacillus species:

Lactic acid bacteria, like Lactobacillus species, are important in the formation of lactic acid during fermentation. Lactic acid contributes to the souring of food and acts as a preservative by lowering pH and inhibiting the growth of harmful microbes. The Lactobacillus adds shelf stability and safety to siddu and lugri.

Leuconostoc species:

Leuconostoc species also produce lactic acid like Lactobacillus and participate in the fermentation process. In addition to lactic acid, they also produce carbon dioxide, which contributes to the fermentation process and the meals' unique texture and flavor.

Starter Cultures:

Siddu and lugri are fermented using traditional starter cultures such as Phab and Treh. Starter cultures contain naturally existing microorganisms that have been passed down for generations from family members and all play an important role in the fermentation process.

Phab:

Phab is an originally indigenous starter culture in Himachal Pradesh, primarily for siddu. It is a consortium of microorganisms, including yeasts and bacteria, that kick starts the fermentation of the dough. Phab enhances the flavor, texture and quality of siddu, because it ensures that the fermentation process follows a consistent path of fermentation and ensures that there are chain assemblages of specialized microbial communities that are unique to the production of these foods.

Treh:

Treh is a traditional starter culture used for fermenting lugri (a type of Himachali bread). Just like Phab, Treh incorporates a wide variety of microorganisms to accomplish the fermentation process. Using such starter cultures contributes to microbial diversity and ensures a flavor

profile that can be retrofitted with the traditional flavor of Himachali cuisine. The fermentation of siddu and lugri is generated through these starter microorganisms and builds complex flavors and textures that are found in the dishes. The interacting microbe complex during the fermentation process is important for the flavors and preservation characteristics of siddu and lugri.

Health Benefits and Probiotic Potential

Fermented foods and beverages like siddu and lugari contain friendly microbes that can contribute to a favorable flavor and texture to the final product, and possibly offer health benefits. The lactic acid bacteria (LAB) from fermented foods, including lactobacillus and leuconostoc, are specified to have probiotic potential.

Probiotic Properties

Probiotic bacteria, specifically lactic acid bacteria (LAB), are known to promote gut health by finishing the microbiota in the digestive tract. Numerous studies have shown that LAB strains from siddu and lugri possessed antibacterial activity against common infections. This information suggests they have the potential to serve as natural preservatives and promote digestive health.

Gut Health:

LAB can assist with digestion and restore gut microbiota homeostasis after it may be disrupted by antibiotics or poor dietary habits. Immunity enhancement: Some LAB strains may enhance the immune system to combat dangerous diseases.

Antimicrobial Properties:

LAB's antimicrobial action can help limit the growth of foodborne bacteria, making these foods safer to consume.

Nutritional Value:

Siddu and lugri, in addition to their probiotic effects, contain vital nutrients. As such, they are important components of the regional diets of Himachal Pradesh's rural community. Generally, fermented foods are more nutritious than their counterparts because of the following reasons:

Increased Nutrient Availability:

Rotting decomposes complex molecules, including phytic acid, which can inhibit mineral absorption like iron, zinc and calcium. Hence, fermented foods usually contain higher bioaccessible nutrients.

Protein Digestion:

Fermentation also degrades proteins, making them more digestible and nutritionally valuable.

Improved Digestibility:

The contribution of beneficial microorganisms improves carbohydrate and protein digestibility, subsequently increasing the bioavailability of important nutrients. Siddu and lugri provide a consistent source of carbohydrates, proteins, vitamins, and minerals for the rural population of Himachal Pradesh, thereby providing a nutritious and balanced diet.

Cultural Significance

Siddu and lugri are not just food or dishes, but a part of the culture of Himachal Pradesh, usually served in different festivities, marriages, and family functions. These typical items express hospitality, a sense of togetherness, and a cultural legacy.

Culinary traditions:

Siddu: Siddu, a sort of steamed bread, is historically made for festivals such as Dussehra, Diwali, and other local festivities. The dough is loaded with spices, herbs, and occasionally even meat, resulting in a tasty and festive feast.

Lugri:

Lugri is a fermented flatbread often prepared for special events and meals. It is typically eaten with veggies, dals, or yogurt. Lugri is significant in social gatherings, where preparation and consumption of lugri as part of a meal during celebrations is a communal expression of enjoyment, and lugri is invariably prepared for a variety of rites and rituals, and is culture, or custom, bound. For example, siddu is regularly served to guests at important events, and in the context of Himachali society, the significance of hospitality is in the spirit of the udasi.

Challenges and Modern Impacts:

Though the microbial diversity of siddu and lugri contributes to their unique flavor and health benefits, today’s food production practices may limit the traditional fermentation processes. Industrial food processing often includes commercial yeast and relies on uniform fermentation procedures that may eliminate the unique microbial diversity in a traditionally fermented food.

Microbial Diversity Loss:

Industrial practices may reduce the number of Indigenous microbial species, reducing the distinctive properties of siddu and lugri. This loss may result in changes in flavor, texture, and even the health advantages connected with these foods.

Challenges and Modern Impacts

The microbial profile of siddu and lugri contributes to their unique taste and health benefits, however, modern food processing methods can often impede authentic fermentation processes. Industrial processing methods usually involve the use of commercial yeast, and standardized fermentation conditions, which can significantly reduce the naturally-occurring microbial diversity found in traditionally fermented foods as microbila diversity promotes a more complex flavour ingredient.

Microbial Diversity Loss:

Industrial methods may be reducing the species of Indigenous microorganisms, which may in turn reduce the unique characteristics of siddu and lugri's characteristics, resulting in loss of taste, texture and health benefits associated with the foods.

Health Benefits:

Today's food processing methods may also impact the probiotic potential of certain foods. As beneficial bacteria may not survive pasteurization or other processing techniques applied for bulk mass production, the health benefits of these foods are diminished.

CHAPTER 3

Materials and methods

3.1 Materials

3.1.1 Microbial Strains:

Table 1: Microbial Strains

Strain	**Sources**
E. coli DH5α	IMTECH (Institute of Microbial Technology), Chandigarh, India
Bacillus subtilis	IMTECH (Institute of Microbial Technology), Chandigarh, India
Mycobacterium smegmatis MC^2155	Central Drug Research Institute (CDRI), Lucknow, India

3.1.2 Media:

Table 2: Media

Nutrient Broth	HIMEDIA
Nutrient Agar	HIMEDIA
Luria Broth	HIMEDIA

3.1.3 Chemicals:

Gram's Iodine	HIMEDIA
Lactophenol Cotton Blue	Loba Chemie
Crystal Violet	Loba Chemie
Safranin	HIMEDIA
Methylene Blue	Fisher Scientific
Basic Fuschin	HIMEDIA
Tween80	SRL
Agrose	HIMEDIA
Nacl	HIMEDIA
Chloroform	SRL

Table 3: Chemical

3.1.4 Instruments:

Table 4: Instruments

Autoclave	REFLITECH
Incubator shaker	Macflow Engineering
pH meter	Eutech
Centrifuge	Eppendorf
Light Microscope	OLYMPUS
Incubator	Thermo Scintific
Weighing Balance	Citizon
Laminar Air Flow	Rescholar
Vortex mixer	REMI
Water Bath	NSW INDIA
4°C storage	Allied Frost
-20°C storage	Blue Star
Biochemical kit	HilmVic

3.2

Method

3.2.1 Different microbiological techniques

3.2.1.1 Simple Streaking

1. The nutrient agar petri plate was appropriately labeled with the microorganism name and date.
2. The inoculation loop was sterilized using the flame of a Bunsen burner.
3. Once the loop had cooled down, an individual colony was selected from the cultured plate.
4. The loop was gently pulled across the nutritional agar plate in a zig-zag pattern.
5. The loop was again sterilized until it turned red hot.
6. The plates were inverted and incubated at 37°C for 24 hours.

3.2.1. 2 Quadrant Streaks

1. The nutrient agar petri plate was appropriately labeled with the microorganism name and date.
2. The inoculation loop was sterilized using the flame of a Bunsen burner.
3. When the loop cooled, it picked up an isolated colony from the cultivated plate.
4. A smear was made on one end of the plate.
5. Waving the inoculum back and forth, spread it evenly around the first quadrant.
6. The loop was sterilized again.
7. Rotate the plate 90 degrees and start new streaks from the end of the preceding one.
8. The same procedure was followed three more times.

3.2.1.3 Gram staining.

1. A grease-free and clean slide was taken.
2. Apply one drop of normal saline to the slide and prepare a smear with a complete loop of sample.
3. The slide was left to air dry and then carefully attached with heat.
4. Pour crystal violet dye onto the slide, let it sit for 30 seconds to 1 minute, then rinse with water.

5. Pour Gram's iodine mordant dye on the slide for 1 minute, then rinse again.
6. After washing with 95% alcohol for 10-20 seconds, the slide was washed with water.
7. Pour counterstain safranin dye for 40 seconds, then wash with tap water.

3.2.1.4 Ziehl-Neelsen staining.

1. A grease-free and clean slide was taken.
2. Place one drop of normal saline in the center of the slide and prepare a smear with a full loop of sample.
3. Heat was used properly to repair the slide.
4. After drying, the slide was saturated with carbol fuschin and placed on a hotplate for 5 minutes.
5. The slide was cleaned with decolorizer (3% HCl in 96% ethanol) and rinsed with water.
6. The cell was counterstained with Methylene Blue for approximately 45 seconds.
7. The slide was washed with water.
8. The slide was let to air dry.
9. The slide was examined under a light microscope.

3.2.1.5 Isolation of microorganisms from soil samples

1. A soil sample was gathered from the JUIT campus using a sterile container.
2. Each Eppendorf tube was filled with 900µl of Luria broth.
3. A 100ul soil sample was obtained from the neat sample and placed into one of the tubes. 4.All tubes were serially diluted, for example: Neat ,10^{-1}, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6}, 10-^{7}, 10^{-8},10^{-9},10^{-10}.
4. 100µl of diluted material from each tube, including the neat sample, was put on nutrient agar plates separately.
5. Plates were incubated at 37°C for 24 hours.
6. After 24 hours, the colonies on each plate were counted, and the CFU (Colony Forming Units) was determined.

3.2.1.6 Serial Dilution Procedure for *E. coli:*

1. *E. coli* culture was obtained and transferred to a sterile container.
2. Fill each Eppendorf tube with 900 µL of Luria broth or sterile saline.

3. To make the tidy sample, 100 µL of the *E. coli* culture was put to one of the diluent-containing tubes.
4. After that the culture was serially diluted across multiple tubes, labeled as Neat, 10^{-1}, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}, and 10^{-10}.
5.
6. 100 µL of diluted material from each tube, including the neat sample, was plated on separate nutritional agar plates.
7. Plates were incubated at 37°C for 18-24 hours.
8. Following incubation, the colonies on each plate were enumerated and the Colony Forming Units (CFU/mL) determined.

3.2.1.7 Serial Dilution Procedure for Siddu

1. Siddu culture was obtained and transferred to a sterile container.
2. Fill each Test tube with 900ml of Luria broth or sterile saline.
3. To make the tidy sample, 100ml of the *E. coli* culture was put to one of the diluent-containing tubes.
4. The culture was serially diluted in many tubes, such as Neat. 10^{-1}, 10^{-2}, 10^{-3}, 10^{-4},10^{-5}, 10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}, 10^{-10}.
5. 100 mL of diluted material from each tube, including the neat sample, was plated on separate nutritional agar plates.
6. Plates were incubated at 37°C for 18-24 hours.
7. Following incubation, the colonies on each plate were enumerated and the Colony Forming Units (CFU/mL) determined.

3.2.1.8 Molecular biology techniques

3.2.1.8.1 Genomic DNA isolation from *E. coli*

1. The *E. coli* sample was inoculated in Luria broth and incubated for 24 hours at 37°C.
2. The *E. coli* sample was inoculated in Luria broth and incubated for 24 hours at 37°C.
3. After 24 hours, *E. coli* culture was transferred to Eppendorf tubes and centrifuged it for five minutes at 9,500×g.
4. The *E. coli* sample was inoculated in Luria broth and incubated for 24 hours at 37°C.
5. After 24 hours, *E. coli* culture was transferred to Eppendorf tubes and centrifuged for five minutes at 9,500×g.
6. The supernatant was discarded, and the pellets were stored in Eppendorf tubes.
7. Add 400µl of SDS lysis buffer to the pellet and stir with pipette.

8. After mixing, the tubes were incubated at 65℃ in a water bath for 30 minutes.
9. After incubation, 400µl of phenol and chloroform (1:1) were added to the tubes.
10. The tubes were centrifuged at 16,060×g for 10 minutes at room temperature.
11. The upper layer (aqueous layer) was placed into new Eppendorf tubes.
12. Add an equal volume of cold isopropanol to the DNA precipitation tubes.
13. The tubes were stored at -20℃ for 18 hours.
14. The tubes were centrifuged at 13,684×g for 15 minutes at 4℃.
15. Discard the supernatant and rinse the DNA pellet with 500 µl of 70% ethanol
16. The supernatant was discarded, and the pellets were stored in Eppendorf tubes.
17. Add 400µl of SDS lysis buffer to the pellet and stir with pipette.
18. After mixing, the tubes were incubated at 65℃ in a water bath for 30 minutes.
19. After incubation, 400µl of phenol and chloroform (1:1) were added to the tubes.
20. The tubes were centrifuged at 16,060×g for 10 minutes at room temperature.
21. The upper layer (aqueous layer) was placed into new Eppendorf tubes.
22. Add an equal volume of cold isopropanol to the DNA precipitation tubes.
23. The tubes were stored at -20℃ for 18 hours.
24. The tubes were centrifuged at 13,684×g for 15 minutes at 4℃.

3.3 Biochemical Testing

3.3.1 Biochemical Test

Preparing the inoculum

1. Identify the organism using a common medium, such as Nutrient Agar (M001) .
2. Inoculate a single isolated colony in 5 ml of BHI Broth (M210) and incubate at 35- 37°C for 4-6 hours until the inoculum turbidity reaches 0.1 OD at 620nm or 0.5 McFarland standard. Certain organisms may require more than 6 hours of incubation. In this situation, incubate until the inoculum turbidity equals 0.1 OD at 620nm.
3. To prepare the inoculum, choose 1-3 well-isolated colonies and make a homogeneous suspension in 2-3ml sterile saline. The suspension density should be 0.1 OD at 620 nm.

Inoculation of the kit :

1. To inoculate the kit, first open it aseptically. Peel off the sealing foil.
2. Apply 50 µl of the aforesaid inoculum to each well using the surface inoculation method.

3. Alternatively, the kit can be infected by stabbing each individual well with a loop full of inoculum.

Incubation:

Incubation temperature ranges from 35 to 37 degrees Celsius. Incubation lasts 18-24 hours.

Interpretation of results :

Interpret findings using the standards specified in the identification index. Add reagents to wells no 1,2 and 3 at the end of the incubation period (18-24 hours).

1 Indole Test:Well No.1

1 Add 1–2 drops of Kovac's reagent (R008).
2 The appearance of a reddish pink colour within 10 seconds suggests a positive reaction.
3 If the test is negative, the reagents remain a pale color.

2 Methyl Red Test:Well No.2

1 Add 1-2 drops of the reagent (1007).
2 If the test is positive, the reagent will remain red.
3 If the test results are negative, the reagent decolourises and turns yellow.

3 Voges-Proskauer Test:Well No.3

1 Use 1-2 drops of Baritt reagent A (R029) and 1-2 drops of Baritt reagent B (R030).
2 Pinkish red Colour development within 5-10 minutes indicates a positive test.
3 A negative reaction is indicated by a lack of color change or a slight copper color (due to the reaction of Baritt reagents A and B).

CHAPTER 4

Result

4.1 Basic Microbiology Techniques

4.1.1 Simple Streaking

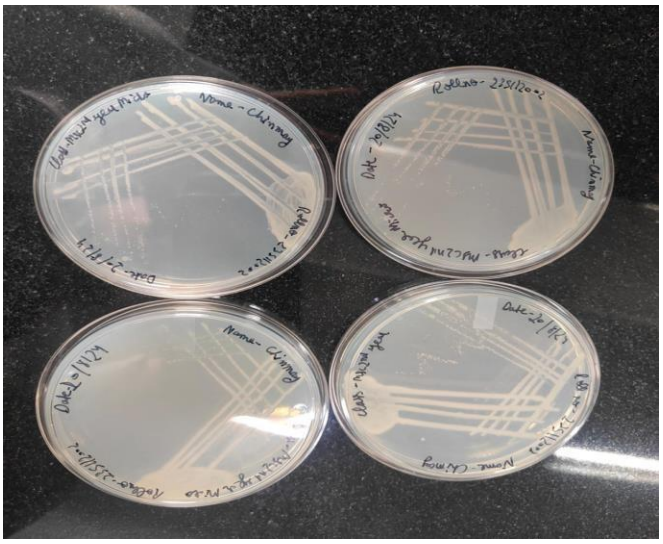
E. coli, B. subtilis cultures were streaked on NA media to boost inoculum for short-term preservation. Representative images of culture plates [Fig:1] are provided below.

Figure 1: Simple Streaking of *E. coli*

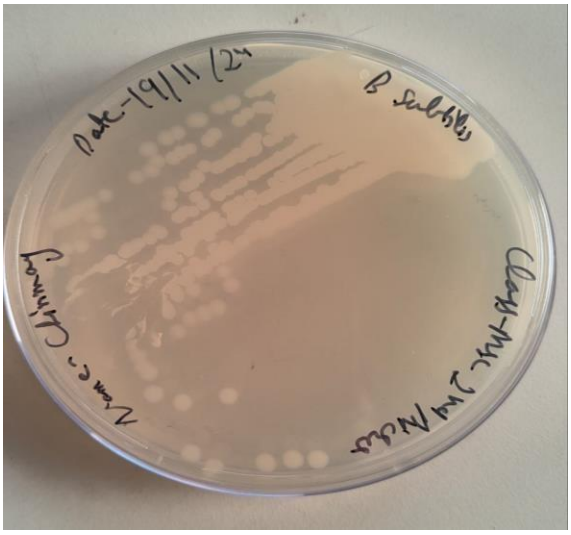
4.1.2 Quadrent Streaking

To isolate colonies, *E. coli*, *B. subtilis, M. smegmatis* were streaked in quadrants. And these colonies were used in subsequent investigations.

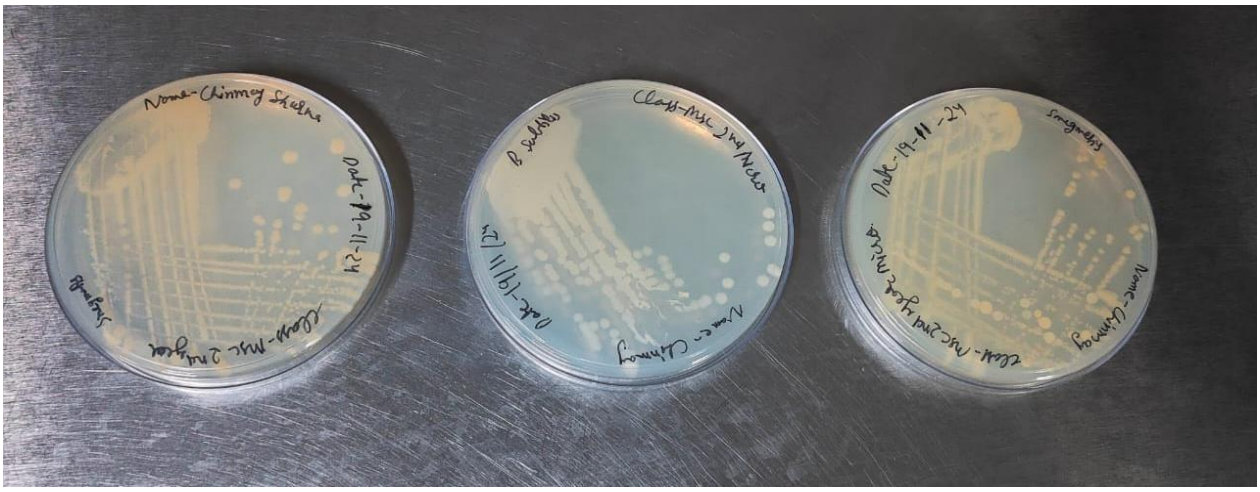
Representative photographs of culture plates [Fig:2] are provided below



(a) *E. coli*



(b) *B. subtilis*

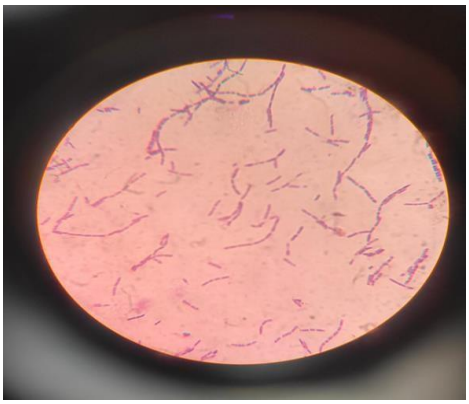


(c) *M. smegmatis*

Figure 2: (a) Quadrant Streaking of *E. coli* , (b) (c) Quadrant Streaking of *B. subtilis*

4.2 Gram Staining

Gram staining was done to confirm that the colonies we have isolated by streaking contained pure cultures of *E. coli* or *B. subtilis* contained pure cultures of *E. coli* or *B. subtilis*



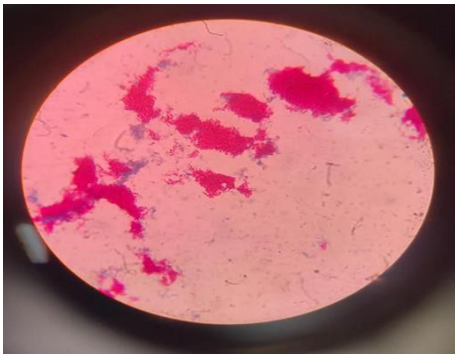
(a)

(b)

Figure 3: (a) Gram staining of *B. subtilis*, (b) Gram staining of *E. coli*

4.3 Ziehl- Neelsen staining

Ziehl- Neelsen staining was done to confirm that the colonies we have isolated by streaking were taken from pure cultures of *M. smegmatis.*



(a)

Figure 4: (a) Ziehl- Neelsen staining

4.4 CFU Count

4.4.1 CFU Count from Soil

Soil was taken from the JUIT campus and CFU count of Soil sample was done to determine number of cells were present in the Soil . Serial dilution of samples was made and 100 µL of each dilution was plated in duplicate, [Fig: 5] shows representative plates obtained after incubation of plates.

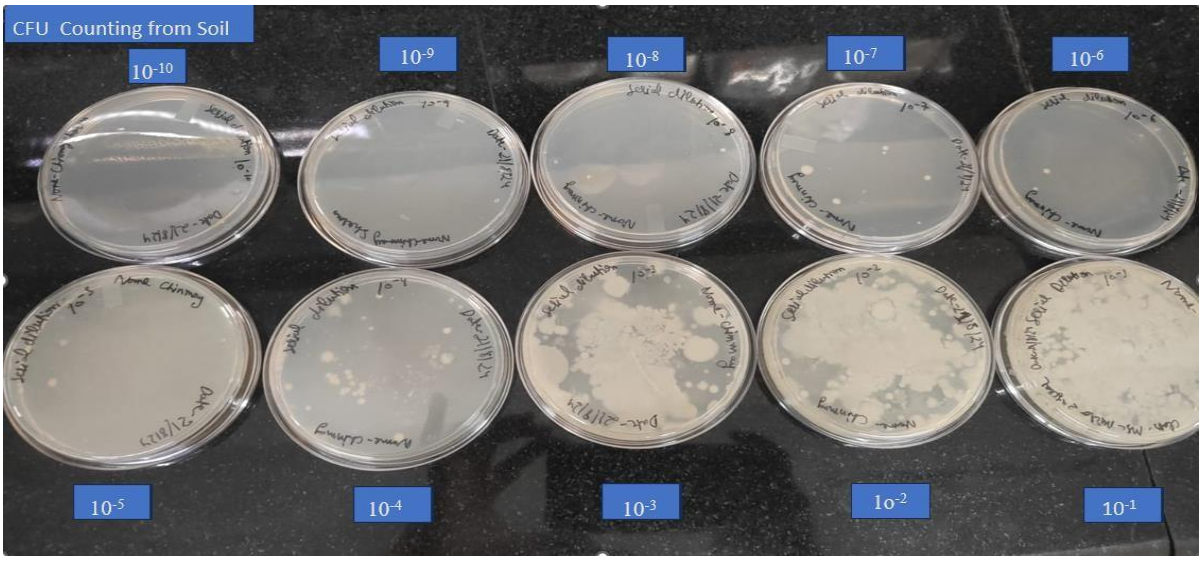


Figure 5: CFU Count

4.4.1 CFU Count from *E. coli*

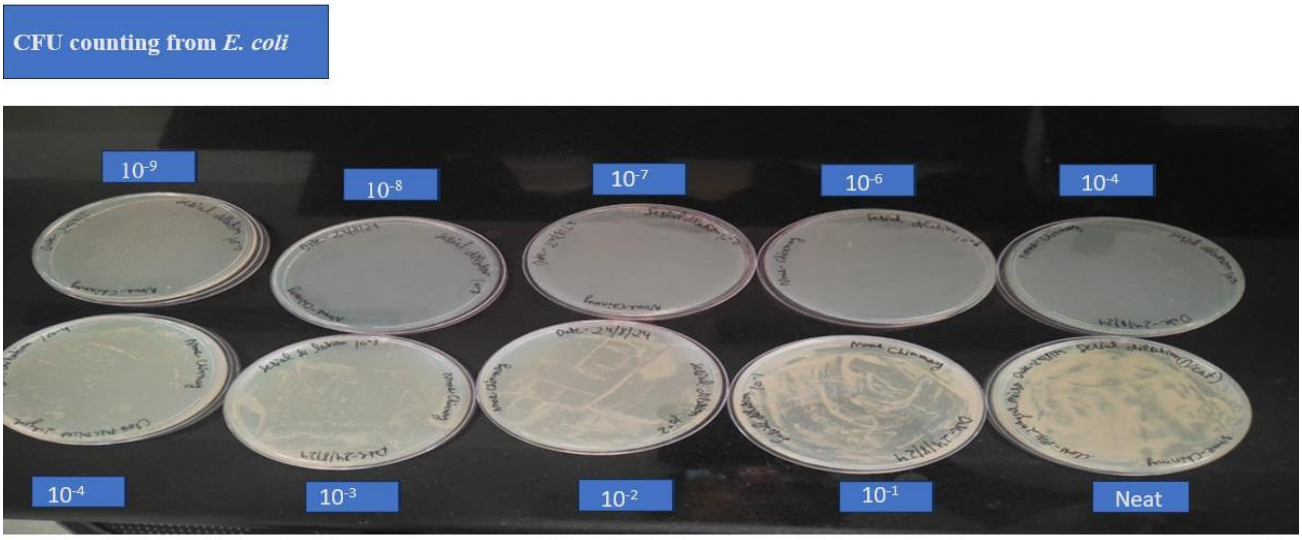


Figure 6: CFU Count from *E. coli*

4.5 Molecular Techniques

4.5.1 Genomic DNA Isolation of *E. coli*

Overnight-grown *E. coli* culture was used to isolate its genomic DNA. And genomic DNA was run on 0.8% of agarose gel [Fig:7].

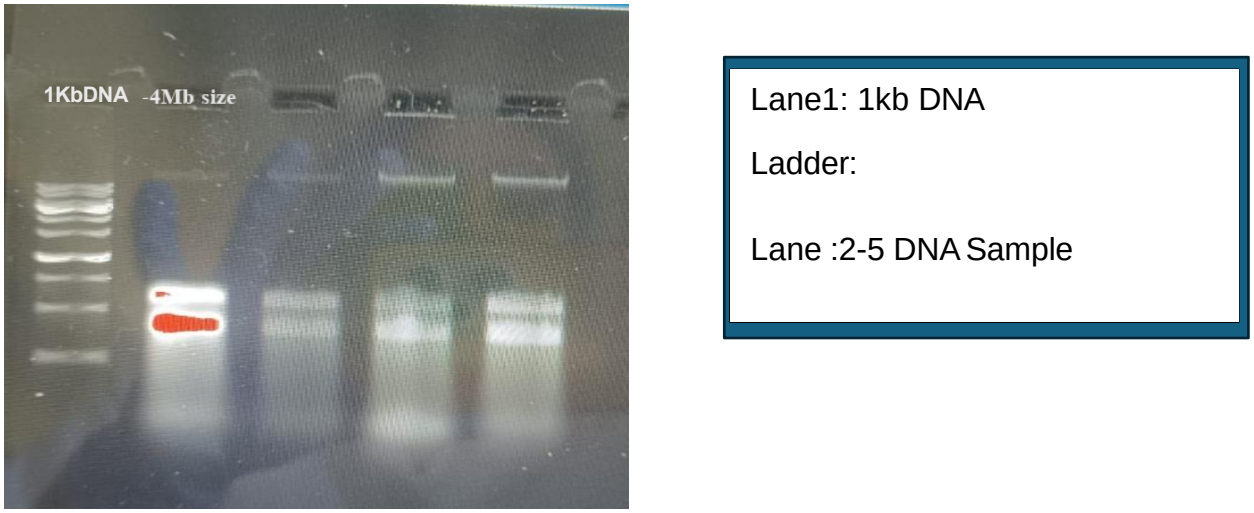


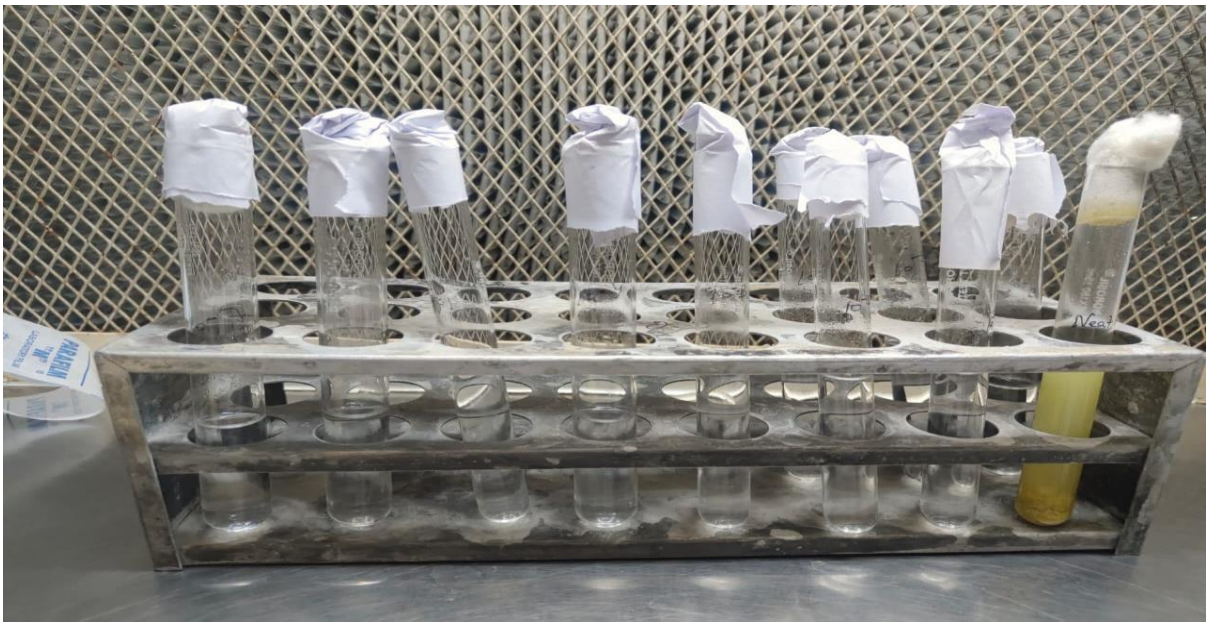
Figure 7: Genomic DNA Isolation of *E. coli*

4.6 Serial dellution of siddu

Siddu was taken from the Native Place of Himachal Pradesh and CFU count of Siddu sample was done to isolate the bacteria . Serial dilution of samples was made and 100 µL of each dilution was plated in duplicate, (Fig: 8) shows representative plates obtained after incubation of plates.

(a) siddu Sample

(b) 1gm Siddu



(b) Dilution

CFU count of Siddu

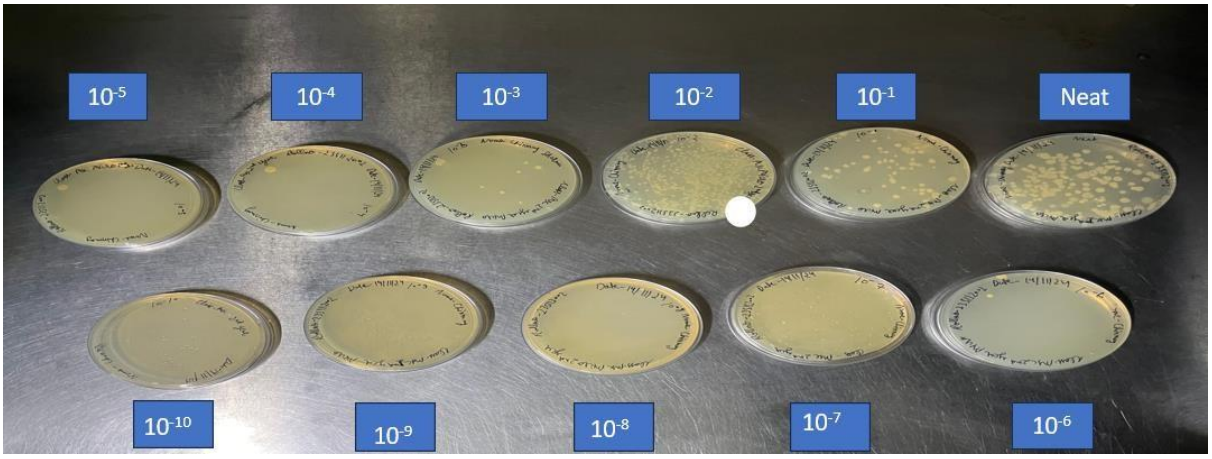


Figure 8: CFU Image shows that all the dilutions are plated on Petri plates and colonies were observed and counted.

Table 5: Dilution and number of colonies obtained

Dilution	No.of Colonies
Neat	Not Countable
10^{-1}	50
10^{-2}	240
10^{-3}	8
10^{-4}	1
10^{-5}	1
10^{-6}	2
10^{-7}	0
10^{-8}	0
10^{-9}	0
10^{-10}	0

CFU count /ml =No of colonies counted ×dilution factor

Volume plated (in ml)

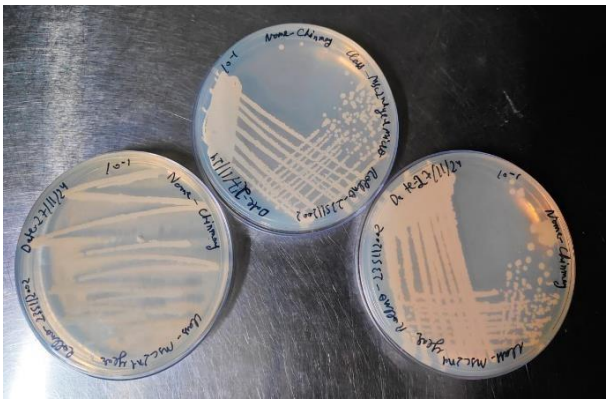
$= 50\times10^{-1}/0.1$

$=50\times10^{10}$ CFU/ml

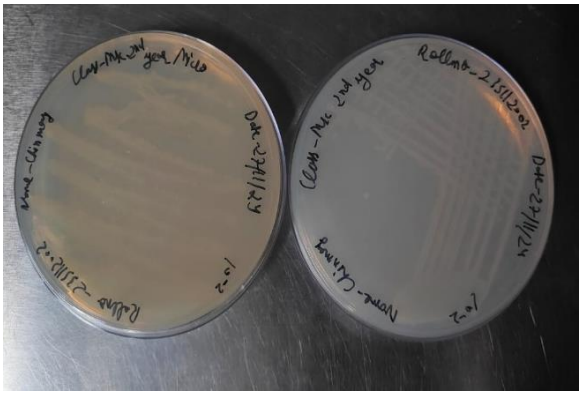
4.6 Streaking

4.6.1 Quadrate Streaking and Simple Streaking is Done to isolate pure Colonies[Fig:9]

(a) Neat



(b) 10^{-1}



(c) 10^{-2}

Figure 9: Quadrate Streaking and Simple Streaking

4.5.1 Gram Staining

Gram Staining is done and Shows the Gram negative results and shape of cells is coccus and Rod Shaped[Fig:10]

(a) (b)

Figure 10: (a), (b) Gram Staining

4.6.3 Biochemical testing

Siddu sample was inoculated in Nutrient broth and incubated for 24 hours at 37°C.After the Growth apply 50 µl of the inoculum in Biochemical kit to each of the well using the surface inoculation method. Incubation is given to the Biochemical kit for 18-24 hours at temperature ranges from 35 to 37 degrees Celsius. Then Interpret findings using the standards specified in the identification index. Add reagents as per the procedure to wells no 1,2 and 3 at the end of the incubation period (18-24 hours).[Fig:11]

5ml of Test Sample

(a) Test tube

(b) Reagents

(c) Standard kit

(d) Control

(e) Test Samples

Figure 11: Biochemical test kits

Table:6 Results From Biochemical Test

Test Samples	Indole	Methyl Red	Voges Proskauer's	Citrate utilizationmn	Glucose	Adonitol	Arbinose	Lactose	Sorbitol	Mannitol	Rhamnose	Sucrose
Neat	**-ve**	**-ve**	**+ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**
-1	**-ve**	**-ve**	**+ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**	**-ve**
-2	**-ve**	**-ve**	**-ve**	**+ve**	**+ve**	**-ve**	**+ve**	**-ve**	**-ve**	**+ve**	**+ve**	**-ve**

These Results Tells Us that the test samples of plate named neat and -1 is unknown and the -2 indicates the *Enterobacter* species. So it Can be identified further by the molecular Techniques.

Future work Plan

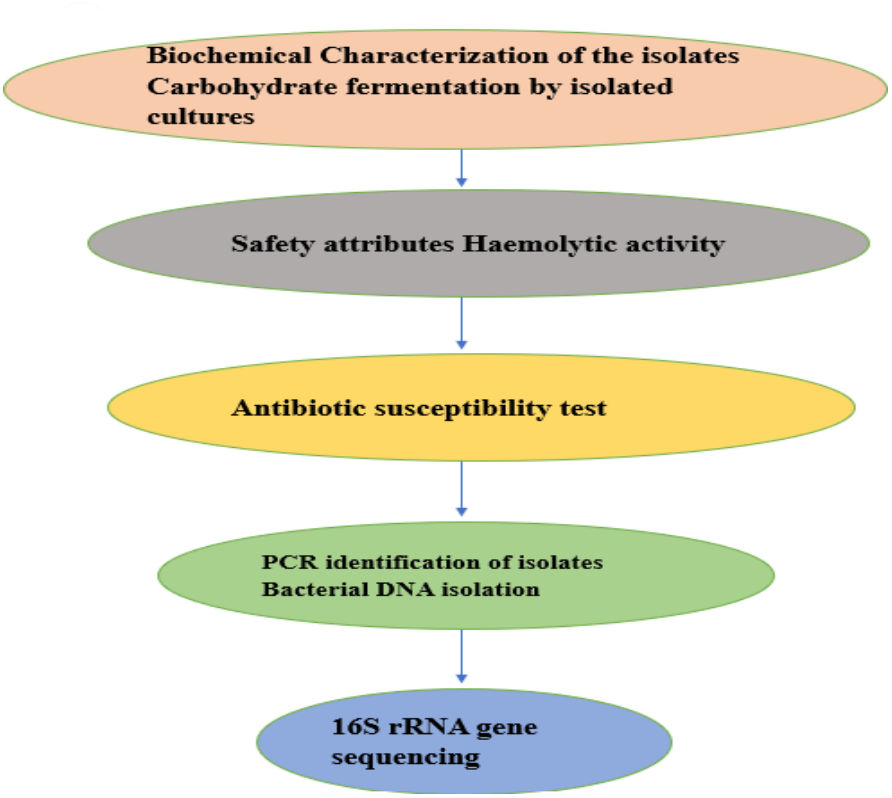


Figure 12: Future work Plan

CHAPTER 5

Company profile

Company profile:

Founded in 2010, EPub Solutions Pvt. Ltd. is a prominent digital

publishing and content transformation company with its headquarter city/country]. For clients worldwide, such as

academic publishers, educational institutions, and business entities, the co maintaining and transforming digital content. EPub Solutions provides from manuscript conversion to metadata tagging and quality assurance, w

competence in eBook formats like EPub2, EPub3, Mobi, and fixed layout.

Services offered by the company include conversion of eBooks and XML/HTML,

typesetting, editorial help, accessibility compliance (WCAG, EPUB Accessibility 1.0), and validation checks with programs like Ace by DAISY and EPUBCheck. EPub Solutions is known for its content automation, XML-first workflows, and superior digital outputs that are compatible with Kindle, Apple Books, and Google Play Books.

The organization guarantees a smooth workflow for digital publishing with a diversified staff of editors, quality analysts, and developers. Editorial assistants are essential in structuring information, enforcing style rules, proofreading text, and conducting accessibility device testing.

EPub Solutions is committed to innovation and quality in digital publishing. The company continually adapts to meet the ever-increasing demands of accessibility, worldwide distribution, and the discoverability of content. Through strategic partnerships and ongoing education, the company positions itself as a trustworthy partner for the future of publishing solutions.

CHAPTER 6

Introduction

6.1 Selection Process

Date: 27-Feb-2025

Employment Offer Letter

Dear Chinmay Sharma,

We are pleased to offer you continued employment with E Pub Solutions Private Limited in the position of Editorial Assistant. This offer letter outlines the updated terms and conditions of your employment, effective 01-Mar-2025. This letter supersedes any previous employment agreements or offer letters.

1. Employment Details and Terms

1.1. Date of Joining: 01-03-2025

1.2. Compensation

Your annual Cost to Company (CTC) will be INR 2,76,000 (Two Lakh Seventy Six thousand Only). This salary is subject to applicable deductions as per law.

1.3. Work Schedule

- Office Timings: 10:00 AM to 7:00 PM (Monday to Saturday).
- Weekly Off: Third Saturday and all Sundays, unless otherwise decided by management.

1.4. Probation Period

- You will be on a probation period of 30 days from the date of joining.
- During this period, your performance will be evaluated, and your continuation will be at the discretion of the management.
- The probation period may be extended or shortened based on the management's assessment.
- Your employment can be terminated during the probation period without notice or citing a reason.

1.5. Confirmation of Employment

Your employment confirmation will be communicated in writing upon satisfactory completion of the probation period. If not confirmed in writing, you will continue to be on probation.

2. Responsibilities and Conduct

- You will be responsible for performing the duties assigned to you by the management, including any additional tasks that may be allocated from time to time.
- Maintain confidentiality of all company information, business processes, and client data. Any breach of confidentiality will lead to disciplinary action which can result in Termination as well.

6.2 Introduction

The publishing industry has undergone a major digital revolution over the past 20 years by completely altering how information is produced, delivered, and maintained. Digital-first methods are not only replacing old print-based processes, but also complementing them, generating new technologies, new skillsets, and new ways to work. Editorial responsibilities, especially that of an editorial assistant, have been reimagined significantly in this restructured environment. Instead of only performing administrative tasks like scheduling, communicating, and distributing copy the job of an editorial assistant now has a new, practical role—managing workflows and assisting publishers in workflows related to digital publishing.

To accommodate the increased demand for eBooks, online journals, open-access repositories, and accessible content formats, publishers have altered their workflow processes to include structured content management systems, XML/HTML-based editing tools, and various end-products such as EPub, PDF, Kindle (Mobi), and accessible formats suitable for screen readers. In accordance with these changes, the definition of editorial job has expanded, and editorial assistants are now expected to enhance the linguistic and technical quality of the final digital product. The current scope of work can include duties such as content formatting, alt-text production, hyperlink check, device use testing, and metadata tagging.

In particular, EPub Solutions Pvt. Ltd., a digital publishing and content transformation company, provides a comprehensive case study on the role of editing assistants in a digital workflow. The editorial assistants at EPub Solutions mediate between editors, designers, and software developers to ensure that all content meets editorial standards, as well as accessibility standards, and all content is up to digital standards. As well as managing project schedules and version controls, the assistants often contribute to content checking with tools such as XML linters, Ace by DAISY, and EPUB Check.

This thesis anticipates to explore the redefined role of the editorial assistant in a digital publishing context by looking at the processes, challenges, and skills pertaining to the position with EPub Solutions. The study will investigate how the projects faced by the editorial assistant are influenced by the structures of the teams, the technological tools, and the standards for content. The thesis is intended to highlight the importance of continuing education, and adaptability reviewing this fast-moving published world powered by technology.

This study aims to add to the larger conversation on workforce development and workflow optimization in the digital publishing sector by comprehending the changing duties of editing assistants in actual digital production environments.

In this thesis, I use all-digital content creation company EPub Solutions to analyze the role of the publication editing assistant given an evolving digital-publishing landscape. The shift from printed media to digital media has resulted in a deeper shift in how editing assistants deploy their particular roles, leading to new forms of technology, skills, and approaches to the work editing assistants perform. In this research, the role of the editing assistant is viewed within the digital publishing context through different roles of quality assurance, metadata tagging, content ordering, and collaboration with IT and production departments. Ultimately, with respect to EPub Solutions in particular, this research draws attention to the shifting role of editing assistants and the central role it plays in maintaining editorial integrity by adapting to changing technology platforms like automation, XML, HTML5, and EPub, and builds on the existing literature through qualitative interviews and a detailed workflow analysis of editing assistants at EPub Solutions. This research highlights the developing role and significance of ongoing development of skills, while the assistant role represents the critical link in the supply chain of digital content for public consumption.

6.2 Nature of work

By understanding the evolving responsibilities of editing assistants in real- world digital production settings, this study seeks to contribute to the broader discussion on workforce development and workflow optimization in the digital publishing industry.

1. To examine how traditional publishing has led to the shift in editing assistant roles to digital processes.
2. To investigate the particular duties and routine work of EPub Solutions' editing helpers.
3. To assess the digital platforms, tools, and formats (such as EPub, XML, and PDF) that are utilized during the editorial process.
4. To ascertain the knowledge, abilities, and education required of editorial assistants working in digital publishing.

5 To evaluate how difficult it is for editing assistants to keep digital content accessible, consistent, and of high quality. To make suggestions on how to improve professional growth and editorial procedures in digital publishing settings.

CHAPTER 7

Job role

7.1 The Editorial Assistant's Role in Publishing Articles

The production and distribution of articles, particularly in scholarly, instructional, and journalistic contexts, have changed as a result of the digitalization of publishing. The function of the editorial assistant has changed dramatically in this context, moving from providing administrative assistance to playing a crucial role in the creation of content. With a focus on digital contexts, this literature review examines how editing assistants' roles in the article publishing process are evolving.

7.2 Traditional Publishing Editorial Assistants

Historically, Editorial Assistants have served a facilitative role on the part of editorial decision-makers (Thompson, 2005) and performed a variety of administrative duties such as tracking correspondence, organizing manuscripts, creating contracts, and assisting senior editors. Editorial assistants were largely tasked with helping prepare content, in print operations, as a set of logistical rather than technical or editorial duties. Thus, there was much to distinguish the editorial decision-making from the supporting. Though, with the emergence of digital publication, these lines are starting to fade.

7.3 Digital Publishing Editorial Assistants

With the increased digitization of publishing, less reliance on the physicality of the printed word, and the implied involvement of editorial teams with increased expectations for speed, multi-platform outputs, and discoverability of content, editorial assistants will have to have a high level of technological engagement. Koralek (2019), has argued a suitable level of technological engagement will be inevitable with the predisposition towards an XML-first workflow in article publishing, which will require editorial assistants to have an understanding of file validation and structured mark-up. In agreement with Kozak (2019), Pianzola (2020) describes that editorial teams and production teams are starting to work closer together on structuring content using XML or HTML. As a consequence of the increased focus on tagging digital content, editorial assistants will increasingly need to assure that published material, whether that be for a freemium model, or for a fully open-access model, has appropriate topic tagging, device-readiness, and digital compliance in relation to WCAG and EPUB Accessibility 1.0.

Tools for Editing and Content Management

The workflow of the editorial assistant has also been impacted by the arrival of tools like JIRA, Trello, and content management systems like OJS (Open Journal Systems). Editorial assistants can track peer review timelines, monitor decisions about manuscript submissions, follow

changes, and disseminate information within departments using these tools (Gould & Rowntree, 2021). Now they can also think about editorial workflow coordination and project management.

Needs for Training and Skills

Additionally, the literature draws attention to the widening skill gap in editorial staffing. Editorial assistants are increasingly expected to be digitally literate since digital publication necessitates familiarity with file formats (EPub, PDF/A, HTML5), editing software (Adobe InCopy, Oxygen XML Editor), and validation tools (EPUBCheck, Ace by DAISY) (Johnson, 2018). However, on-the-job training is an essential part of editorial development because few academic publishing programs provide specialized training for these hybrid jobs.

Literature Gaps and the Need for Role-Specific Research

Despite this broader focus, there isn't much in-depth research on editorial assistants in the scholarly literature. The majority of studies focus on more general editorial or publishing processes, frequently ignoring the special difficulties and contributions of entry- or mid-level editorial workers. There is a lack of knowledge about the practical contributions made by editing assistants to the creation of digital articles, especially in mid-sized content transformation companies like EPub Solutions

CHAPTER 8

Methodology Used For Job Role

This chapter describes the methodology used to investigate the function of editorial assistants in EPub Solutions' digital publishing workflow. To obtain a thorough grasp of editorial practices, skill needs, and workflow integration in an actual organizational setting, a qualitative case study methodology was selected.

8.1 Design of Research

The changing function of editing assistants in the context of digital publishing was examined using a qualitative case study methodology. This architecture was chosen because it is appropriate for investigating intricate, situation-specific phenomena (Yin, 2014). This study intends to produce comprehensive, in-depth insights into the editing processes and difficulties faced by publishing experts in a digital-first company by concentrating on a specific organization—EPub Solutions Pvt. Ltd.

8.2 Choosing the EPub Solutions Pvt. Ltd. case.

Because of its significant emphasis on digital content transformation—specifically, creating eBooks, journals, and accessible digital material for global publishers—EPub Solutions was chosen as the case study site. The organization is a perfect subject for researching the changing role of editorial assistants because of its integrated editorial and production strategy, reliance on XML-first workflows, and use of editorial technology tools**.**

8.3 Data Gathering Techniques

To guarantee validity and triangulation, data was gathered from a variety of qualitative sources:Semi-structured Interviews: Technology leads, project managers, and editorial assistants were interviewed. Over the course of [insert duration], interviews were conducted with [insert number] people. Daily editing chores, the use of digital tools, confirming that the XML tags have the correct hierarchy and structure.

To find tagging mistakes, run validation tools like as Schematron, EPUBCheck, or custom scripts.

teamwork techniques, and perceived difficulties were the main topics of the interviews.

Document Analysis: Workflow diagrams, editorial policies, and digital production timetables were among the internal papers examined. These documents gave background information on how editorial duties are organized and sequenced, as well as how technology is incorporated into day-to-day operations.

Observational Notes (Optional if applicable): Short observational sessions were held where allowed to see editing duties such metadata development, file validation, and content tagging.

8.4 Analysis of Data

The data was interpreted using a thematic analysis approach in accordance with Braun and Clarke's (2006) recommendations. Following transcription, inductive coding of the interview data was used to find new trends pertaining to roles, process complexity, tool use, and skill improvement. To guarantee consistency and in-depth examination, themes were honed and compared with the process documentation.

During analysis, the following key motifs were found:

1. Increased use of editorial assistants in digital processes
2. Automation and the use of digital tools for editorial work
3. Needs for skill development and training
4. Workflow issues and gaps in collaboration

8.5 Moral Points to Remember

Prior to the interviews, each participant gave their consent after being made aware of the study's objectives. Sensitive internal data was handled in compliance with ethical research guidelines, and anonymity and confidentiality were preserved at all times.

8.6 Restrictions

The results may not apply to all publishing organizations because this is a case study of a specific organization. Nonetheless, the findings offer insightful information about the patterns and difficulties that are probably encountered in other digital publishing settings.

8.7 Synopsis of the Process of Digital Publishing

A manuscript submitted by an author, institution, or client organization usually starts the digital publishing process, which then moves through a planned pipeline of editing, formatting, validation, and distribution duties. Digital publishing must take into consideration compatibility across a variety of reading devices and formats, including EPub, MOBI, PDF/A, and HTML5, in contrast to traditional print publishing, where typesetting is sometimes the last stage of production. The workflow at EPub Solutions is based on an XML-first approach, in which content is converted early on into structured XML to enable multichannel publishing[11]. This makes it possible to generate digital outputs simultaneously or as needed, which are compatible

with online learning management systems, Amazon Kindle, Apple Books,andGooglePlayBooks.

8.8 Crucial Steps in the Workflow

1. **First QA and Ingestion of the Manuscript Submission by the author or client via email or OJS**. Editorial assistants perform the first checks for completeness (e.g., presence of figures, tables, references). The title, author names, abstract, and keywords are among the metadata that is collected about the document[13].
2. **Pre-editing and formatting**

   Raw files are cleaned and standardized using Word macros or InDesign templates. Editorial assistants can standardize citation formats, remove non-standard characters, and apply templates for consistent formatting.
3. **XML-First Model Conversion**

The content is converted into structured XML (eXtensible Markup Language) after being parsed. In order to assist, editorial assistants tag content elements such as headlines, block quotations, and references. Confirming that the XML tags have the correct hierarchy and structure. To find the tagging mistakes, run validation tools like as schematron, EPU check or custom scripts.

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6. **Language review and copyediting**

Based on workflow choices, either before or after XML tagging. Editorial assistants help with consistency and grammar checks. highlighting unclear or absent content. Using tracked changes to implement author corrections.

7. **Rights Management and Metadata Tagging**

Accessibility and discoverability are guaranteed by accurate metadata. Subject categories, author affiliations, licensing terms (such as Creative Commons), and ISBN/DOI numbers are entered by assistants. To guarantee accessibility compliance, use alt text for pictures (WCAG 2.1) .

8. **Generation of Output**

Multiple formats are produced from a single XML source: EPub (fixed-layout or reflowable) MOBI (for older Kindle models) PDF/A (for print-compatible or archival versions) Editorial assistants aid with quality assurance testing of these outputs on various platforms, such as Adobe Digital Editions, the Apple Books app, and the Kindle Previewer.

9. **Complete Quality Assurance**

To guarantee: Correct layout and pagination, a last checklist review is carried out. Table of contents and functional hyperlinks. alt-text for figures and pictures.

10. **Distribution and Delivery**

Files are sent straight to online markets or uploaded to client websites. Editorial assistants create metadata sheets for distribution partners, check asset packing, and uphold file name conventions.

3.8 Technology and Tools Accessibility and Used Validation:

Ace, EPUBCheck by Daisy Managing Metadata: Excel, OJS, Crossref, DOI activation Using Adobe InCopy and Oxygen XML Editor for tagging and editing

Project Management:

Basecamp Having received training on these platforms, editorial assistants support the integrity of the workflow and the material.

4.9 Editorial Assistants' Function in the Workflow

Between the technical, production, and editorial departments, editorial assistants act as a liaison. Their contributions include:

Pre-editing and initial content intake. validation of markup and XML tagging. assistance with proofreading and copyediting. upholding criteria for accessibility and consistency in metadata.

performing quality tests prior to delivery. Their efforts guarantee that the finished products are accurate, reader-friendly, and platform- compliant.

8.9 Opportunities and Difficulties

Among the difficulties faced by editorial assistants are:

1. The challenging learning curve of markup languages and internet tools[12].
2. The demand for regular updates on platform-specific specifications.
3. Coordinating massive content flows with short turnaround times[14].
4. But there are also chances for progress in the digital world:developing one's knowledge of automation technologies, XML, and content accessibility, extending positions to include digital asset management and project coordinating[15].

The Editorial Assistant's Role

Editorial assistants play an essential role in the digital publishing workflow as a liaison between writers, reviewers, and production teams. To facilitate paper submissions, editors also communicate with authors primarily by email, instant messaging applications (e.g., WhatsApp), or systems like the Open Journal System (OJS) [16]. Upon receipt of an article, editorial assistants are responsible for registering it into the publishing system and then monitoring the progress of the paper through copyediting and peer review. The editorial assistant creates the article processing charges (APC) invoice and also issues an acceptance letter after editorial review and the ultimate changes requested by the editor[17]. The editorial assistant sends the evidence of payment to the accounts team for confirmation after the author submits it upon receipt of payment.

Once the financial confirmation is made, the manuscript moves to the galley proof stage when the author is given final formatted access to approve. This is the stage the author will also be able to make any corrections they proposed[18]. The editing assistant publishes the article after the author has approved it and ensures it is published online[19].

Post publication examples of work include activating the Digital Object Identifier (DOI) and issuing the author a publishing certificate. The editing assistant maintains all standards of

publication, informs all parties involved, and ultimately ensures the manuscript advances smoothly and timeliness through this workflow[20].

8.10 Workflow of the Editorial Assistant: A Case-Based Narrative

The editorial assistant at EPub Solutions has a variety of responsibilities, especially when it comes to managing journal article submissions. This case follows a standard publishing workflow that is organized by an editorial assistant:

Step 1: Communication and Article Submission The editorial assistant contacts the author via a variety of channels, such as email, WhatsApp, and the Open Journal Systems (OJS) platform, and authors submit their manuscripts using these methods based on their comfort level[21].

Step 2: **Registration of Articles and**
Coordination of Reviews

Following Receipt Of The Manuscript,

The Editorial Assistant:
Checks the submission for accuracy,logs the piece into the editorial system within the company[22]. Assigns it for peer review or internal evaluation,makes sure the manuscript complies with the ethical guidelines and formatting requirements of the journal. They keep track of the article's development and function as a liaison between the writers and reviewers, guaranteeing prompt and transparent communication.

Step 3: Generation of Invoices and Acceptance

The editorial assistant creates the article processing fee (APC) invoice and issues an official acceptance letter once the editorial or peer-review team gives their permission. The author has access to this document in exchange for payment[23].

Step 4: Verification of Payment

The author provides the editorial assistant with a proof of payment once the payment has been completed[24]. The accounting team receives this information from the assistant for verification. This stage guarantees that, prior to the text being published, all financial procedures are appropriately followed.

Step 5: Author approval and creation of the galley proof

The article is structured into its final layout, known as the galley proof, after verification. The editor sends this version of the manuscript back to you after receiving and relaying the last round of changes from the author[25]. If the typesetter is making any changes or adjustments, they will work with you at this point for that purpose. The author then enters the final step in the publishing process when they sign off on the galley[26].

Step 6: Services For Publication And Post Publication After Being Approved By The Author:

The journal or client's platform is where the article is formally published[27]. To guarantee the article's traceability and discoverability, the editing assistant registers its Digital Object Identifier (DOI).

As a formal acknowledgement, the author receives a publication certificate.

The editing assistant keeps thorough records during this process and makes sure that every step is finished on schedule and to the required levels of quality[28].

8.11 Conclusions and Remarks

The role and adaptability of editing assistants in the digital publishing landscape is evident in this case study[29]. Their role extends beyond basic administrative work to include: workflow monitoring, correspondence, QA, project coordination, and technical expertise of publishing formats/systems. At EPub Solutions, editing assistants are part of the digital content lifecycle and have training to address both content and system issues.

8.12 Final Remarks

Editorial assistants are essential to the realization of a digital goods publishing project, as demonstrated in the case of EPub Solutions, and their ability to work with multiple stakeholders, abide to compliance, and adapt to new tools and technology is indicative of how editorial roles are evolving more broadly in a digital world. Editorial assistant roles are now becoming essential to uphold author satisfaction, quality, and accuracy (remember these things) as publication practices shift to further automated and XML-first processes.

CHAPTER 9

Result and interpretation

Overview

In this chapter, the primary findings and conclusions pertaining to the qualitative data collected in the case study of EPub Solutions are outlined. The chapter seeks to provide a complete description of the editorial assistant's work across the digital publishing cycle, including practical descriptions of processes, tools, and communication approaches. The findings are presented within the context of contemporary academic publishing practices, including definitions from Web of Science, Scopus, and HEC-recognized journals.

9.1 Procedure for Submitting Articles

Manuscripts are usually submitted by authors using a variety of methods, most commonly email, Open Journal Systems (OJS), or messaging apps like WhatsApp. The duties of the editorial assistant include:

Checking the completeness of the submission (abstract, keywords, figures, references). sending a formal email acknowledging receipt of the manuscript.

submitting the work for approval via the internal editing system or the OJS.

Clear communication and close attention to detail are necessary during this first stage, particularly when contributions are not in a standardized format.

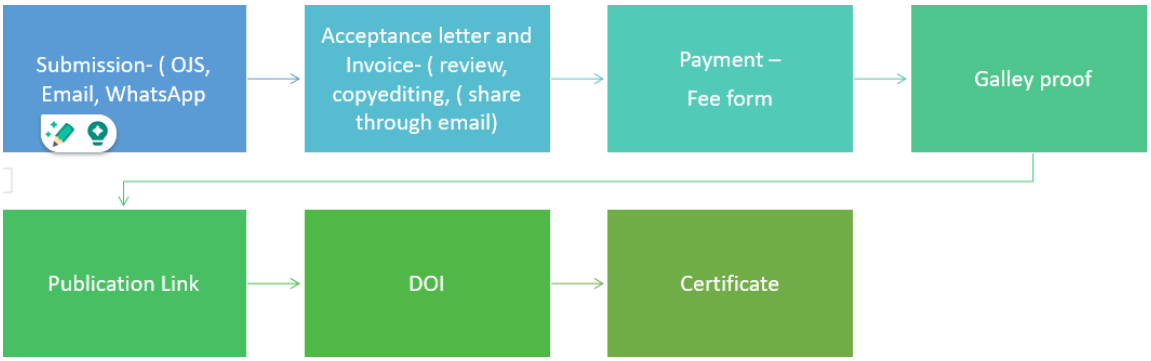

Figure 13: Publication Process

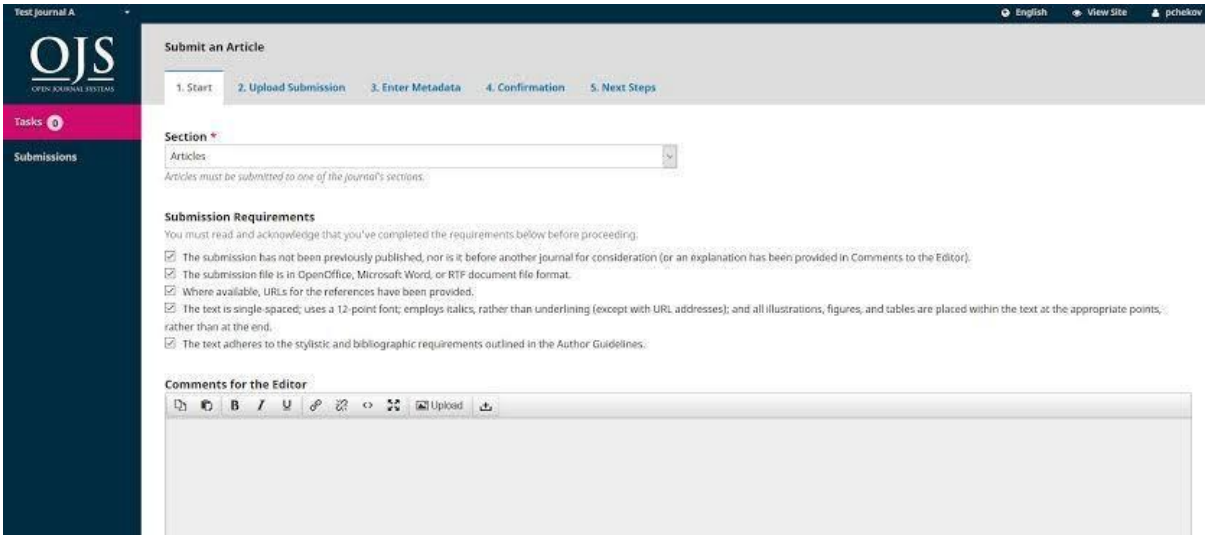

Figure 14: Submission

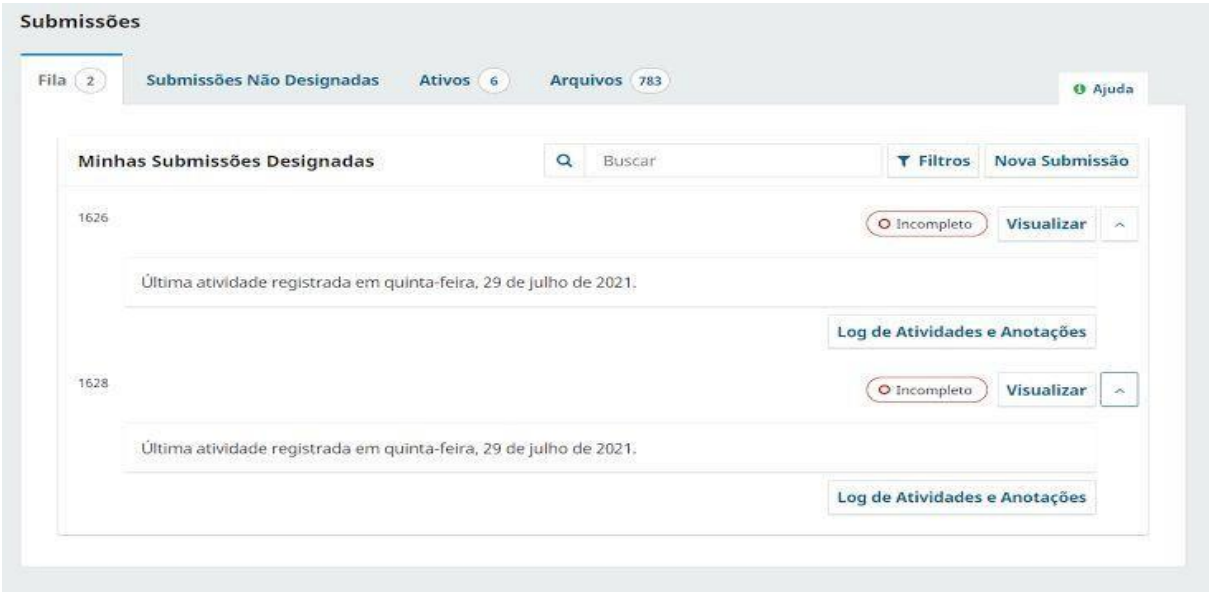

Figure 15: Submission Portal

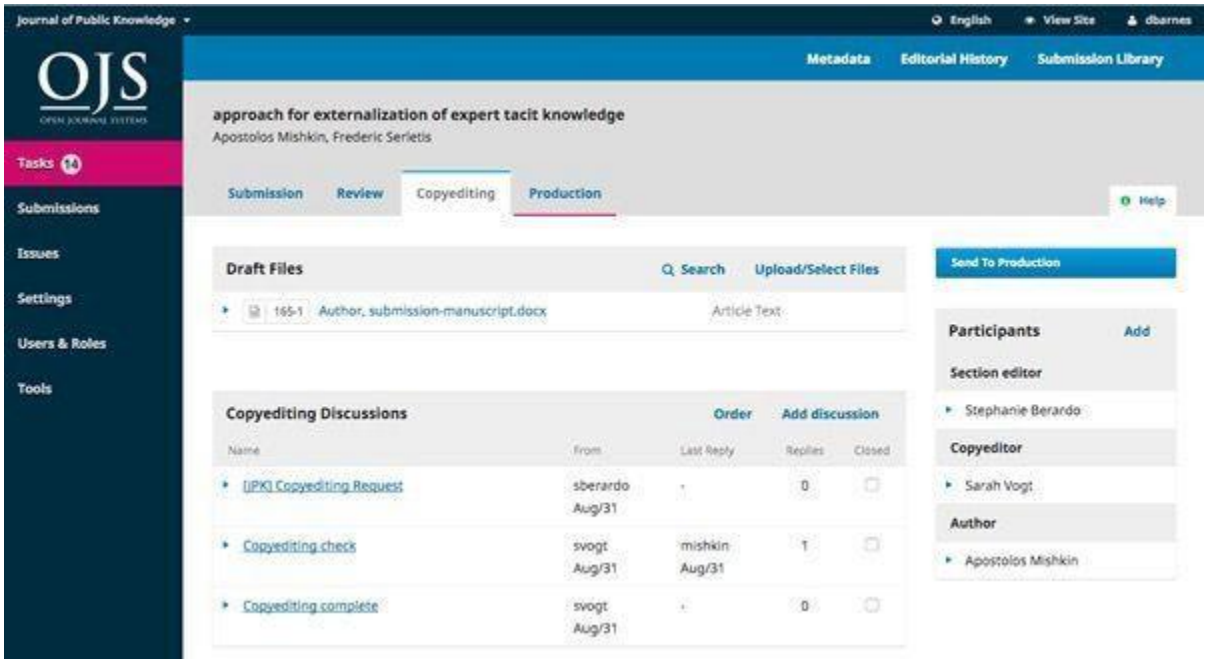

Figure 16: reviewers and copyediting stage

9.2 Answering Questions and Communicating with Authors

Responding to author inquiries is a significant aspect of the editing assistant's work. These consist of: questions concerning review schedules, processing times, and submission requirements. inquiries concerning the requirements for acceptance into journals that are recognized by HEC, Web of Science, or Scopus.

Payment, galley proof review, and certificate issuance clarifications.

Email is typically used for communication. Apps for communicating are also utilized in casual or urgent situations. When answering questions, the assistant keeps a professional and timely demeanor. If necessary, they escalate complicated questions to editors or management.

9.3 Tracking Payment, Invoicing, an Acceptance After final approval, the assistant to the editor:

Forwards the letter of approval to the writer.

creates and distributes a publishing charge invoice (if applicable). confirms payment and provides proof of transaction and receipt. works in tandem with the accounting team to confirm payment before moving forward.

Archives of Razi Institute
Razi Vaccine & Serum Research Institute

Date: 21/ October/2021
Ref: 3141-37313

In The Name of GOD

Dear Dr Manal Hadi Ghaffoori Kanaan,

This is to confirm that after technical and in-house evaluation, the below mentioned manuscript has been finalized and accepted for publication in the journal issue 1 (2022). You can have access to your paper at http:// archrazi.areeo.ac.ir/ after publication.

Manuscript ID: ARI-2108-1833
Manuscript Title: Antimicrobial Resistance and Antibiogram of Thermotolerant Campylobacter Recovered from Poultry Meat in Baghdad Markets/Iraq
Co-Authors: Zena Kassem Khalil , and Fatten Ahmad Mohammed

Truly yours
Editor- in-Chef
Archives of Razi Institute
Dr. Rasool Madani

Razi Vaccine & Serum Research Institute
Archives of Razi Institute

IR Iran-Karaj-Hessarak-POBox 31975-148 Telfax 98 26 34509772 http://archrazi.com

Figure 17: Acceptance letter

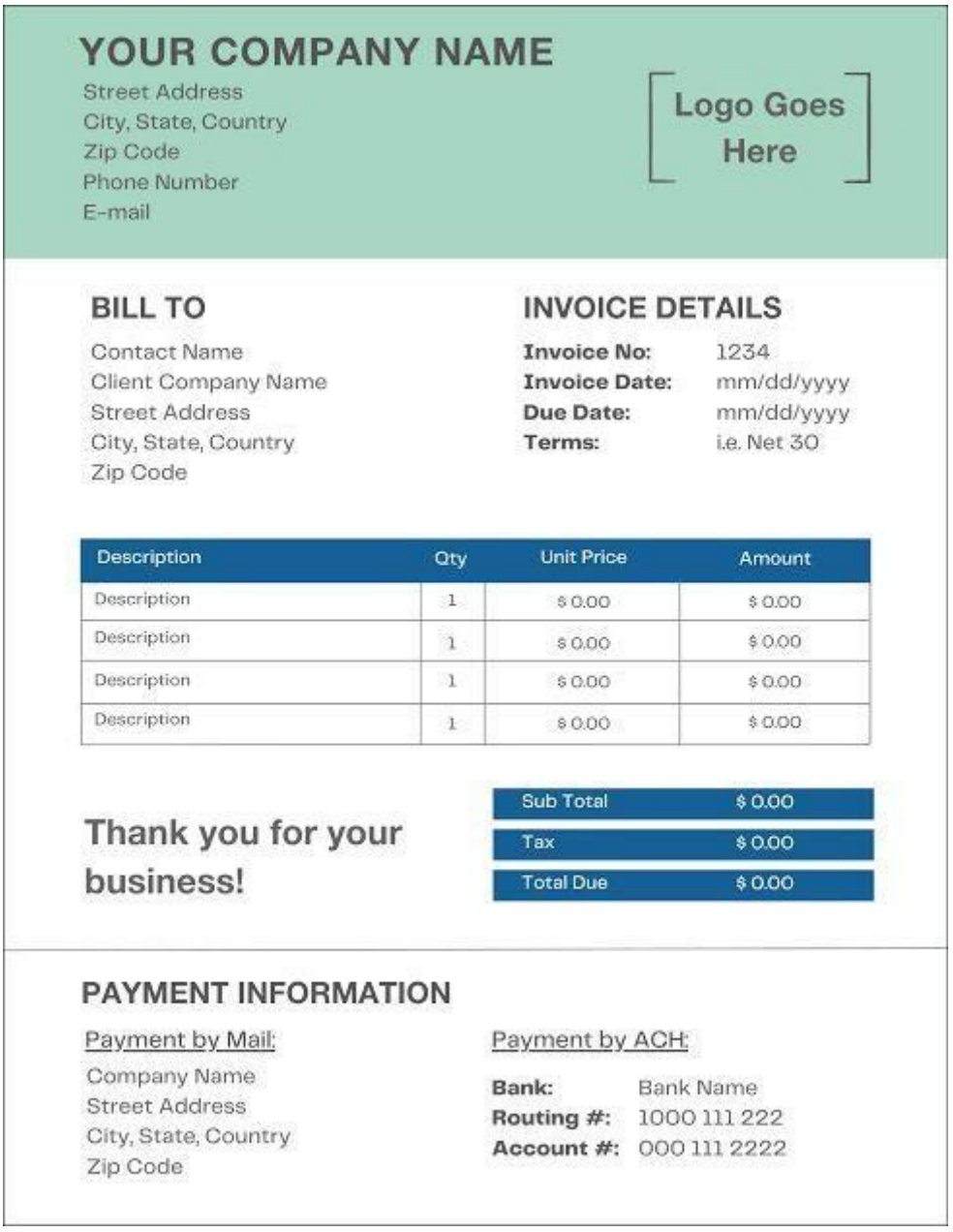

Figure 18: Invoice

9.4 Final Author Confirmation and Galley Proof

The galley proof is sent to the author for one last review after formatting and editing. The assistant to the editor:

1. Conveys the necessary adjustments.
2. Ensures author consent before to publication.
3. Verifies the accuracy of all metadata, including author names, affiliations, and ORCID IDs.

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Research Article

Educational Administration Theory and Practice

The Role Of Innovation In Sustainable Development In The Selected Countries During The Period (2007-2020)

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ARTICLE INFO

ABSTRACT

The study aimed to identify the impact of technological innovation on the sustainable development of the countries of the study sample, which included (Iraq, Tunisia, Egypt and Kuwait) during the period (2007-2020), and the cross-sectional data method was used and the fixed effects model was used to analyze the study variables, and this study resulted in a positive and statistically significant effect of total capital formation and expenditure on research and development as a percentage of GDP on GDP and a negative relationship between labor force and GDP. The study also recommended that governments increase government spending on infrastructure, invest in education and training, and increase government funding for research and development.

Introduction:

The innovations that lead to the introduction of new technology have been since they have known a dynamic engine for the wheel of economic development, and their importance has increased with the era of knowledge that we live in through an increase in productivity in quantity and quality as a result of the introduction of advanced and new technical methods aimed at creating more efficient products that lead to raising the level of competition and occupying a distinguished position in the international market after satisfying the local

Figure 19: Galley proof

9.5 Final Publication and DOI Activation After everything is decided:

Platforms such as CrossRef are used to produce and activate a Digital Object Identifier (DOI). The article can be found on the digital archive or journal's website. The author receives the final link and a publication certificate.

In order to be indexed in the Scopus, Web of Science, and HEC categories, this stage verifies the article's digital identification and citability.

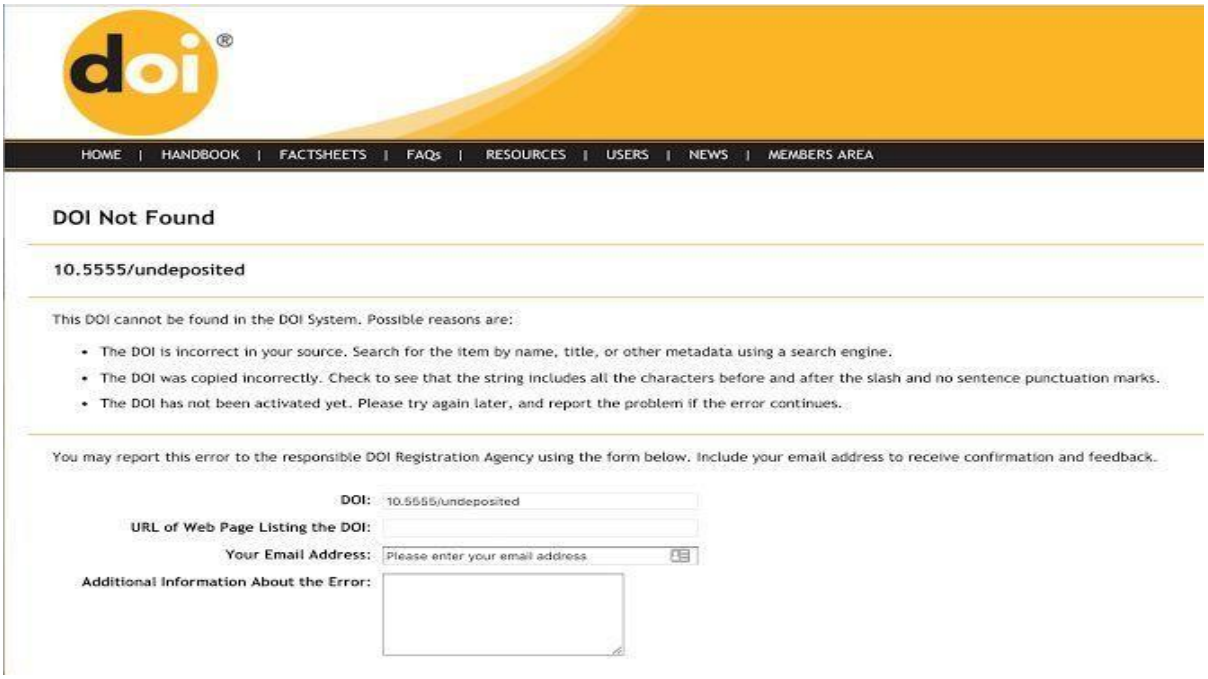

Figure 20: Inactivated DOI

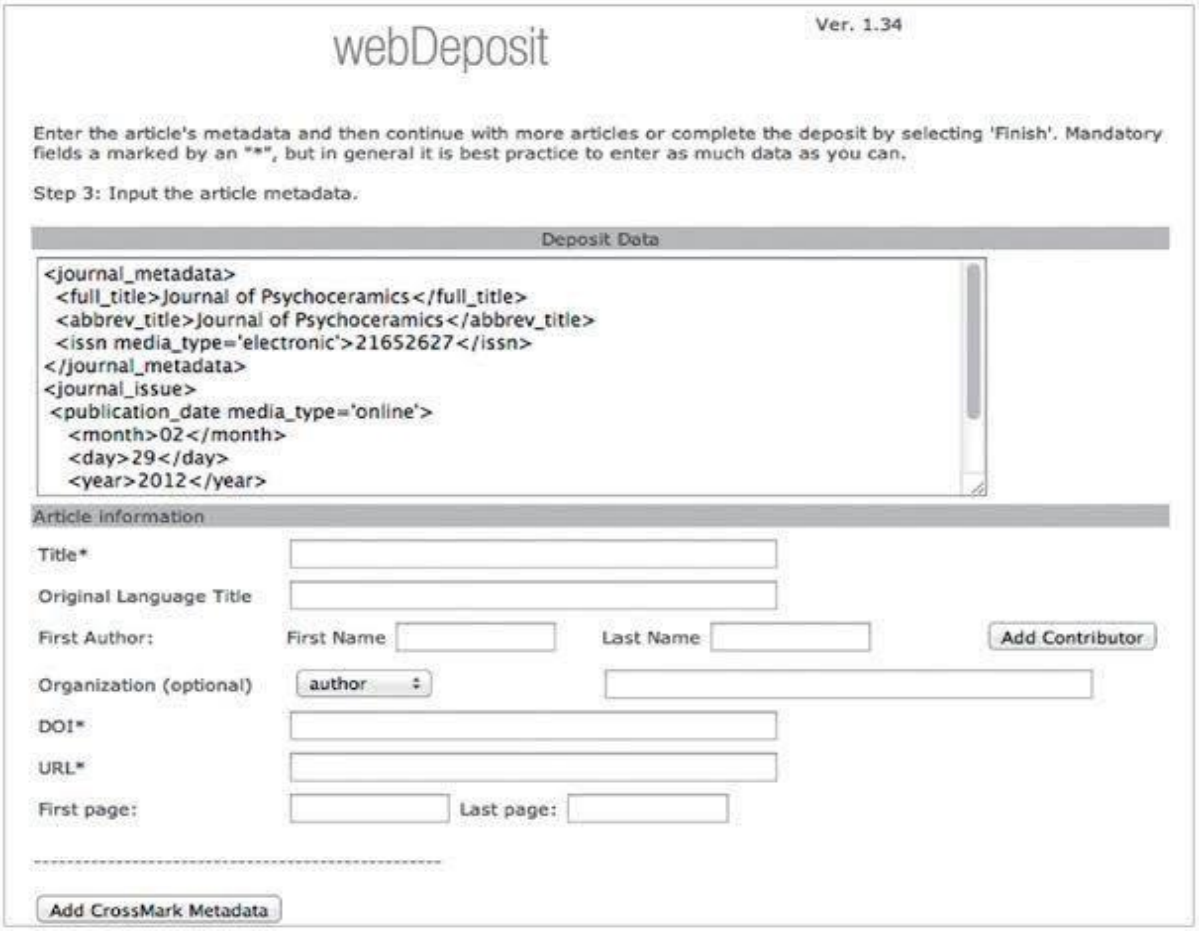

Figure 21: Crossreff For DOI Activation

Figure 22: DOI Activation

9.6 Discoverability and Indexing

Editorial assistants for journals included in Web of Science, Scopus, or HEC categories make sure that:

1. Accurate metadata entry is made to facilitate automated indexing.
2. Articles adhere to major database formatting, referencing, and citation guidelines. If manual submission is required, contact with indexing services is kept up to date. Interpretation
3. The editorial assistant acts as a liaison between the production staff, reviewers, and authors. In addition to editorial comprehension, this position calls on technological know-how, effective communication, and acquaintance with international indexing standards. The assistant's capacity to effectively manage deadlines, tools, and correspondence is crucial to the seamless operation of the digital publishing lifecycle.

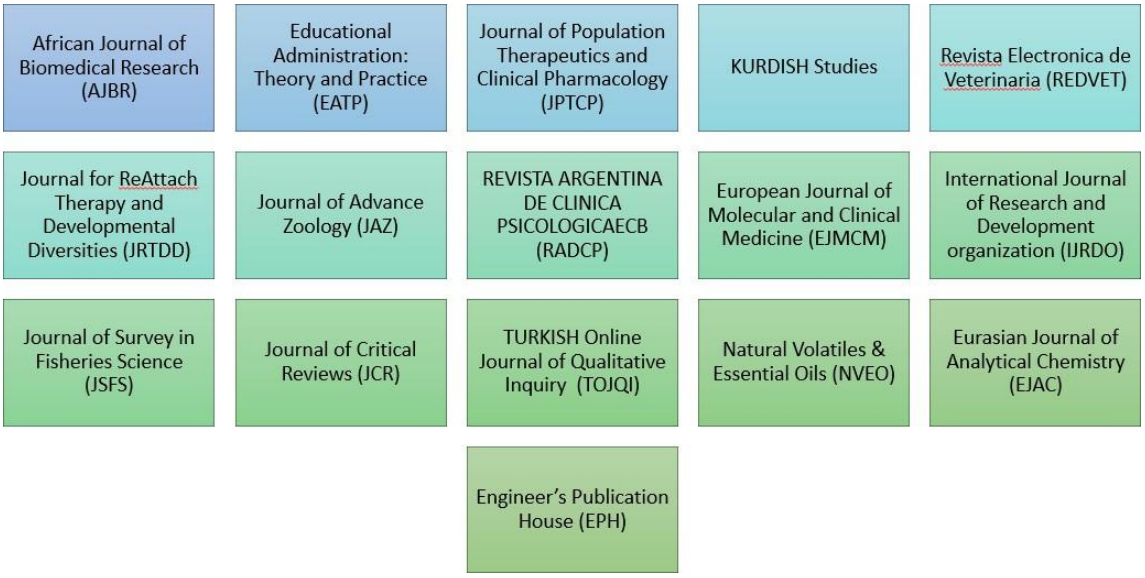

Figure 23: Journals and their Indexing

Chapter 10

Conclusion

Conclusion:

Siddu and Lugri, traditional Himachali dishes, contain probiotic strains mostly from the lactic acid bacteria group. Gram staining, streaking, and serial dilution procedures demonstrated their microbial richness and possible health advantages. The study emphasizes the necessity of keeping traditional fermentation processes to improve the probiotic content of these foods. Additional research, such as molecular identification and functional testing, can confirm their health-promoting characteristics.

As a Job Experience with the advent of digital publishing, the position of the publication editorial assistant has changed significantly. The editing assistant, often thought of mostly as an administrative role, now plays a vital and dynamic role in overseeing the entire digital publication workflow.

Through a targeted case study of EPub Solutions, a business that provides publishing support and digital content conversion, this thesis investigated this transition.

The duties of an editorial assistant at EPub Solutions go well beyond administrative work. To guarantee the seamless and prompt release of digital content, they act as coordinators of the publication process, interacting with authors, reviewers, technical teams, and accounting departments. Among their responsibilities are managing manuscript submissions through messaging platforms, OJS, or email; supervising the peer-review and copyediting phases; creating invoices and monitoring payments; and managing crucial post-acceptance tasks like managing galley proofs, DOI activation, and publication certificate issuance. Editorial savvy, technical know-how, communication abilities, and project management are all necessary for this position.

The implications of the study suggests some important themes. Nowadays, editorial assistants are involved in publication workflows and frequently serve as intermediaries between technical and editorial teams. Discoverability, accessibility, and scholarly value are all directly impacted by their competency with digital technologies, metadata management, and quality checks. However, the study also documented some significant challenges including the lack of formal instruction related to digital publishing technologies and role ambiguity that interfered with productivity and advancement in these roles.

In conclusion, editing assistants are now direct participants in the burgeoning digital publishing ecosystem versus a behind-the-curtain player. Editorial assistants will face greater and greater

challenges as publishing is being driven more and more to the XML-first workflow, open-source access formats, and global distributions. Institutions, publishers, and organizations will need to recognize this condition by providing these professionals with proper resources, training and acknowledgement given their new responsibilities. This will enhance the delivery of the publication process as a whole, but also will help to improve the quality of the deliverables. More generally, this will elevate the quality and efficiency of the publishing process, while also ensuring the ability to flourish and endure in a world of current digital dissemination of content.

CHAPTER 11

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