PREFACE

"An expert is a person who has made all the mistakes that can be made in a very narrow field."

– Neils Bohr

A natural biopolymer known as hyaluronic acid drew my attention as it reportedly has several clinical, aesthetic, and biomedical functions. Owing to its numerous properties, it has earned potential roles in several surgeries related to eyes, knees, skin, and drug delivery. Thus, I chose this study to find options for increasing hyaluronic acid production using the *Streptococcus zooepidemicus* bacterial strain. Different process characteristics that could affect the fermentation system were used to develop the strategies.

Firstly, I tried to optimize the medium composition for mycophenolic acid production. The optimized medium was used for further studies in the shake flask and bioreactor. The kinetic analysis of mycophenolic acid production was carried out in a stirred tank bioreactor. Once the fermentation process's kinetic behavior was analyzed, different strategies were employed to study their effect on hyaluronic acid production.

Then, the stirred tank bioreactor production was studied using different dissolved oxygen concentrations.

A scale-up study was also performed to encounter and solve the problems during the enhanced hyaluronic acid production.

In order to validate the production of hyaluronic acid, purification was carried out. The purified sample was then characterized using different analytical techniques.

Thus, with the immense support and guidance of my Ph.D. supervisors, Prof. Pradeep Srivastava and Dr. Abha Mishra, I have compiled my efforts in the form of this thesis. The thesis has been divided into five chapters:

1. **Introduction:** Details the importance of mycophenolic acid as a therapeutic agent.

2. **Review of Literature:** Describes the study done in the bioprocess development of mycophenolic acid and other antibiotics.

3. **Materials and Methods:** Provide information about the chemical reagents and other aids utilized during the study. It also describes the methodologies which have been adopted for the study.

4. **Results and Discussion:** Gives an insight into the findings of this study and their implications.

5. **Conclusion:** Summarizes the work as well as provides the future scope of this work.

A list of publications has been attached at the end.

I hope this research report will interest Biochemical and Bioprocess Engineering researchers.