

## Preface

*Pleurotus osteratus* (*P. osteratus*), a species from the *Pleurotus* genus, has been intensively studied for its anti-cancer activity, attributed to higher molecular weight myco-metabolites. Conversely, little is known about the anti-cancer bioactivities associated with lower molecular weight myco-metabolites, to list a few ergosterols, and polyphenolic compounds claimed as lower molecular weight biomarkers responsible for anti-cancer activities of *P. osteratus*. Besides this, the comprehensive myco-metabolite profiling, the correlation between myco-metabolites and their bioactivities, and underlying mechanisms are still illusive.

The presented research work was designed to explore differential bioactivity-based screening of preferential extracted higher molecular weight, and lower molecular weight myco-metabolites, a detailed myco-metabolite profiling, and correlating with bioactivity and tracing mechanistic pathway involved in the anti-cancer intervention of potential one.

The thesis is divided into six chapters and are as follows:

**Chapter 1** deals with the exhaustive review on explored anti-cancer potential of *Pleurotus* mushroom till date, an overview on chemometric and network pharmacology, and along with rationale and research objectives. **Chapter 2** explores the bioactivity-based screening of different species of *Pleurotus* mushroom with their myco-chemical profiling. **Chapter 3** describes chemometric-based analysis of myco-metabolite of bioactive enriched fraction of *Pleurotus osteratus* (screened species) and its correlation with in-vitro cytotoxic activity. **Chapter 4** presents tracing the anti-cancer mechanism of HFPO1 (potential fractionate of *P. osteratus*) by the integrative approach of network pharmacology and experimental studies.

**Chapter 5** documents tracing the anti-cancer mechanism of EFPO1 (potential fractionate of *P. osteratus*) by the integrative approach of network pharmacology and experimental studies. **Chapter 6** represents the overall summary and conclusion of the research work.