5. SUMMARY OF THE STUDY

- Both the strains (*M. purpureus* and *M. sanguineus*) had yielded appreciable pigment and biomass under tested stress conditions.
- *M. sanguineus* was able to tolerate elevated temperatures and yielded maximum pigment for spores treated at 70°C.
- Both strains had shown variation in spore’s morphology under heat stress. A ruptured cleistothecium resulting in pigmented spores being spread out from the fruiting body was observed.
- The screened agro-residues had produced different metabolites on different substrates categorizing them unique based on their nutritional value.
- For secondary metabolite production, wheat bran for lovastatin, coconut oil cake for GABA and jack fruit seed for β-glucosidase was established as the best substrate from this study.
- *M. sanguineus* was established as an efficient producer of secondary metabolites as higher yield (lovastatin and GABA) was observed from *M. sanguineus* compared to *M. purpureus* and its co-culture.
- Ninhydrin based protocol was proposed for GABA estimation.
- Co-culture technique was not found compatible for *M. sanguineus* and *M. purpureus*
- β-glucosidase, an extracellular enzyme was partially purified and characterized from *M. sanguineus* and was found an efficient producer.
- In strain improvement, a developed albino strain was observed efficient producer of lovastatin even without pigment biosynthesis
- Albino strain had shown significant variation with wild strain in respect to alteration in spores morphology and secondary metabolite production.
- Compare to wild strain, albino was found more efficient producer of fatty acid
- One unknown ester of fatty acid was observed with albino strain. Based on the mass fragmentation pattern, this unidentified compound could be predicted as methyl ester of a known compound 2-methyl nonadeconate.
- Significant genetic variation on the basis of RAPD was also observed between wild and albino strain.
- *M. sanguineus* and obtained mutants were established as a non-citrinin producer strains under experimented condition.
- *M. sanguineus* and mutants fermented extract had given significant amount of antioxidant and anti-bacterial activity.
- Purified red pigment from *M. sanguineus* crude extract had shown significant higher antioxidant activity and less antibacterial activity compared to crude extract.
- The structure of purified red pigment was found to be different from the known structure of the red pigment with respect to the bonding and the presence of additional hydroxyl groups. The empirical formula for this compound was deciphered as $C_{21}H_{33}NO_9$ with molecular mass of 443.2 amu.