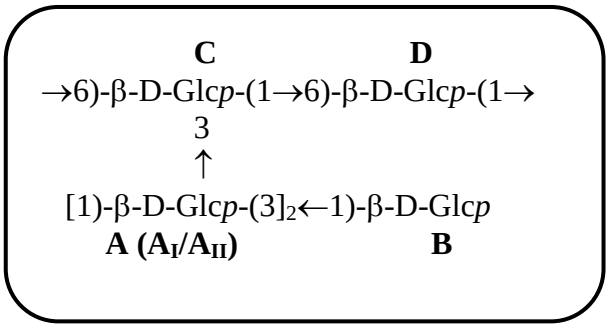
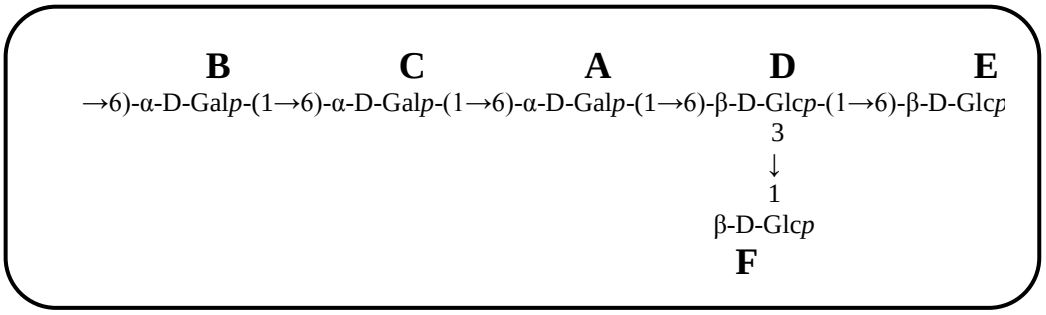
CONCLUSION

The present thesis work isolation, purification, characterization and biological activities of two different polysaccharides from two different edible mushrooms (*Termitomyces heimii and Lentinus fusipes)* were carried out. Also synthesis of silver nanoparticles (AgNPs) using a hetero polysaccharide (consisting of glucose, fucose and galactose), extracted from the *Lentinus squarrosulus* (Mont.) Singer and its effectiveness as an antibacterial agent were examined.

A water soluble β-glucan, with an average molecular weight ~1.48 x 10^5 Da, was isolated from the alkaline extract of an edible mushroom, *T. heimii* and the following structure was characterized by chemical analysis and 1D/2D NMR studies:



A water soluble heteroglycan with an average molecular weight ~ 60 kDa, was isolated from the hot aqueous extract of an edible mushroom *L. fusipes* and the following structure was characterized by chemical analysis and 1D/2D NMR studies:



The polysaccharides, β-glucan and heteroglycan, showed no efficacy towards lipid peroxidation up to 200 µg/ml, 160 µg/ml, respectively. They are biocompatible, play a beneficial role on cell proliferation and exhibited protection against nicotine stimulated toxicity. Moreover, they also exhibited potent antioxidant activities by diminishing the ROS and NO in the nicotine stimulated lymphocytes. It was noted that the optimum concentration of heteroglycan for NO production and splenocyte proliferation was found to be 80 µg/ml and 20 µg/ml respectively.

The hetero polysaccharide from the *Lentinus squarrosulus* (Mont.) Singer fulfilled dual purpose of reducing and stabilizing agent for preparation of silver nanoparticles, no external toxic reducing agent are used (green synthesis). The average size of the nanoparticles was found to be 2.78 ± 1 nm. The synthesized AgNPs-PS conjugates were found to be effective bactericidal agents against multiple antibiotic resistant (MAR) bacterium *E. coli* MREC33. DNA fragmentation study using FACS enabled to understand the mode of antibacterial activity. AgNPs-PS conjugates were also found to be compatible with human RBCs at its LD_{50} dosage. Finally, synergistic antibacterial effect was noted with hemocompatible dose of AgNPs-PS conjugates in combination with different antibiotics.