10.0. SUMMARY AND CONCLUSION

Together with AIDS/HIV and tuberculosis, human malaria represents one of the three most dangerous infectious diseases of humankind. In 2007, 1.38 billion people were estimated to be at risk of infection with *P. falciparum*, the protozoan endoparasite responsible for up to 2 million annual human deaths from malaria. The lack of an effective medicine and the rapid spread of resistance to most antimalarial drugs are major concerns for the control of this unicellular eukaryote. In particular, the complexity of the *Plasmodium falciparum* life cycle, which is associated with many unique morphological and metabolic states, has challenged efforts to identify parasite specific molecular mechanisms that can be targeted by new malaria intervention strategies. Hence, the present study has carried out to find out the safe and efficacious medicines for the successful management of malaria. The salient findings of the work are listed as follows:

1. A total of 148 total heterotrophic bacteria (THB) and 21 actinomycetes (ACT) strains were isolated from 36 marine sponge samples. The maximum counts of THB was found in November (monsoon season) and ACT in May (summer season).
2. Among the 76 THB and 20 Actinomycetes strains isolated, only two strains viz., strains ACT-20 showed maximum inhibition of parasitaemia (IC$_{50}$ at 3.125 µg.ml$^{-1}$) and followed by THB-14 (IC$_{50}$ at 6.25 µg.ml$^{-1}$).

3. In silico analysis of the most promising strain of THB-14 showed high similarity (92%) with bacterium DR379 and comes under Enterobacteriaceae and named as Bacterium RJAUTHB-14, moreover actinomycete strain (ACT-20) showed 100% similarity with Streptomyces sp. SB9 comes under the family of Streptomycetaceae and named as Streptomyces sp. RJAUACT-20.

4. Toxicity studies reveals that, the bioactive crude extracts obtained from bacterium RJAUHTB-14 and Streptomyces sp. RJAUACT-20 were found to be non toxic in rats up to 2500 and 3000 µg.kg$^{-1}$ bw. Serum parameters such as AST, ALT, ALP, protein, albumin, globulin and bilirubin in serum were found normal. Blood parameters such as WBC, poly morphonuclear leucocytes, lymphocytes, eosinophils, haemoglobin, RBC, PCV%, platelet, cholesterol, TGL, HDL, LDL, VLDL, sugar and urea showed negligible changes.
5. Heavy metal studies showed that, the most active extracts from sponge associated actinomycetes and bacteria contain heavy metals at a permissible level as per WHO guidelines. The bioactive constituents such as alkaloids and tannins were reported to present in bacterium RJAUTHB-14 and reducing sugars, phenol and alkaloids were found in *Streptomyces sp.* RJAUACT-20.

6. The microbial contaminants such as *E. coli, Salmonella sp.* and *Enterobacter sp.* are found within the acceptable limits of WHO guidelines.

7. The physical properties such as ash value and the organoleptic parameters such as colour, taste, odour and consistency are found within the admissible limits of WHO.

It is concluded from the present study that, the sponge associated bacterium RJAUTHB-14 and *Streptomyces sp.* RJAUACT-20 isolated from Palk Strait region has potential bioactive principles having good antiplasmodial activity covering all permissible standards of WHO guidelines and hence it opens a new way for the development of potential antimalarial drugs. The purification and structural elucidation of the unique chemical classes present in the most effective crude extracts are highly warranted for the successful completion of clinical trails.