Conclusion:

From this study following conclusions were made:

- Males are more susceptible to malaria than females probably due to hormonal differences.
- Age groups between 10-50 years were found more susceptible than other age groups.
- Prevalence of *P. vivax* was found more than *P. falciparum* in this region.
- Though the microscopic test is the standard method, it requires skilled person for the diagnosis. Therefore this method can be replaced by RDT to avoid delay in proper treatment. In this study sensitivity, specificity, PPV and NPV for RDT were found 97.8%, 99.3%, 99.38% and 97.47% respectively in comparison with gold standard of microscopy.
- The RDT efficacy is more even in case, when patient has already taken any medicine before visiting doctor.
- In some of the cases, old drugs like CQ and PQ as well as modern drugs like artemisinin derivatives and lumefantrine were not effective.
- From molecular study it can be concluded that the parasites selected in the present study were not found to be drug resistant. The results were in complete agreement with WHO and NVBDCP report.
- From the BLAST study with NCBI and PlasmoDB database, it was found that *Pv*LDH sequence was 99% resembling to LDH of *P. vivax* Ori-1 and Ori-4 strains. *Pf*LDH sequence was 99% resembling to LDH of *P. falciparum* Mzr-1 and 3D7 strains.
- To avoid the side effects of antimalarial drugs, herbal drugs can be used. The herbal components from tulsi and mamejavo fulfilling Lipinski’s Rule of five, were also found to be effective on LDH and *dhps* enzyme. Over all best suited antimalarial drug candidates found from *in silico* study were luteolin, apigenin and swertiamarin, all belongs to mamejavo.
- *In silico* study can narrow down the range of the possible antimalarial drug candidate before doing their *in vivo* or *in vitro* study.
Future Plan and Suggestions:

- The *in silico* study will be confirmed by studying the effect of herbal drug components obtained from tulsi and mamejavo and will be tested *in vitro* or *in vivo*.
- We can also test other herbal components derived from other plants.
- The concentration of the effective component will be determined.
- RDT must be employed as a confirmatory test to avoid transmission of drug resistance.
Summary:

Malaria has been a major parasitic, communicable tropical disease transmitted by the biting of female *Anopheles* mosquito and caused by four *Plasmodium* species namely *Plasmodium vivax*, *P. falciparum*, *P. ovale* and *P. malariae*. Among them *P. vivax* and *P. falciparum* are common in India. The reemergence of malaria has been reported in several countries such as India, Peru, China and Korea. It has become a serious health problem in these countries. In India during the year 2011 total malaria cases reported were 3,36,545. Among them 53.75% were due to *Plasmodium falciparum* and rest of the cases were due to *P. vivax*. Delay in malaria treatment may lead to serious consequences including death.

Prompt and effective treatment is also important for controlling the transmission of malaria, for which rapid diagnosis is of prime importance. Microscopy continues to be the gold standard for identification of *Plasmodium* species in the laboratories. But the sensitivity of microscopy may fluctuate depending upon the skill of technician. To solve this problem, WHO has recognized RDT as simple and cost effective diagnostic test for malaria to overcome the deficiencies of microscopy and clinical diagnosis.

There are several different approaches for the assessment of parasite’s susceptibility to antimalarial drugs such as chloroquine, artemisinin derivatives, coartem, atovaquone, amodiaquine hydrochloride etc. WHO has recommended several *in vivo* methods. One such guideline suggested by WHO is to collect blood before treatment and after 48 hours of treatment. It should lead to decrease in parasite count by less than 25%. Parasite count greater than 25%, suggest possibility of high degree resistance, inappropriate therapy or inadequate drug absorption. To determine the drug efficacy study was performed on malaria patients.

Bioinformatics now a day become a valuable field to solve many biological problems and even for malaria. *In vivo* and *in vitro* test are time consuming, expensive and lengthy therefore *in silico* test were performed with NCBI, PlasmoDB, PDB, NCBI Pubchem and ZINC databases. The online tools used were BLAST, Clustal W, T Coffee, Swissmodel, Swissdock. The offline tools used were Arguslab, UCSF Chimera and Open Babel. Docking study was performed using components of medicinal plants, i. e. tulsi - *Ocimum sanctum* and mamejavo - *Enicostemma littorale*. pLDH and dhps were used as drug target.