Summary and Conclusions
1. An extensive and exhaustive review (1912-1999) based on conventional botanical descriptions, phytochemistry of their extracts and scientific parameters of dose dependence in vivo and in vitro, of antimalarial and antiamoebic plants along with their common antiprotozoal features has been listed.

2. The ethnobotanical information was gathered by direct field interviews of old villagers, ladies, the professional singers (Barots) and local healers (Gunijis and Vaidyas) practicing traditional medicine in the last half century. The most commonly described antipyretic plant was *Calotropis procera*. The intact buds and flowers, roots burnt in mud-pots, and latex beads picked up from the sand are being used in fever. Similarly the plant *Commiphora wightii* was chosen to test its antiamoebic activity based on its mention in ethnobotanical information (Sharma 1995).

3. *C. procera* is a wild weed while *C. wightii* is a conserved plant with some socioeconomic benefits. *C. procera* is distributed widely in nature and may be one of the only available medicinal plants in a desert ecosystem and finds a place in folklore. *C. wightii* has however found a limited place in the pharmaceutical market.

4. Since plants have been found active against one particular organism can possess a broad spectrum of antiprotozoal activity against other organisms, so both the plants *C. procera* and *C. wightii* were tested against *P. falciparum* and *E. histolytica*. These two pathogens which are prevalent in the region are also easier to cultivate in the laboratory.

5. The preliminary phytochemical screening for *C. procera* leaves, roots, stem, flower and bud extracts showed most commonly found classes of compounds, while with the gum-oleo resin extract of *C. wightii* the alkaloids were absent. Peroxides, commonly known to be present in other antimalarial plants like Artemisia were conspicuous by their absence in both these plants.

6. All the ten standard antimalarial drugs tested showed activity at 30 to 3000 times lower doses of IC$_{50}$ (0.00032-4.914 µg/ml) for MRC *P.f. 20* and IC$_{50}$ (0.0047-4.959 µg/ml) ) for MRC *P.f. 76*. The individual variations between the chloroquine related drugs and artemisinin related drugs were not significant. However the Artemisinin related drugs showed a better dose response for MRC *P.f. 76*. 
7. A significant variation was found in the *in vitro* antiplasmodial activity between different fractions and different parts of the two plants when tested using Analysis of Variance, which was further tested by Tukey's test, for the two isolates of *P. falciparum*. Statistical significance was also found for the dose effective responses for antiamoebic activity with *E histolytica in vitro*.

8. Of the six ethanolic extracts flower ethanol extract (IC$_{50}$=0.112 mg/ml and 0.519 mg/ml) is found to be the most active followed by budethanolic extract (IC$_{50}$=0.122 mg/ml and 0.684 mg/ml) in both the CQ sensitive MRC *P. f.* 20 and CQ resistant MRC *P.f.* 76 isolates respectively. Among the total 23 fractions, gum hexane (IC$_{50}$=0.0068 mg/ml and 0.301 mg/ml) is the most effective against both the isolates of *P. falciparum*. These may be studied further to purify and isolate the active component responsible for antiplasmodial activity from these crude extracts.

9. Gum-oleo resin of *C. wightii* (IC$_{50}$= 0.48.09 μg/ml) followed by its hexane fraction (IC$_{50}$= 10.08 μg/ml) and further Guggulsterone-E (IC$_{50}$= 2.584μg/ml) and Cembrene-A (IC$_{50}$= 6.94 μg/ml) were the best when tested for their antiamoebic activity against *E. histolytica* HM-1: IMSS *in vitro*.

10. Of the four purified compounds as obtained (Dr. Sukh Dev), Cembrene-A from the gum-ooloe resin of *C wightii* is effective as both anti amoebic (IC$_{50}$ =6.94 μg/ml) and anti malarial (IC$_{50}$= 0.687 μg/ml in MRC *P.f.* 20 and 12.61 μg/ml in MRC *P.f.* 76). Also Cembrene-A showed chloroquine potentiating action in combination with chloroquine (A.E.I.= 6.171) in MRC *P.f.* 20.

11. An interesting feature of this study is the tendency in reversal of resistance in the CQ resistant isolate MRC *P.f.* 76 with the IC$_{50}$ values reverting to those similar for the CQ sensitive isolate MRC *P.f.*20. with flower ethanol, gum-resin ethanol, and flower ethylacetate when tested in combination with chloroquine.

12. Of the six ethanol extracts, the gum ethanol extract was least toxic when tested *in vitro* for their hemolytic activity in human erythrocytes. k1 (rate constant), in the pseudo-first-order reaction, increases with increase in dose of both extracts and fractions. The percentage hemolysis of fractions was lower as compared to crude ethanol extracts.

13. In our study the overall plant extracts showed little DNA binding except in cases in which scattered 50 % reduction in the final absorbance was observed when tested
for their biological activity using a trial run of DNA-methyl green assay. Gum-oleo resin of *C. wightii* and flower extracts of *C. procera* were identified for their better DNA binding in the presence of graded doses of chloroquine.

14. The use of established scientific methodologies and newer parameters for bioactivity like 1) *in vitro* schizontocidal activity and antiamoebic activity, 2) %age hemolysis, and 3) DNA binding for biological activity, with crude plant extracts may enrich scientific literature. In this the linkages with ethnobotany have been shown but need to be further reinforced with isolated compounds.