

CHAPTER VI

CONCLUSIONS & FUTURE WORK

6. 1. Conclusions

The major findings of the study on hair follicle regenerating property of phytopharmaceuticals isolated and purified from *E. alba* and *A. barbadensis* and their biochemical characterizations leads to the following conclusions:

1. The genome size of *A. barbadensis* (4.42×10^9 bp) is longer than the genome of *E. alba* (4.27×10^9 bp).
2. The compound Ea 1 isolated from the *E. alba* methanolic extract showed structural similarities with eclalbasaponin from FTIR, MS and NMR spectral analysis. The molecular formula of the compound was found to be as $C_{32}H_{62}O_8$ and the mass value 620.3.
3. The compound Ea 2 is an aliphatic compound isolated from the *E. alba* ethylacetate extract and the probable structure of the compound was determined as $C_{15}H_{28}N_2O_2$ with the mass value 268.22.
4. According to the FTIR and NMR spectral data, probable molecular formula of compound Av 3 were found to be $C_{13}H_{18}O_4$ with mass value of 238.12. Also,

compound Av 4 was found to be similar with aloenin, from the spectral data analysis.

5. Eclalbasaponin isolated from *E. alba*, showed highest antibacterial activity among all the isolated phyto-compounds, although aloenin showed highest antifungal activity.
6. In the case of DPPH scavenging assay, both eclalbasaponin and aloenin showed strong radical scavenging property as compared to the standard gallic acid and quercetin. Antioxidant activity of both eclalbasaponin and aloenin were studied here for the first time.
7. All the isolated phyto-compounds possessed no cytotoxicity on murine macrophage cell line (RAW264.7) upto the concentration of 100 mg/ml.
8. All the isolated phyto-compounds were found to be non-irritant on rabbit skin even after 72 hours of exposure.
9. Warfarin at 1.7mg/kg for 60 days could induce alopecia in wistar albino rats. The initial area of patchy hair fall lead to total body hair loss.
10. Both eclalbasaponin and aloenin showed good hair follicle regenerating ability in the case of warfarin induced alopecia in the animal models as compared to the standard drug minoxidil. The regeneration time of hair follicles as well as the time of completion of hair growth was much less in the case of eclalbasaponin treated animals, in comparison to aloenin and minoxidil treated animals.

11. The length and weight of hair after treatment with eclalbasaponin, was increased as compared to aloenin and minoxidil. Rate of elongation is 0.16 cm/day and increment of hair weight is 0.27 mg/day.
12. Skin histological study confirmed the initiation of hair follicle regeneration on 4th day, 6th day and 9th day in the case of eclalbasaponin, aloenin and minoxidil treated animals, respectively.

6.2. Future works

1. Eclalbasaponin and aloenin can be used in pharmacological research and incorporated in hair fall treating cosmetic products which may increase their effectivity.
2. Molecular mechanisms of both the compounds on hair follicle can be studied in future. Molecular docking of eclalbasaponin and aloenin on drug targeted enzymes like 5α -reductase II enzyme may be studied in future.