ABSTRACT

Plants produce a diverse range of bioactive molecules, making them a rich source of different types of medicines. A regular and widespread uses of herbs throughout the world has increased serious concern over their quality, safety, and efficacy. Thus, a proper scientific evidence or assessment has become the criteria for acceptance of herbal health claims. In the present study, *Amaranthus caudatus*, *Amaranthus spinosus* and *Amaranthus viridis* belong to the family Amaranthaceae were selected based on ethnomedical claims. Since there was no scientific evidence it was felt to carryout the comparative studies of various species of Amaranthus for antidiabetic and anticholesterolemic activities using different models.

Successive solvent extraction of powdered leaves of three plants were carried out using different solvents viz., Petroleum ether (60 -80°C), chloroform, acetone, methanol and water were subjected to phytochemical screening. Methanol and aqueous extracts were determined for total phenolic and flavonoid content, TLC and HPTLC studies. The methanol and aqueous extracts of three plants were evaluated for antidiabetic and anticholesterolemic activities by using different models. The antidiabetic activity was carried out by using alloxan and STZ induced diabetes for 21 days at 200 and 400mg/kg p.o. Blood glucose, lipid profile, histology of rat pancreas, changes in body weight were determined. The anticholesterolemic activity was carried out by using hypocholesterolemic activity for 8 days and Triton induced hyperlipidemia for 24hrs and 48hrs at 200,300 and 400mg/kg p.o. Serum cholesterol, triglycerides, HDL and LDL were determined.

Phytochemical studies showed the presence of phytoconstituents like glycosides, phenolic compounds, tannins, proteins and aminoacids, fixed oils and fats and carbohydrates showed positive tests. Methanol and aqueous extracts of *A. viridis* had the highest phenol and flavonoid content of 83.26 ug/mg GAE, 52.82ug/mg GAE and 138.89 ug/mg RE, 98.28ug/mg RE respectively. The acute LD50 value for methanolic and aqueous leaves extracts of
three plants were found to be safe upto 5000mg/kg p.o. The statistical data indicated that in hypoglycemic activity in normal rats, all the three plants of Amaranthus showed significant (P<0.05) in reducing the blood glucose level on the 14th day of the study. In alloxan induced diabetic rats, methanol extracts of *A. caudatus, A. spinosus and A. viridis* and aqueous extract of *A. viridis* at 400mg/kg showed significant (p<0.01) antidiabetic activity on 14th day of the study period. In STZ induced diabetic rats, methanol extract of *A. viridis* at 400mg/kg showed significant activity (p<0.01) in reducing blood glucose level on 7th day. Methanol extracts of *A. spinosus and A. viridis* at 400mg/kg showed significant (p<0.01) increase in body weight on 7th & 21st day of study period. *A. viridis* at 400mg/kg p.o. showed significant (p<0.01) in decreasing cholesterol, triglycerides, LDL and (P<0.05) in increasing HDL in STZ induced diabetes rats. Histologically, focal necrosis was observed in the diabetic rat pancreas but was less obvious in treated groups. In hypocholesterolemic activity, *A. viridis* at 300mg/kg showed significant (p<0.01) in decreasing cholesterol and *A. viridis* at 400mg/kg showed significant (p<0.01) in decreasing triglycerides, LDL and increasing HDL cholesterol. In Triton induced model, *A. viridis* at 400mg/kg showed significant (p<0.01) in decreasing cholesterol, LDL after 24hr and 48hr. *A. caudatus and A. viridis* at 400mg/kg showed significant (p<0.01) in decreasing triglycerides and increasing HDL cholesterol level. These results suggest that, methanolic extract of *Amaranthus viridis* showed significant antidiabetic and anticholesterolemic activity compared to *Amaranthus caudatus and Amaranthus spinosus*. Hence methanolic extract of *Amaranthus viridis* was subjected to isolation and characterization.

Three compounds have been isolated. **Compound- I- AV-KG (1S,4aS,7R,7aS)-7-hydroxy-7-(hydroxymethyl)-1-\{[3,4,5-trihydroxy-6-(hydroxyl methyl)tetrahydro-2H-pyran-2-yl]oxy\}-1,4a,7,7a tetrahydrocyclopenta[c]pyran-4-carboxylic acid, Compound II-Dammaranediol Class:[triterpene], Compound-III- Isomer of Dammaranediol**
Finally, it can be concluded that *Amaranthus viridis* possess potent anti-diabetic and anti-cholesterolemic activities compared to *Amaranthus caudatus, and Amaranthus spinosus*. 