CONCLUSION

The present piece of work highlights following important points:

**Andrographis paniculata (Burm. f.) Nees** (Acanthaceae) is a renowned plant in South-Asian traditional medicine, used for the treatment of cold, fever, laryngitis and several infectious diseases ranging from malaria to dysentery and diarrhea. The plant is claimed to possess immunological, antibacterial, antiinflammatory, antithrombotic, hepatoprotective and antidiabetic properties and is advocated as a safe, highly important, medicinal plant for general mankind. In the present study, we have investigated, for the first time, this plant as renoprotective agent.

**ANTIRENAL FAILURE ACTIVITY OF THE PLANT**

‘**Andrographis paniculata**’

**ON DIABETIC AND NON-DIABETIC ALBINO RATS**

**DIABETIC NEPHROPATHY**

- Among the various parts of the plant studied, roots were found to be most effective compared to aerial parts.

- Among the various solvent extracts tested, methanolic root extract is found to be most effective compared to Pet ether and CHCl₃ extracts.

Above conclusion has been drawn on the basis of the following observations:

**Aerial Extract: Pt.ether:** Improved Serum Creatinine (36.36%), Serum Urea (42.86%), Urinary Creatinine (19.28%), Urinary Urea (11.06%) and Urinary Proteins (2.36%) levels; **CHCl₃:** Improved Serum Creatinine (57.85%), Serum Urea (41.35%), Urinary Creatinine (20.48%), Urinary...
Urea (19.14%) and Urinary Proteins (5.32%) levels; **MeOH**: Improved Serum Creatinine (61.98%), Serum Urea (53.68%), Urinary Creatinine (54.22%), Urinary Urea (21.71%) and Urinary Proteins (3.62%) levels.

**Root Extract: Pt.ether**: Improved Serum Creatinine (46.28%), Serum Urea (44.96%), Urinary Creatinine (56.43%), Urinary Urea (14.56%) and Urinary Proteins (2.14%) levels; **CHCl₃**: Improved Serum Creatinine (65.28%), Serum Urea (53.76%), Urinary Creatinine (56.95%), Urinary Urea (20.32%) and Urinary Proteins (5.38%) levels; **MeOH**: Improved Serum Creatinine (76.86%), Serum Urea (56.59%), Urinary Creatinine (94.32%), Urinary Urea (44.78%) and Urinary Proteins (23.05%) levels.

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**GENTAMICIN INDUCED RENAL FAILURE**

- Among the various parts of the plant studied, roots were found to be most effective compared to aerial parts.

- Among the various solvent extracts tested, methanolic root extract is found to be most effective compared to Pet ether and CHCl₃ extracts.

Above conclusion has been drawn on the basis of the following observations:

**Aerial Extract: Pt.ether**: Improved Serum Creatinine (42.73%), Serum Urea (41.42%), Urinary Creatinine (17.42%), Urinary Urea (19.17%) and Urinary Proteins (11.40%) levels; **CHCl₃**: Improved Serum Creatinine (50.20%), Serum Urea (60.59%), Urinary Creatinine (20.44%), Urinary Urea (21.11%) and Urinary Proteins (15.64%) levels; **MeOH**: Improved Serum Creatinine (69.91%), Serum Urea (63.07%), Urinary Creatinine (56.97%), Urinary Urea (21.37%) and Urinary Proteins (24.82%) levels.

**Root Extract: Pt. ether**: Improved Serum Creatinine (52.98%), Serum Urea (43.05%), Urinary Creatinine (50.24%), Urinary Urea (19.34%) and Urinary Proteins (11.50%) levels; **CHCl₃**: Improved Serum Creatinine
(62.06%), Serum Urea (63.40%), Urinary Creatinine (54.92%), Urinary Urea (24.33%) and Urinary Proteins (21.69%) levels; \textbf{MeOH}: Improved Serum Creatinine (74.85%), Serum Urea (68.00%), Urinary Creatinine (83.83%), Urinary Urea (42.90%) and Urinary Proteins (30.47%) levels.

**HISTOPATHOLOGICAL STUDIES**

- Predominant activity of \textbf{MeOH} root extract finds support from histopathological studies. Renal damage due to gentamicin was found to be reduced, almost towards the normal., under the influence of the MeOH root while \textbf{Pet ether} and \textbf{CHCl}_3 root extracts exhibited increased mesangial matrix, enlarged capillary tufts, and atropic glomerulus, segmental sclerosis, respectively.

**CHEMICAL STUDIES**

- The presence of two compounds viz., 3-[2-[decahydro-6-hydroxy-5- (hydroxymethyl)-5, 8a-dimethyl-2-methylene-1-napthalenyl] ethylidene] dihydro-4-hydroxy-2(3H)-furanone (\textit{Andrographolide}) and a \textbf{Glucose derivative of Andrographolide} have been characterized. The compound \textbf{FME}\textsuperscript{C} has been earlier reported in the aerial and root parts of the plant, while \textbf{FME}\textsuperscript{B} has been traced in roots of \textit{A. paniculata} for the first time.

- The renoprotective bioassay of the two isolated compounds viz. \textbf{FME}\textsuperscript{C} and \textbf{FME}\textsuperscript{B} against gentamicin - induced nephrotoxicity and diabetic nephropathy in rats has been observed as follows:

**Individual:**

- \textbf{FME}\textsuperscript{B} (\textit{Gentamicin nephrotoxicity}): Improved Serum Creatinine (51.31%), Serum Urea (48.27%) and Urinary Proteins (13.24%) levels, at a dose 20 µg/ml; \textbf{Diabetic nephropathy}: Improved Serum Creatinine (61.22%), Serum Urea (51.99%) and Urinary Proteins (23.48%) levels; at a dose 90 µg/ml; and
- **FME** (Gentamicin nephrotoxicity): Improved Serum Creatinine (71.13%), Serum Urea (75.08%) and Urinary Proteins (44.20%) levels, at a dose 20 µg/ml; **Diabetic nephropathy:** Improved Serum Creatinine (54.73%), Serum Urea (75.62%) and Urinary Proteins (35.10%) levels; at a dose 90 µg/ml.

**Combinational:**

**Gentamicin nephrotoxicity:**
Improved Serum Creatinine (81.42%), Serum Urea (77.26%) and Urinary Proteins (51.09%) levels, at a dose 20 µg/ml;

**Diabetic nephropathy:**
Improved Serum Creatinine (58.26%), Serum Urea (63.92%) and Urinary Proteins (32.35%) levels; at a dose 90 µg/ml.

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Both the bioactive principles namely, Andrographolide (FME) and its glucose derivative (FME), isolated from the roots of the plant, individually abolished the changes produced due to renal damage albeit, combination of these, synergistically resulted in a better protection. The renoprotective potential of andrographolide and its glucose derivative against both, drug induced nephrotoxicity and diabetic nephropathy, makes both the plant metabolites interesting for clinical research.