9. SUMMARY

It is an ancient practice to use herbs and herbal products for treating human ailments. The researchers began their study on isolating many phytochemicals and characterising lead molecules with more therapeutic benefit with minimal toxicity. But many of the lead molecules were found to be highly toxic and were obsolete. But the crude drugs containing the same molecules are being used in the treatment since the ages by Ayurvedic practitioners in their crude form or after subjecting them to specific shodhana process. But there are no scientific data on the shodhana process and its impact on phytochemical and pharmacological profiles. Keeping this in view few herbs and the prescribed shodhana processes to detoxification of them were used and scientifically validated. The herbs/herbal products selected for the present study were i. seeds of nux vomica, ii. guggul and iii. Seeds of datura. The present study was planned with the following objectives:

The specific objectives of the study are;

1. To study the influence of shodhana process on the physico-chemical and pharmacognostic features of the herbal products [seeds of *Strychnos nux-vomica*, guggulu (oleogum resin of *Commiphora mukul*) and seeds of *Datura metel var. fastuosa*] of the study.

2. To study the influence of various shodhana processes on the phytococonstituents of herbal products of the study.
kashaya. Shodhana of guggulu with cow milk was also found to be useful. Shodhana processed datura seeds showed enhanced efficacy. The completely shodhana processed (2\textsuperscript{nd} method) seeds showed better efficacy than partially processed seeds (1\textsuperscript{st} method). The enhanced efficacy may be due to decreased total alkaloid content and increased hyoscyamine content. The results are comparable with standard drug treatments.

It may be concluded that the traditional system of purification (Shodhana) can influence the phytochemical, pharmacological and toxicological profile of the plant drugs and useful in adopting shodhana processes in increasing safety, and efficacy of the drugs. It is worthwhile to adopt shodhana processes as per Indian system of medicine in the development of herbal formulations with applications of modern technology to assess its safety and efficacy.

It is evident from the study that ultra modern techniques like HPTLC, HPLC, LC-MS, and spectroscopy are very much useful in assessing the influence of traditional way of detoxification of toxic drugs.
3. To study the influence of the shodhana processes on the toxicity of the herbal products of the study.

4. To study the influence of the shodhana processes on the Pharmacological profile and therapeutic efficacy of the plant products of the study.

5. To establish a rationality in prescribing a specific shodhana process for a particular drug.

As a part of this study the selected plants were subjected to specific shodhana processes as per the ancient literature. The products before and after each step of shodhana were validated by assessing various pharmacognostic parameters (i.e. loss on drying values, ash values), phytochemical profile (i.e. concentration of principal phytoconstituents, LC – MS, HPTLC/HPLC, etc.) and pharmacological and toxicological profiles. The current study was carried in the phased manner as below:

Phase-I: Plant material for the study are collected and subjected for analysis of various pharmacognostic and phytochemical investigation.

Phase-II: In this phase of investigation, the plant materials are subjected to various shodhana processes as described by ancient literature or native practitioner. In addition to this, the processed materials are subjected to various pharmacognostic and phytochemical investigation.
Phase-III: In the third phase, unprocessed and shodhana processed materials are subjected to the toxicological and pharmacological study.

Phase-IV: In the final phase of the study, comparison was made between the processed materials with that of the unprocessed materials with respect to pharmacognostic, phytochemical, toxicological and pharmacological analysis. Furthermore, it was also planned to assess the efficacy of various shodhana process on the therapeutic efficacy of the plants of the study.

*Strychnos nux-vomica* was detoxified by two methods namely i. Method described in the ancient literature and ii. Method adopted by the native practitioner. The unprocessed and shodhana processed seeds after each step of shodhana were studied to assess the influence of shodhana (detoxification) on various pharmacognostic, pharmacological activities including acute toxicity were used to assess the influence of shodhana.

Shodhana process altered the pharmacognostic standards and reduced the total alkaloids, strychnine & brucine contents and also eliminated loganic acid glycosides. The acute toxicity (LD50) of shodhitha product was reduced to the extent of 1/10th of the unprocessed seeds. The efficacy of nux-vomica seeds in protecting liver, stomach, and kidney was significantly enhanced by shodhana treatment. Similarly analgesic and anti-inflammatory potency of the seeds was also increased after each step of shodhana. The completely
shodhana processed (both ancient method & modified methods of processing) and formulation showed more therapeutic efficacy when compared with partially (1\textsuperscript{st}, 2\textsuperscript{nd} steps) processed products. A modified method adopted by native practioner showed more efficacy than ancient method. The efficacy of shodhana processed products was comparable with standard drug treatments. Therefore the shodhana process used by Ayurvedic system of medicine for detoxification of nuxvomica seeds is scientific and justifiable.

The guggul oleo-gum resin and datura seeds were similarly detoxified by ancient methods of shodhana and were analysed for the influence of them on various pharmacognostic, and phytochemical analysis, acute toxicity and pharmacological activities.

Detoxified guggulu did not altere the toxicity of guggulu. But shodhana treatment enhanced the potency of guggulu in reducing inflammation, elevated lipid profile, gastric ulcers and protecting cardiac tissue in rats. The phytochemical analysis showed that the concentration of guggulu lipids was reduced significantly after shodhana treatment. Further guggulusterone E concentration was reduced and guggulusterone Z concentration was increased when it is detoxified by swedhana with cow milk. Contrary to this Guggulusterone z concentration was decreased after shodhana treatment with triphala kashaya. But during shodhana with triphala kashaya the gallyl glucose present in the triphala is diffused into the guggulu and this may be reason for enhanced antiulcer, cardiopretective potency of the guggulu after it is detoxified by triphala