

PHARMACEUTICAL ASPECTS OF PANCHGAVYA MEDICINES

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Relevance of Pharmaceutical Aspects

Pharmaceutical Science is, in a way, research wing of modern medicines. Allopathy owes its global spread and acceptability to research and development activities in pharmacy institutes and pharmaceutical industries. A similar arrangement is desirable for traditional systems of medicines and Panchgavya medicines, too, need to be supported by elaborate and extensive research findings to make them globally relevant and useful.

Indian breeds of cows are considered as best in the world for their medicinal utility. Among the panchgavya i.e. milk, curds, ghee, urine and dung, gomutra is known to be most useful for medicinal purposes. Considering this, some research work on gomutra was undertaken and carried out in the couple of years in our college. (A personal experience prompted and propelled the work.)

Evaluation of Gomutra for its Pharmaceutical Utility

As per the principles of pharmaceutical sciences, every biological activity is attributable to some chemical moiety. So, It was planned to carry out chemical and biological studies on gomutra to correlate medicinal activities with chemical composition. However, the two pronged work proved to be too long to be continued, hence focus was shifted more to biological studies with the rationale that if biological utility is established, it will be worth spending time and labor on chemical studies later.

Chemical investigations

Gomutra samples were fractionated into two parts – Distillate (Ark) and Residue (Kshar). Distillate was subjected to Gas Chromatography (GC) analysis to know about the volatile components of gomutra. Residue was subjected to multiple test procedures, especially to investigate phytochemical moieties. Presence of inorganic substances, especially medicinally useful metal species, was also tested using modern analytical instruments. A brief data of chemical investigations is summarized below.

- GC analysis of distillate showed presence of some low molecular weight aliphatic acids like acetic and propionic which are known to be medicinally potent.
- Chemical tests on residue with various standard reagents indicated presence of alkaloids, saponins, flavonoids and tannins which have multifarious medicinal activities. The incinerated ash of residue showed trace quantity of gold, among other metals.

Biological Investigations

Both the fractions of gomutra – distillate (ark) and residue (kshar) were subjected to some in vitro and in vivo biological investigations as follows,

Evaluation of Antimicrobial activity (in vitro)

Evaluation of Anti Cancer related activities (in vitro)

Evaluation of Wound Healing activity (in vivo)

Evaluation of Analgesic activity (in vivo)

Evaluation of Antidiabetic activity (in vivo)

Evaluation of Immunomodulatory activity (in vivo)

- Antimicrobial activity

Using the standard 'Cup Plate' method, antibacterial activity was tested against microorganisms *Staphylococcus aureus*, *Bacillus subtilis* and *Escherichia coli* and the results (zones of inhibition) were compared with standard modern antibacterial drug tetracycline.

Using standard 'Cup Plate' method again, antifungal activity was also tested against fungal strains of *Aspergillus niger*, *Aspergillus flavus* and *Candida albicans* and the results (zones of inhibition) were compared with standard modern antifungal agent griseofulvin.

- Anticancer related activity

Due to nonfeasibility of cell line studies at the institute, anticancer activities were studied only indirectly

Antioxidant activity was tested with DPPH radical scavenging method and results compared with standard antioxidant compound ascorbic acid.

Antimitotic activity was tested with cell division of root tips of *Allium cepa* and the results were compared with standard antimitotic agent methotrexate.

Antiproliferative activity was tested with viability of yeast cells on incubation for 72 hours in presence of test substances (gomutra fractions) and comparing the results with standard antiproliferative agent methotrexate.

- Wound healing activity

Using albino rats with inflicted wounds, wound healing activity was tested using ointment containing gomutra kshar (residue) and the results were compared with standard drug nitrofurazone.

- Analgesic activity

Employing 'Rat Tail Immersion' method, analgesic activity was tested on albino rats administering test (distillate and kshar) solutions orally and the results were compared with standard analgesic agent diclofenac sodium.

- Antidiabetic activity

In the alloxan induced diabetic rats, distillate and residue were administered orally and the serum glucose levels were measured periodically (at the interval of 7 days) in a span of four weeks. The results were compared with standard antidiabetic drug glibenclamide.

- **Immunomodulatory activity**

Using albino rats, the immunomodulatory activity was tested employing two experimental methods namely Delayed Type Hypersensitivity (DTH) method and Carbon Clearance Assay. In DTH method, the immune response was measured through measurement of induced edema in the experimental animals by using Plethysmometer and comparing the results with standard immunomodulator levamisole.

In Carbon Clearance Assay, phagocytic index was measured as a measure of defense mechanism induced by immunomodulators (distillate and residue). The results were compared with the effects of standard immunomodulator levamisole.

The Road Ahead

It is observed that there is immense potential in the panchgavya components, of which ongomutra was subjected to investigations in the present work. All branches of basic and applied sciences can contribute substantially in this huge and Herculean task of establishing the medicinal utility of Panchgavya medicines through contemporary scientific methods.

Numerous medicinal formulations containing Panchgavya components are available for use. But they are being used more out of faith in traditional medicines than any backing of scientific evidences. To make panchgavya medicines globally useful and acceptable, tremendous investigative research has to be put in by Indian scientific fraternity. Academic institutions have readymade work force available in the form of post graduate and Ph. D. students. Similarly, reasonably well established research facilities can also be made available easily. Pharmacy, Ayurved and Science colleges should pick up research work in the area of Panchgavya to facilitate this. The findings of the work must also be published and presented at appropriate forums so that the message spreads among the masses.

It must be noted that spread and success of any healthcare system largely depends on the system's continuous research and development activities. Global presence of allopathy has proved this beyond doubt. Panchgavya medicines, too, can get their due importance provided their pharmaceutical aspects are extensively explored, studied, investigated and published and presented before the world.