

# Herbs – a safe and scientific approach

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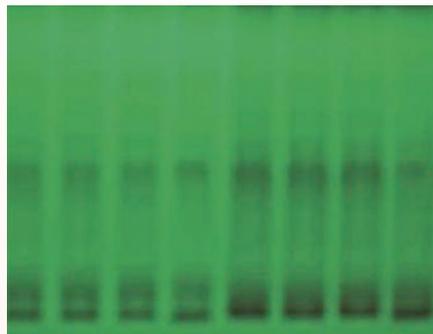
Today, mankind finds itself at the crossroads where sustaining the entire ecosystem has become a major debatable issue. The heedless over-harvesting of natural resources with low priority given to replenishing them has led to a question mark over the very survival of the human race along with sustainability of the environment.

Food security and food safety can not be unlinked. Safe food is not just a subject of discussion for intellectuals but a necessity. With all strata of society, including consumers, scientists and the media giving much attention to the issue, the world is becoming aware of the indiscriminate use of harmful chemicals and other additives in the food chain that lead to short and long term harmful effects on the body.

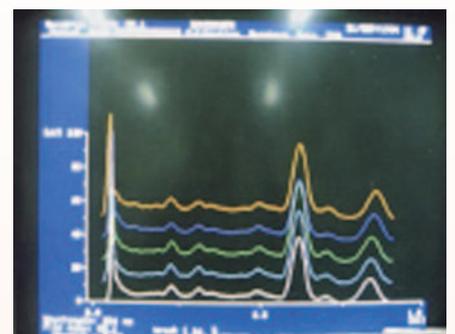
## Herbs generate interest

At present, there is an increasing number of phytogetic products available. However, due to a large variation in chemical composition these products (especially herbs) are generating a great deal of scrutiny.

Many herbs were in use long before their introduction in modern medicine. From the 1970s to the 1990s, 25-30% of all the drugs dispensed in the USA contained compounds of plant origin and their worldwide contribution is more than 50%. According to the latest survey it was found that 477 out of 868 drug molecules discovered between 1981 and 2002 belonged to natural products.



The TLC chromatography – an integrated tool in ensuring quality of raw material as well as final product quality check.



Though safe feed plays a profound role in classifying the food from animal origin as safe, the production of safe food can not be attributed to the use of safe feed alone.

It is quality feed, free from harmful chemicals, along with other practices like proper hygiene, potable water and sound management practices, that is required to produce wholesome, nutritious, near-natural food with desirable organoleptic properties. An animal in a suboptimal status of health cannot produce food with the above properties. Healthy food can only come from healthy animals.

Therefore, there is no debate on the usefulness of herbs in animal healthcare, however the need is to make herbal science stand on a scientific platform, rather than be supported by mere beliefs from thousands of years of use. The experimentation, trials and proper recording of data is what is

needed to establish the efficacy, quality and safety quotient of herbal formulations.

The most important question, for example, is whether herbs work as claimed. The only way to prove it is by scientific experimentation to prove not only the efficacy of individual herbs, but also the polyherbal formulation as most of the products available are polyherbal in nature.

There is plenty of scientific literature available on Ayurvedic plants pertaining to their efficacy to modulate the biological response.

## Proven efficacy

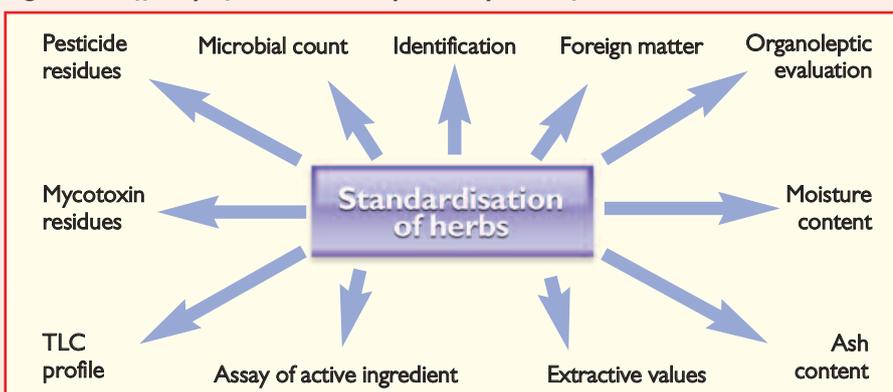
An in-vitro study has shown that mangiferin-treated macrophages showed increased lysosomal enzyme acid phosphatase activity and enhanced cytotoxicity and phagocytosis against ascetic fibrosarcoma (AFS) cells. The augmented tumour killing activities were associated with enhanced tumour target binding by the macrophages.

Phyllembin (*Phyllanthus emblica*) was found to have activity against *Staphylococcus aureus*, *E. coli*, *M. tuberculosis* and *Staphylococcus typhosa*.

*Withania somnifera* (glycowithanolides) showed anti-stress activity in an experiment. Administered one hour prior to the stress procedure, it reduced an increase in superoxide dismutase and lipid peroxidation activity, with concomitant increase in catalase and glutathione peroxidase activities in both brain frontal cortex and striatum regions.

The risk of antibiotic resistance and xeno-

Fig. 1. The efficacy of herbs must be proved by scientific evaluation.



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 biotic residues in tissues and secretions of farm/food animals makes a good case for the search of alternatives to conventional antibiotic therapy.

There are herbs with antimicrobial properties that not only give an alternative to antibiotics but some of them are also surprisingly bestowed with the attribute of reducing the existing antibiotic resistance or cross resistance among micro-organisms.

Plumbago zeylanica (plumbagin) has been studied for its effect on the development of antibiotic resistance using sensitive strains of *Escherichia coli* and *Staphylococcus aureus*.

Organisms were inoculated into the antibiotic (streptomycin/rifampicin) medium, some growth was observed due to development of resistance.

However, it was completely prevented when plumbagin was added to the medium and this was attributed to prevention of antibiotic resistance.

*Azadirachta indica* leaf extracts added to fungal growth media at 1, 5, 10, 20 and 50% v/v concentration prior to inoculation essentially blocked (98%) aflatoxin biosynthesis at concentrations greater than 10% v/v. An aqueous extract of *Andrographis paniculata* improved biliary flow in rats, increased liver weight and decreased duration of action hexobarbital in hepatotoxicity induced by carbon tetrachloride, tetracycline and isoniazide.

Phytogenic feed additives have a very different mode of action (MOA) from AGPs. The MOA of AGPs is mainly related to their antibacterial effect against specific pathogenic bacteria in the gastrointestinal tract of animals, hence they are specialists.

Phytogenic feed additives, on the other hand, have a greater impact on the different factors that promote growth of pathogenic bacteria. The MOA supports the animal's endogenous defence mechanisms, thus it can be considered a more sustainable long term solution without posing a risk to animals, consumers and the environment.

The second most pertinent question is whether herbal formulations boast the same quality (stability, consistency and shelf life) as contemporary medicines. The answer is an overwhelming yes. A good scientific protocol is a must to ensure the quality of raw materials, quality checks and final quality standards (which include packing), so procedures are necessary to ensure quality and batch to batch consistency.

Quality check standards start from the

very beginning, for example collection of raw material and ends in completion of the final product. However, increasing research efforts are needed into the actual selection, screening, processing and standardisation of plants to be used as raw materials.

Another step in quality assurance utilises the strength of many factors, such as chemical composition, extraction values and assays for active constituents, but new technologies such as TLC fingerprinting are coming to the fore that can provide precise information about the quality and efficacy of the raw materials.

## Ensure product safety

For herbs to become the therapy of choice there is also the question of safety. Though safety remains the most acceptable hypothetical attribute and the reason a large population has remained adhered to it, besides availability, scientific data is still needed to validate claims. Sometimes it is difficult to produce direct evidence on safety parameters, however correlation has to be established between certain parameters and the safety of the subject, consumer and environment to overcome this barrier.

The toxicological evaluation of phytochemicals is a crucial step in establishing the safety quotient and standard toxicological studies (LD50, acute, subacute, chronic, teratological toxicity etc) can only answer the basic queries on the toxicological profile of individual plant material.

## Conclusion

There is a need to adopt comprehensive, well planned and defined objectives to meet sustained and high production. There are alternative systems available to achieve these objectives, however a blind approach to put them into production can not be solicited. An alternative system can not be a substitute to the contemporary system of therapy, but both can complement each other in establishing a safe and sustained approach to animal production.

Herbs, along with other alternative systems of medicine, should be given due focus so they can be adopted and used to achieve maximum production without any harmful effects. The need is to prove their worth on a scientific basis, rather than on experience of use only. ■

**Table 1. The toxic dose and the quantity of ingredients administered through one of the poly-herbal formula in chickens clearly reflects the margin of safety.**

Ingredients	LD50*/MTD ** Data (mg/kg bodyweight)	Quantity of ingredient administered per day (mg/kg body weight)	
		Adult bird	Chicks
<i>Mangifera indica</i>	>1000 (LD50)	0.18	2.08
<i>Ocimum sanctum</i>	1000 (MTD)	2.68	31.25
<i>Withania somnifera</i>	1000 (MTD)	3.57	41.67