Herbal products – the way forward?

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The changing world that the poultry sector finds itself in means that there are many changes to how we look after our breeders.

One only has to look at coccidiosis to see how its control has switched from a heavy reliance on chemicals (anticoccidials) to one with a heavy reliance on coccidiosis vaccination.

At the same time the previous emphasis of looking after the health and well being of the birds is now coupled to the health and well being of the consumer by placing a heavy emphasis on the production of safe foods.

Hand in hand with this has been a move towards the use of 'green', eco friendly or natural products and a declining reliance on chemicals such as antibiotics.

This has been typified by the ban on antibiotic growth enhancers in the EU and the recent situation with regard to enrofloxacin in the USA. Accordingly, the spotlight is turning more and more on to alternative options and the Indian company, Ayurvet Ltd, is to the fore when it comes to research into herbal and natural products.

This article will focus on their philosophies and some of their products which are of particular interest to breeders.

For many years herbal medicine has been used by many societies but it is only in recent years that the actual substances in various herbs that bestow pharmacological or performance benefits on to animals have been identified.

Indian knowledge bank

One particular country where this approach has been to the fore is India. Here there is a great knowledge bank known as 'Ayurveda' and in recent years much of this knowledge, which was primarily in the human field, has been focused on animals.

A decade or so ago one of the leading players in human holistic healthcare came into the animal sector and created the company which is now known as Ayurvet Ltd ('Ayur' signifying life and, of course, 'vet' meaning veterinary).

Now the company has a unique corporate philosophy of combining traditional Ayurvedic wisdom and knowledge with modern scientific precision and technology to find solutions for the problems encountered in livestock production. The result of this has been the production of safe, dependable and environmentally friendly remedies for animal health.

	CONTROL		STRESROAK	
Group	1	2	3	4
Average weight at six weeks (g)	1260	1291	1502	1481
FCR	2.40	2.37	2.08	2.15
Mortality (%)	19	16	6	7
Weight of bursa of Fabricius (g)	1.46	1.79	3.36	3.38
Weight thymus (g)	4.76	5.16	6.72	6.77
Plasma cortisol (ng per dl)	14.4	14.8	3.9	4.2

Table 1. Countering stress in broilers (high levels of plasma cortisol reflect stress and low levels reflect its prevention). Note the correlation between low plasma cortisol levels and improved performance.

Multi-step process

For any product its development and introduction into the market place is a multi-step process, each of which is supported by modern scientific approaches. Basically the quality of the final product is as good as the quality of the raw materials that are used in its production and so a lot of work is done to ensure the quality and between batch uniformity of raw materials.

Quality assurance utilises traditional bench marks such as chemical composition, extraction values and assays for active constituents but new technologies such as TLC fingerprinting are coming more to the fore.

Increasing research efforts are going into the actual development of the herb plants and understanding the growing conditions which influence their quality and productivity. This is helping them eliminate one of the limiting factors in their field – herbs of poor quality.

When it comes to production, state of the art equipment and technologies are used and these improve and preserve the efficacy of active ingredients. Many production and packaging processes are 'hands free' as this protects products from an important possible source of contamination – workers' hands!

Any new product goes through rigorous screening. First, an initial evaluation is under-

Continued on page 18

Table 2. The benefits of Superliv.

Diet	Treatment	Body weight (g)	Feed consumed (g)	FCR	Mortality (%)
A	Control	1415	2703	1.91	6.7
	Superliv	1477	2762	1.87	3.3
B	Control	1365	2948	2.16	6.7
	Superliv	1389	2875	2.07	6.7
C	Control	1207	2788	2.31	16.7
	Superliv	1283	2861	2.23	13.3
D	Control	1321	2906	2.20	10.0
	Superliv	1352	2853	2.11	6.7

Continued from page 17
taken when key parameters such as palatability, convenience of use, dose determination and the side effects of prolonged treatments coupled to cost benefit analyses are undertaken.

After this, clinical and pharmacological studies are carried out at various well known and respected research institutes and on commercial farms.

Performance assessment

This work is to verify and substantiate the clinical benefits, to assess the product's performance under a variety of commercial conditions and to gain further insight into the mode and mechanisms of action of the product.

Stress is a word that is used to mask a multitude of sins and 'stress' is often present in poultry flocks from placement to depopulation in a variety of forms.

Stress adversely affects bird performance but, probably more importantly, depresses cellular and humoral immunity which, in turn, often results in birds which are more susceptible to various specific and non-specific infections. Research is now identifying how herbal products exert their anti-stress properties.

For example the anti-stress activities of Withania somifera glycowithanolides have been shown to reduce an increase in superoxide dismutase and lipid peroxidation activity with a concomitant increase in catalase and glutathione activities in the brain showing that aspects of chronic stress induced pathology can be mitigated by this herbal extract.

In more specific pathologies, such as those of tumour formation, herbal benefits have been seen.

For example, the immunomodulatory activity of the herb Magnifera indica was shown to increase the lysosomal enzyme acid phosphatise activity and enhance the cytoxic and phagocytoxic activity of macrophages against tumour cells.

Importance of free radicals

In poultry the importance of free radicals such as lipid peroxides, hydrogen peroxide and superoxide radicals in causing tissue damage and perpetuating the formation of further radicals to continue the damage is well known and, in fact, is part of the organic selenium story.

One of the herbal antistressors is Stresroak and the data in Table 1 highlights

Herbal antistressor and flock performance enhancer

Stresroak is a herbal antistressor, immunomodulator and performance enhancer that can improve breeder flock performance. In one study some 6,000 broiler breeders aged 44 weeks were divided into treatment and control groups of roughly equal numbers. The treatment group was supplemented with 20ml per 100 birds per day of Stresroak for 30 days.

The performance and antibody titres of both groups were measured during and after the period of supplementation. In addition, the transfer of maternal antibody to chicks and the subsequent performance of progeny after supplementation was recorded.

In the breeders it was found that the treatment improved hatchability, reduced the number of eggs rejected and enhanced the immune response to vaccination.

In the chicks it was found that treatment with Stresroak improved chick quality and that the chicks had better day old weights, lower mortalities and less early chick mortality.

Parameter	Treated	Control
Day 0 maternal antibody titre		
During supplementation	8922	5594
After supplementation	8706	2190
Day 7 maternal antibody titre		
During supplementation	7754.6	1554.8
After supplementation	6972	1242
Day 14 maternal antibody titre		
During supplementation	7156	958
After supplementation	6246	906.4
Average weight of chicks (g)		
Day one	46	40
Second week	334	280
Third week	568	480
Fourth week	940	730
Survival of chicks to four weeks (%)	96.8	92.3

The beneficial effect in chicks of Stresroak supplementation in parent flocks.

The benefits of Stresroak supplementation in broiler breeders.

Parameter	Treated group			Control group		
	Before treatment	After treatment		Before treatment	After treatment	
	44 weeks	30 days from start of treatment (48 weeks)	8 weeks after completion of treatment (56 weeks)	44 weeks	30 days from start of treatment (48 weeks)	8 weeks after completion of treatment (56 weeks)
Av. egg production (%)	78.2	78.0	72.4	78.2	74.0	62.0
Hatchability (%)	84.0	84.6	81.60	84.0	80.2	76.2
Reject eggs (%)	3.39	0.81	0.91	3.4	4.5	5.3
BD titre	6820	13980 (21 days post vaccination)		6815	12240 (21 days post vaccination)	

the benefits of using the product to counter stress in broilers.

In stress and many other conditions liver function is impaired. This is deleterious for the birds because the liver plays a pivotal role in bird health and physiology that is reflected in bird performance, productivity and profitability. Conversely, impaired liver function directly and indirectly affects vital functions and this can result in poor feed (energy and other key nutrients) utilisation, improper growth, poor livability and increased susceptibility to stressors, infections and toxins.

Benefits for the liver

Various herbs have beneficial effects on the liver via their hepatoprotective, hepatostimulant and choleretic actions.

For example, the herb Andrographis paniculata counters undesirable increases in the activities of hepatic enzymes such as -glutamyl transpeptidase, glutathione-S-transferase and lipid peroxidation. It also has protective action on the beneficial antioxidant activities of various enzymes.

Other work has shown this herb to have an enhancing effect in rats of 44 to 73% on acids. Table 2 shows the effects of Superliv – a product based on these principles in broilers.

Group	Treatment	Body weight (g)	FCR	Aflatoxin residue in liver (ppb)
A	Control	1346	2.12	Nil
B	A + 0.5ppb aflatoxin B1	1205	2.20	9
C	A + 1.0ppb aflatoxin B1	1020	2.33	25
D	B + 1.25kg Toxiroak	1286	2.14	Nil
E	C + 1.25kg Toxiroak	1302	2.13	Nil

Table 3. The benefits of Toxiroak in countering aflatoxicosis.

Another area in which medicines based on herbs come into their own is in the control of mycotoxins and/or the fungi that produce them.

For example an extract from the herb Allium sativum exhibits a 100% inhibitory action on the growth of Aspergillus parasiticus and associated aflatoxin B1 production. Table 3 shows the beneficial effects of such a product (Toxiroak) on broilers that were given aflatoxin B1 in their feed at 0.5 or 1.0ppm.

Calcium utilisation

Another area in which herbal products are useful for poultry is for the improvement of calcium and phosphorus utilisation, which are the two key minerals in bone development and egg shell formation. The absorption of calcium and phosphorus from the intestine is dependant upon many things including their source, ratio, the intestinal pH and the presence of adequate vitamin D3.

Herbs such as Cissus quadrangularis, Uraria picta and Lepidium sativum are some of the herbs that increase the absorption and assimilation of both calcium and phosphorus in the body. As a result of their ergosterol content, some plants may acquire vitamin D activity when exposed to sunlight.

So, if we bring all this together the herb garden may well provide us with many answers for the problems poultry acquire in the field and it is up to the scientists to harness this reservoir of potential solutions for the future. ■

Herbal improver of egg shell quality during heat stress

Ayucal D was evaluated in a trial involving 68 week old layers to see if its use impacted on egg shell quality at a time when the environmental temperature was 40-43°C.

The period of the trial covered the week before treatment, two weeks of treatment and a period of six weeks after treatment had ceased. The product was added at a rate of 15g per 100 birds per day.

Parameter	Treated group		Control group	
	Before treatment	After treatment	Before treatment	After treatment
Egg hatchability (%)	82	84.25	82	81
Egg breakage (%)	3	1	3	3

The effect of Ayucal-D on hatchability.

It was found that the use of Ayucal D increased shell thickness from 0.30 to 0.36mm and reduced porosity from 3.29 to 1.14 and the percentage of broken eggs was reduced from 2.14 to 1.57%.

In another trial in broiler breeders which were suffering a fall in hatchability coupled to a deterioration of shell quality Ayucel D was administered to the birds at a rate of 2kg per tonne of breeder feed.

A gradual improvement was seen 13 days after the cessation of the treatment and the eggs were much improved by 21 days (see table). In particular there was a 2.25% improvement in hatchability and a 2.00% reduction in egg breakages.

The effect of Ayucal-D on eggshell quality.

Parameter	Group									
	Control					Ayucal				
	Before treatment	During treatment	1 week after	2 weeks after	3 weeks after	Before treatment	During treatment	1 week after	2 weeks after	3 weeks after
Shell thickness (mm)	0.30	0.29	0.28	0.29	0.28	0.30	0.32	0.31	0.32	0.36
Egg porosity (No.)	2.71	3.87	2.93	5.37	6.21	3.29	1.07	0.71	1.50	1.14
Egg breakage (%)	1.57	2.20	1.71	3.00	3.64	2.14	2.07	1.21	1.00	1.57