For us both chicken
and egg come first

Synthite

FEED ADDITIVES FROM SYNTHITE

Natural Feed Additives

The demand for products such as eggs, meat and milk is growing by the day. Adapting the practice of optimal husbandry is the only way to meet this demand. And to produce quality products, animals require hiqh quality feed. However, many nations across the globe restrict the use of medically important antibiotics in the feed. Thus, there is an immediate need for natural alternatives. Feed additives which are created entirely using plant extracts help fulfill this need, as they are natural and hence deemed safe.

Plant extracts are used in animal nutrition for various reasons, such as:

- Appetite and digestion stimulants
- Stimulants of physiological functions
- Prevention and treatment of certain pathological conditions
- Colorants and antioxidants

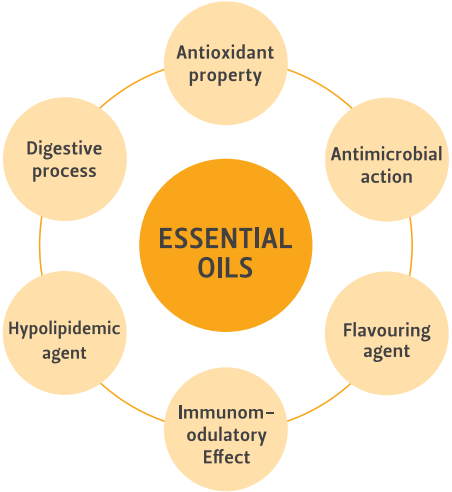
Essential Oils (EO)

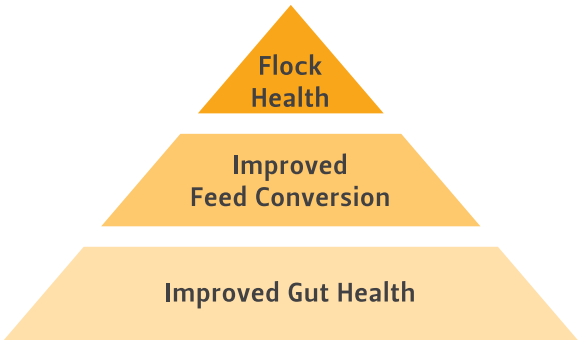
Essential Oils exhibit different activities such as antibacterial, antifungal, antioxidant and anti-inflammatory.

Advantages of using EO:

- Desired effect can be attained using different EO due to their diverse chemical composition
- pH dependency for action

Benefits of Essential Oil:





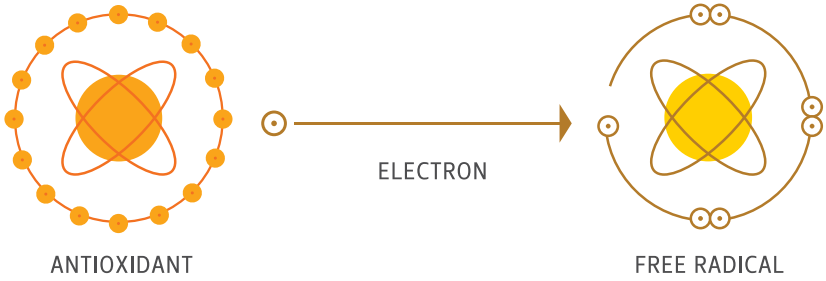
Antioxidant activity of Essential Oils (EO):

Lipid peroxidation is an autocatalytic mechanism leading to oxidative destruction of cellular membranes. The destruction of the cellular membrane can lead to cell death and also to the production of toxic and reactive aldehyde metabolites, known as free radicals.

The presence of free radicals, sets off a chain reaction that can result in further cellular damage that results in aging and a variety of diseases. Antioxdants safely interact with free radicals and arrest the chain reaction before vital cellular structures are damaged.

Thymol and carvacrol are reported to inhibit lipid peroxidation and are said to have strong antioxidant activity.

Oregano oil containing carvacrol added in doses of 50 to 100 mg/kg to the diet of chickens exerts an antioxidant effect in the broiler tissues. A dietary supply of thyme oil or thymol to aging rats showed a beneficial effect on the antioxidative enzymes Superoxide Dismutase (SOD) and Glutathione Peroxidase (GSH-PX), as well as on Polyunsaturated Fatty Acid (PUFA) composition in various tissues. Rats fed with these supplements had greater levels of SOD and GSH-PX and more concentration of PUFA in phospholipids of the brain than the untreated controls.



Antimicrobial Activity of Essential Oils (EO):

Based on their chemical structure, Essential Oils are classified into five groups:

- Terpenoids (mono-C10 and sesquiterpenes-C15)
- Aliphatic compounds of lower molecular weight (saturated and unsaturated hydrocarbons, alcohols, aldehydes, esters and lactones)
- Volatile aromatic components (benzoic acid derivatives, phenylpropanoids and coumarins)
- Nitrogen compounds (indole derivatives and aliphatic amines)
- Sulphur compounds (isothiocyanates and organic disulphides)

The chemical structure of the main Essential Oil components is directly related to their antifungal properties. The presence and position of the hydroxyl group in the molecule, the presence of the aromatic nucleus, solubility in fats and spatial orientation also affect the antifungal activity. Compounds containing aromatic nucleus and phenolic OH group are characterized by high antimicrobial activity.

Preventing Fungal Infection:

Fungal/mycotic diseases cause significant economic losses to the poultry industry. Their direct infectious nature and production of mycotoxins (the secondary fungal metabolites produced in grains or poultry feed) affect birds' health. Several fungi have created havoc in the poultry industry and some of them even caused direct harm to human health due to their zoonotic implications. They are responsible for high morbidity and mortality. Mycotoxicosis is a major disease caused due to fungi.

Minimal inhibitory concentration of EO on selected microorganisms against poultry pathogens (in µl/ml)

	Escherichia coli	Salmonella typhimurium	Staphylococcus aureus	Listeria monocytogenes	Bacillus cereus	Candida albicans
Carvacrol	0.1–5.0	0.2–0.25	0.2–0.45	0.4–0.5	0.25	0.15
Thymol	0.10–0.45	0.06	0.17–0.25	0.20–0.45	0.35–0.45	0.15
Eugenol	0.55		0.75	0.55	0.3	
Cinnamaldehyde	0.10–0.50		0.18–0.35	0.20–0.45		0.20
Cineole	0.4–1.1		0.1–0.45	0.02		
Limonene	0.7					

Synthite product range:

A healthy chicken gives a healthy egg. And a healthy egg means a happy consumer. Keeping this in mind, Synthite has developed four unique additives.

Natural Growth Promoters

nturmax

Broiler Development
Necrotic Enteritis

Based on
Turmeric (Curcumin) and Essential Oils

novogold

Layer Development
• Gut Health • Antibacterial

Based on
Marigold and Essential Oils

ntropro

Natural Antibiotic

Based on
Marigold, Rosemary and Cassia

Egg Pigmentation

novoxanth

Egg Yolk Color Enhancer

Based on
Marigold and Paprika

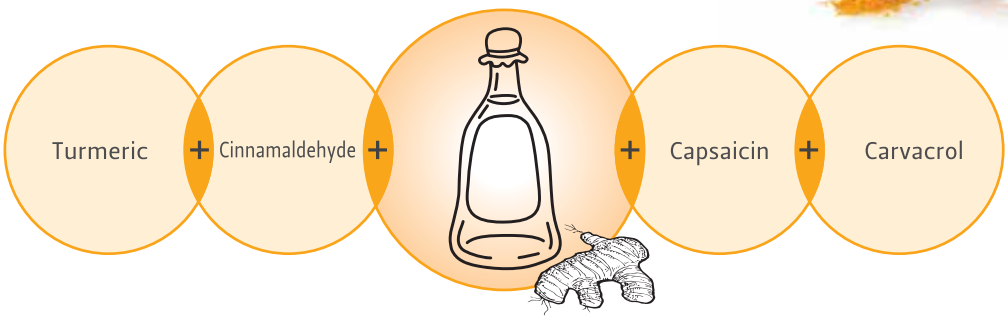
NATURAL GROWTH PROMOTERS

nturmax

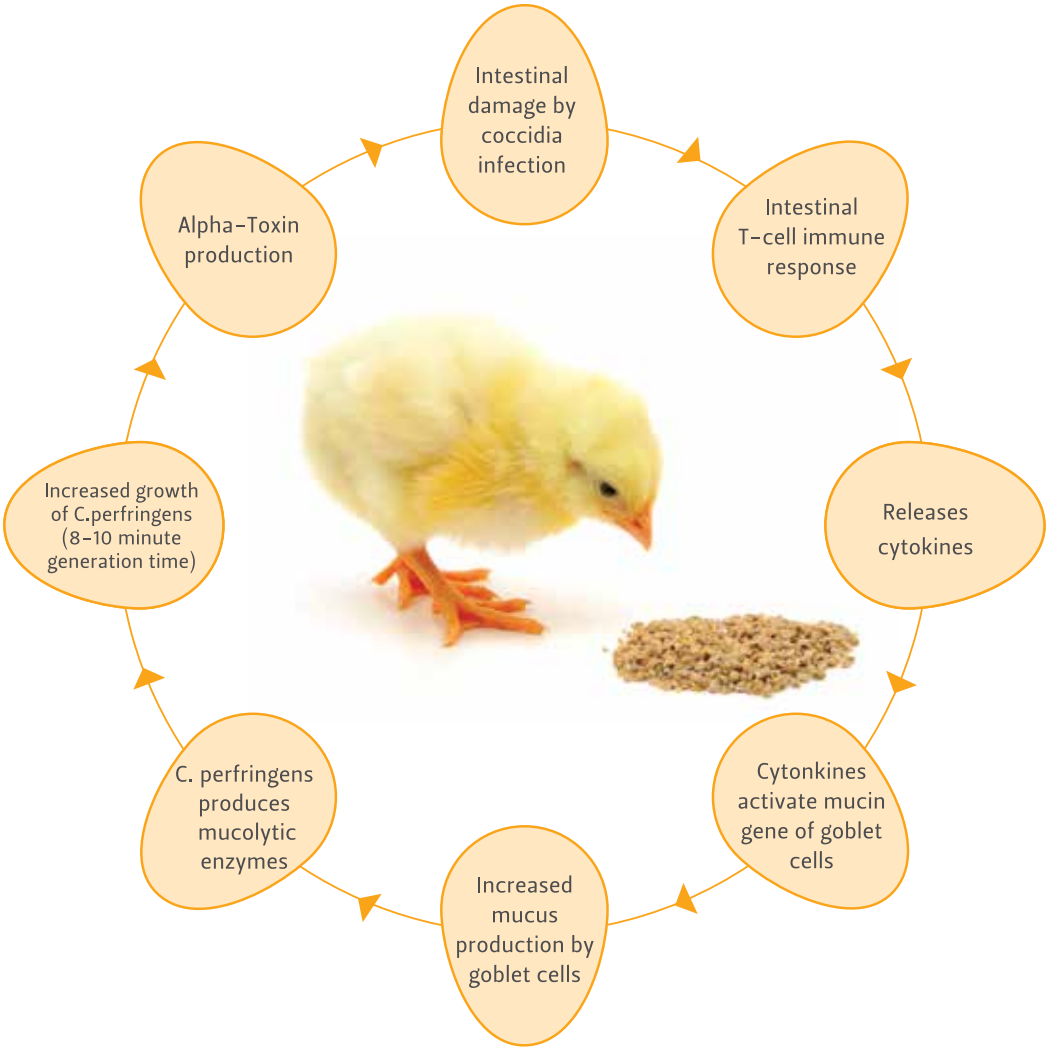
nturmax is a feed additive made from a combination of ingredients. It helps increase the nutritive balance and the performance of birds. It is a mix of turmeric, capsaicin, carvacrol and cinnamaldehyde in a controlled ratio.

nturmax help the birds stay healthy and disease free.
It is commercially available in a powder form.

Following figures elaborate on the various properties of this additive:



Pathogenesis of Necrotric Enteritis



Problem– Feed Contamination
Result – Sub optimal husbandry

High Viscosity Diet

Bacteria: Clostridium
Protozoa: Eimeria

High Protein Diet

Infected Chick

Solution– Feed Mix:

Feed + ηturmax =

Healthier Chick

Results:

- Increased body weight
- Reduced gut lesions
- Decreased serum alpha – Toxin levels
- Reduced – IL8,LITAF, IL–17A, IL–17F mRNA

Product Specifications:

Curcuminoids – NLT 2 %

Appearance – Granules

Colour – Brown

Capsaicin – NLT 0.2 %

Benefits:

nturmax from Synthite has many applications as an additive.

- **Prevent Necrotic Enteritis**
- **Growth promoter**
- **Antibacterial**
- **Anticoccidial**

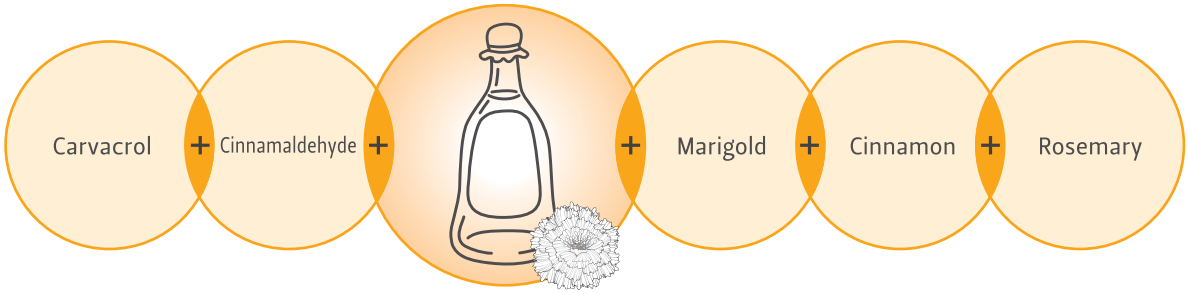
novogold

Essential Oils are considered to be the most vital feed additives as they are safe. The available in vivo data shows that Essential Oils could find use as natural growth promoters in animal diet.

novogold is a blend of Essential Oils with carotenoids. Carotenoids are mainly found in the egg yolk, skin, fat, liver and feathers. They are essential not only for pigmentation, but also for immunomodulation as antioxidants.

novogold is a mix of cinnamon, marigold, cinnamaldehyde, carvacrol and rosemary in a controlled ratio. It is commercially available in a powder form.

Following figures elaborate on the various properties of this additive:



Product Specifications:

Xanthophylls – NLT 5 gm/kg

Appearance – Granules

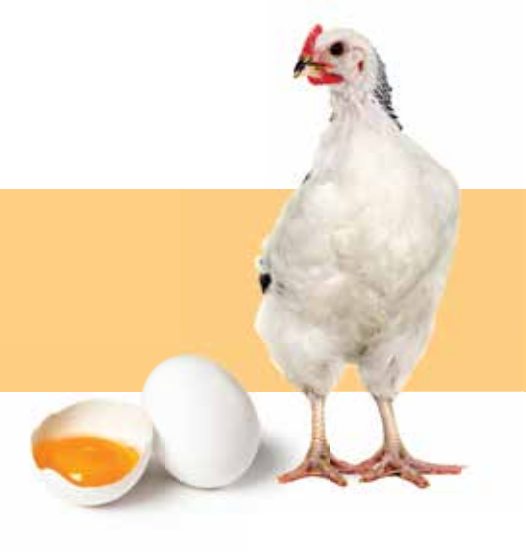
Colour – Light Brown

Carvacrol – NLT 2%

Benefits:

*n*ovogold from Synthite has many applications as an additive.

- **Yolk colour**
- **Antioxidant**
- **Growth promoter**
- **Anticoccidial**

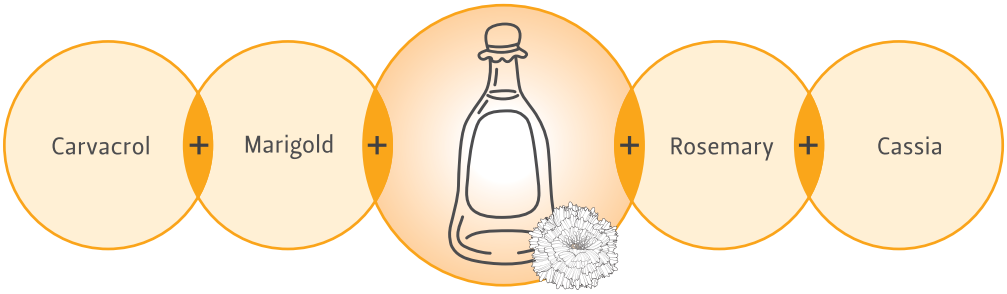


*n*tropro

Plant Essential Oils and their compounds have proven in vitro efficacy as antimicrobial, antioxidant, immunodulating and anti-inflammatory agents. *n*tropro is a feed additive made from a combination of ingredients. It is a combination of various Essential Oils. Carvacrol, rosemary, cassia and marigold are mixed in a controlled ratio to form *n*tropro.

*n*tropro helps increase the nutritive balance and the performance of birds. It helps the birds stay healthy and disease free. *n*tropro is commercially available in a powder form.

Following figures elaborate on the various properties of this additive:



Product Specifications:

Xanthophylls – NLT 5 gm/kg

Appearance – Granules

Colour – Brown

Moisture – NLT 10%

Benefits:

ηtropro from Synthite has many applications as an additive.

- Improve gut health
- Natural antibiotic
- Antioxidant
- Growth promoter

EGG PIGMENTATION

ηovoxanth

Carotenoids are natural compounds present in animals and plants. Their colour ranges from pale yellow to orange and bright red. Birds cannot synthesize carotenoids by themselves. Yet these are essential for their pigmentation, and hence must come from feed. Carotenoids are mainly found in the egg yolk, skin, fat, liver and feathers. Carotenoids also act as antioxidants for immunomodulation in the bird.

Colour of the yolk is one of the major criteria by which customers judge the quality of eggs. Golden yolks are preferred because good colour has been associated with good health. The pigment responsible for yolk colour is xanthophylls present in the feed. The main pigmenting carotenoids are lutein and zeaxanthin. The most important sources of carotenoids in poultry feed are maize, maize gluten alfalfa and grass meals.

Besides dark green vegetables, egg yolk serves as the important source of xanthophylls for human consumption. It is regarded as a highly bio-available source of xanthophylls. An increased intake of lutein and zeaxanthin prevents the loss of vision due to Adult Macular Degeneration (AMD) and age related cataract formation.

ηovoxanth is commercially available in both powder and liquid forms in two variants ηovoxanth Red and ηovoxanth Yellow.

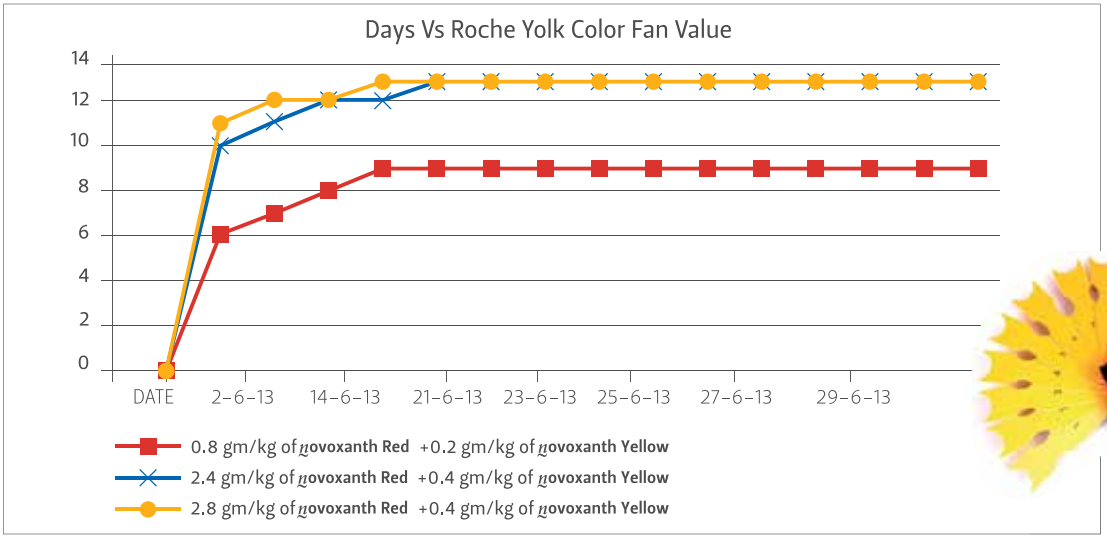
Specifications:

ηovoxanth Yellow	Powder	Liquid
Appearance	Orange Yellow powder	Orange emulsified liquid
Taste	Characteristic taste	Characteristic taste
Solubility	Sparingly soluble in water	Soluble in water
Saponification grade	NLT 95% by HPLC	NLT 95% by HPLC
Xanthophylls	NLT 20 gm/kg	NLT 30 gm/kg

ηovoxanth Red	Powder	Liquid
Appearance	Red to Brown	Red emulsified liquid
Taste	Characteristic taste	Characteristic taste
Solubility	Sparingly soluble in water	Soluble in water
Saponification grade	NLT 95% by HPLC	NLT 95% by HPLC
Xanthophylls	NLT 5 gm/kg	NLT 25 gm/kg

Results:

The dosage for getting Roche Colour Yolk Fan value of 12–14 by ηovoxanth is 2.8 gm/kg of feed.



Dosages Chart:

	ηovoxanth	2.8 kg per ton of feed
	ηtropro	100 gm per ton of feed
	ηturmax	150 gm per ton of feed
	ηovogold	150 gm per ton of feed

Synthite

Synthite Industries Ltd.

INDIA | USA | CHINA | SRI LANKA

Synthite Valley,
Kolenchery, Kerala–682 311, India.
T +91 484 3051200 | F +91 484 3051351
E info@synthite.com | W www.synthite.com

Corporate Headquarters,
Ajay Vihar, M. G. Road, Cochin,
Kerala–682 016, India.
T +91 484 3012222 | F +91 484 2378801

Contact Person:

Govind Diwakar: M–09387485045
Sr. Specialist–Business Development–NPD & R
E govind@synthite.com