

# Natural Poultry Health

A guide to keeping your flock healthy with herbs and other natural products

bioKennis

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# **Natural Poultry Health**

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### **Compiled**

for the Product Working Group Poultry Meat and Eggs of Bioconnect  
by the Project Group Naturally Healthy (based on the Fyto-V project)

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### **DISCLAIMER**

Great care has been taken in compiling this publication. However, the writers cannot be held liable for any damage caused by the use of products mentioned in this text. The information presented here is partly based on information provided by others. Unfortunately we do not have the time or financial means to check all information exhaustively.

It is recommended that professional poultry farmers get their information on this subject from a variety of sources and discuss the use of natural products with a poultry veterinarian. The order of the products in the tables does not imply a valuation of any kind. The lists of products are not exhaustive and complete. When only a few names of general products that contain the same active substances are given, no preference for these products is implied.

We expect all users of this booklet to apply the dosage and use recommended by the manufacturer. When in doubt about use, dosage or duration of a treatment, you can contact the manufacturer of the product.

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# **1 Working with natural products**

This booklet is intended to guide poultry farmers through the ever increasing supply of herbs and other natural products on offer. Which products have proven to be effective and which products might be effective, based on the knowledge that is currently available? This guide aims to answer these questions. Because this type of knowledge is developing quickly, updates will be necessary from time to time.

Besides general information on the use of natural products (in this chapter and in Annex 1), this guide will also provide information on suitable management measures for a number of health issues. The role of natural products in the application of these management measures will also be dealt with. This guide is currently (2011) incomplete, but could be extended in the years to come.

## ***1.1 Preventive use***

Preventing diseases is overall a much better option than fighting them. Prevention of animal diseases is therefore a focal point on many farms. Prevention comprises not only of preventing an infection from entering the farm and spreading, but includes good nutrition, suitable housing, good management and appropriate rearing. This way, the general resistance to diseases of the animals is improved.

Resistance and animal welfare go hand in hand, also in the case of poultry. To increase disease resistance, the animals should experience as little stress as possible. Natural products can play a useful role in improving the condition and general resistance of poultry, resistance to specific diseases can be increased using vaccinations.

Vaccination is a well-known preventive measure. Blood can be examined for antibodies to check whether the vaccination has worked. The effectiveness of other preventive management measures is often less easy to prove than the effectiveness of curative (healing) products. It is for example hard to prove that an animal does not become ill – or gets better quicker – by using certain feed components.

By improving the general disease resistance, less animals will get ill, or the illness will be less severe in case of infections. Also, animals will recover more quickly when they have better resistance. It is therefore always a good idea to work on the general disease resistance of animals, even if no disease has (yet) been identified.

Animals will heal under their own steam, as much as possible, using for instance certain herbs that can temporarily be added to the feed. Such an approach requires early identification of problems in animals. Timely correction of small problems can prevent heavier medication from being necessary down the line. A Dutch book called 'Kipsignalen' (Poultry Signals) explains how to identify problems at an early stage.

## ***1.2 Multifunctional approach***

Stress lowers general disease resistance and can cause a decreased uptake of feed. Decreased appetite can lead to mild intestinal problems, which in turn will reduce feed uptake even more and may cause diarrhoea. This vicious circle needs to be broken fast. The line between improved feed uptake and health improvement is not always clear.

Adding herbs to the feed (as part of the feed or as an additive) is often done to improve the taste and feed intake. But these herbs also influence health in a number of ways. Digestion and metabolism are often improved. Some herbal mixtures have proven in research to influence for instance the respiratory or immune system. A single herb or natural product might also address multiple issues. Garlic, for example, works as an antibiotic (hardly damaging lactobacilli but attacking harmful intestinal bacteria), it protects liver cells against poisoning, is effective against intestinal parasites, increases the production of gastric juices, disinfects the airways and more. Stinging nettle, linseed, camomile and dandelion also work on multiple levels. This is the so-called multi-target effectiveness; it is used for a multifunctional approach of health improvement, using a single herb or herb mixture.

### ***1.3 Role of natural products in management***

We cannot expect miracles from natural products, but they can help in fine-tuning. Good management and good nutrition remain most important. To prevent diseases it is advisable to pay strong attention to management, nutrition and hygiene. See the literature list at the end of this chapter, for books and articles on this subject.

Keep good records of the products that you have used: what they were used for, in which dosages and what the results were. Do not use products of unknown composition and definitely not based on unpublished results.

Ask your feed supplier which herbs or aromas are already in your feedstuffs and get help from vets or feed advisors with in-depth knowledge of these matters. Do not experiment with multiple products at the same time.

In acute and severe cases veterinary advice and regular medication remain essential. These are the top of the pyramid (Figure 1); as a farmer you are responsible for a firm basis.

Disease prevention through the use of natural products is important for animal health. On the one hand to reach an optimal general condition of all animals. On the other hand for the extra care of certain groups of animals at times when they need additional support.

*In summary:*

- From fighting disease to improving health;
- From short-term measure to long-term planning;
- General measures combined with some extra care.

Please refer to the image below

**Figure 1. Managing animal health**  
(from FiBL, 2006, adapted)



***From bottom to top:***

- 1. Measures on the level of breeding and production chain work on the long term and are related to for instance the choice of races or animal types, freedom from certain diseases and vaccination policy.*
- 2. Management at farm level creates optimal conditions in terms of nutrition, climate, housing, hygiene and prevention of disease (vaccinations).*
- 3. Natural products can be used to improve digestion, general resistance and general health. This can prevent diseases or support recovery.*
- 4. In acute cases of disease, medication will be used. If this is successful, the problem will be rapidly solved. Damage will, however, already be done due to diminished growth or production, a higher mortality and the cost of the medications. It is therefore important that the situation does not escalate to the point where only medication can help.*

***1.4 Which products are allowed?***

Please ask your national organic registration agency to find out which products are allowed in organic production. Non-organic herbs may not be allowed or only in lower quantities.

***1.5 Additional information***

More information can be found in the Annexes of this guide. Here you will find background information.



**Literature (only German and English literature is mentioned here):**

- Project reports of EU projects: FEED-SEG, Replace and Safewastes.
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*Cinnamomum aromaticum* Nees

*Cinnamon tree*

## 2 Using natural products

### 2.1. Digestion

#### *Improving intestinal health*

##### Management:

- Composition and quality of feed, quality of drinking water and access to feed and water need to be sufficient. Special attention needs to be paid to the transitions from rearing stage 1 to rearing stage 2 and from pre-laying to laying feed.
- Pay attention to wet litter; is the manure of lesser quality?
- Housing lay-out (sufficient laying nests, perches, sand baths, etcetera), house climate, light and occupancy rate always play a role.
- Pay attention to deviant behaviour, such as sudden occurrence of feather eating, which is often a first sign of intestinal problems.
- Supplying roughage (dried lucerne or grass) gives hens something functional to do. It seems that roughage also has a positive effect on digestion and intestinal health.

##### Natural products:

- Prebiotics, carbohydrates from chicory root, Jerusalem artichoke or the of yeast cell walls can provide an environment in which good intestinal bacteria feel more at home than bad ones.
- Glucanes from the cell walls of yeasts and fungi can bind mycotoxins.
- Probiotics (favourable micro-organisms) occupy the attachment points on the intestinal wall, which leaves no place for pathogenic micro-organisms.
- Herbs or herb mixtures can improve intestinal function (calamus, yarrow, fennel, anise) or have prebiotic functions (garlic, cinnamon).
- Some herbs kill unwanted bacteria (oregano, thyme, garlic, hops).
- Pigeon keepers and hobby poultry keepers often use apple vinegar to improve intestinal health (replaces preventive antibiotics).
- A number of products combine these possibilities .

#### **Intestinal health**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Bio-Mos, Safmannan, Diamond V XP, Progut, Active MOS	prebiotic	Indigestible carbohydrates from the cell walls of yeast.	Feed ca. 0,5-4 kg/ton	Alltech , Green Valley, Speerstra, Progut, Orffa
Prebiofeed	prebiotic	FOS from chicory root	Feed, 1-10 kg/ton	Speerstra
Calsporin	probiotic	Bacillus subtilis	50-100 ppm, feed	Orffa
CloSTAT	probiotic	Bacillus subtilis	2 means: Feed, 500 g/ton, Water, 25 g/1000 l pm	Kemin
Mycosorb	mycotoxins, resistance	Beta-glucanes from cell walls	Feed, 0,5-2 kg/ton	Alltech

### Intestinal health continued:

Product	Application	Composition	Use	Supplier
Allimax	Reduction of unwanted intestinal bacteria	Allicin (from garlic)	1,5 L of a 1000 ppm solution per 1000 L drinking water	Lankerenhof
Biostrong 510	Reduction of unwanted intestinal bacteria, improvement of digestion	Essential oils in micro-capsules	150 ppm mix in feed	Delacon/ Greenvalley
Dosto	Reduction of unwanted intestinal bacteria	Oregano oil	Feed, 0,2-4 kg/t	Dostopharm
Ropadiar GG30 # or Ropadiar Solution	Reduction of unwanted intestinal bacteria	Oregano oil (on diatomite)	Feed 0,2-4 kg/t; 0,25-1,5 L/1000 L drinking water	Ropapharm
P.E.P. 1000	Intestinal function and micro flora	Chicory; anise oil & oregano oil	1000 ppm in feed	Biomin
Avicox	Intestinal infection, recovery	Several essential oils, tannic acid, saponins, flavonoids	Feed, 250 g/ton	Mercordi
Colinex	Increasing resistance	3 herbs, including 2 species of Echinacea	20 mL/1000 L drinking water	Mercordi
Xtract	Resistance, flora, growth stimulation	Spanish pepper, turmeric	Feed 250 ppm	Pancosma
Easystro	Resistance, intestinal health	Prepared straw	Litter	Sambled B.V.
Digestamine	Intestinal function and growth stimulation	About 10 different herbs	Feed, 150 ppm	Speerstra
Duo-KruidenElixer	Higher production through intestinal health	120 herbs	1 litre per 900 litre drinking water	Traseco
Polli sani	Reduction of unwanted intestinal bacteria	Apple cider vinegar (with living yeast)	2 L/1000 L drinking water, once a week for 1-2 days	Wijnen, Odiliapeel
Selko-pH #	Reduction of unwanted intestinal bacteria	Formic acid, acetic acid	Drinking water	Selko

# Not allowed in organic certification, but raw materials (acids) are allowed



*Oregano*

## *Decreased feed intake*

### Management:

- Do not change feed abruptly; exclude disease as a cause for decreased feed intake (if disease is present – treat it first), look at stress factors such as detrimental housing climate or the occurrence of mycotoxins in feed.
- Lately chronic enteritis sometimes causes a decreased feed intake, pay attention to signs, have the animal(s) examined and take preventive measures.

### Natural products:

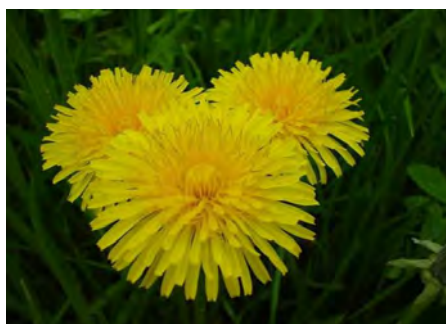
- Herbs that smell attractive, increase appetite when used in small dosages. Examples are: angelica, lovage, caraway, clove, cinnamon, garlic, oregano.
- No natural products are available yet to treat chronic enteritis. The Dutch Veterinary Health Service indicates prebiotics, probiotics and organic acids. This disease turned out to respond well to aspirin, but this medication is not registered for poultry (in the Netherlands). Beta-glucanes from yeast cell walls also work.

### **Decreased feed intake**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Cuxarom Spicemaster P	Appetite, growth	Anise, fennel, thyme, garlic, ginger, basil and more.	Feed, 0,3-1 kg/ton	Lohmann
Digestamine	Appetite, intestinal function, feed conversion	Fennel, oak, mint, anise, thyme, cloves and more.	Feed, 150 g/ton	Speerstra
P.E.P. 1000	Appetite, intestinal function, feed conversion, flora	Chicory; anise and oregano oil.	Feed, 1 kg/ton	Biomin
MacroGard	Resistance	Beta-glucanes from yeast cell walls	Feed, about 250 mg/ton	Orffa

### Traditional (folk) medicine:

- Plants such as willow (buds or bark) or spirea (flower or leaf) contain anti-inflammatory substances such as salicyd acid (aspirin). Both can be used, together or separate, as a powder (1 gram/100 kg animal weight /day) or as a tincture in drinking water (1 ml/100 kg animal weight /day).



*Dandelion*

## ***Watery droppings, intestinal infection due to Clostridium or other bacteria***

### Management:

- When bird density is not too high and the problem cannot be due to a change of feed: have your vet do tests to determine cause (please refer to the paragraph on coccidiosis).
- Several vaccinations are possible.
- Even in the absence of a pathogen, diarrhoea can occur. For instance because of mycotoxins in the feed or as a result of chronic enteritis (see paragraph on reduced feed intake)
- Chances of necrotic enteritis (Clostridium) become higher when too much protein is provided, when protein digestion is poor, when the content of indigestible carbohydrates in feed is too high or when stress factors are present. It may be possible to prevent all of these causes.

### Natural products:

- Herbs with tannins (oak bark, bramble leaf and tormentil roots) can reduce diarrhoea.
- In traditional medicine oak leaves, polygonum and bramble leaves, burnet leaves and potentilla leaves are also used.
- Mucilage (mucous substances), as are present in psyllium or carob can diminish irritation of the intestinal mucous membrane.
- Probiotics provide a more balanced intestinal flora, preparations of Bacillus subtilis in particular, are useful to prevent Clostridium proliferation.
- Hops have proven to work against Clostridium and oregano is effective against Salmonella and E-coli. Garlic and thyme also have anti-bacterial properties.

Refer to the table on general intestinal health as well (page 10).

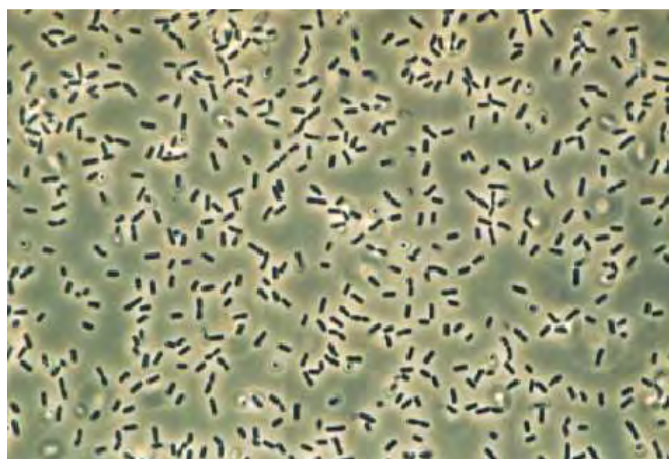
### **Watery droppings:**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Caromic	Watery droppings	Carob	Feed, max.1 %	Euroduna
Endomill	Diarrhoea	Indian herbs	10-day treatment in feed	Indian herbs
Probiotics	See the table on intestinal health			
Rurex	Diarrhoea	Oak bark, cinnamon	Drinking water 5 ml/L	Ecostyle
Silvafeed ENC	Diarrhoea	Chestnut wood	Feed 0,15-0,20 %	Silvateam

### Intestinal infections:

Product	Application	Composition	Use	Supplier
Allicine	E-coli, Salmonella, Clostridium	Garlic (allicin)	1,5 L of a 1000 ppm solution per1000 L drinking water	Lankerenhof
Enteroguard	Improved bacterial balance	Garlic and cinnamon	Feed 05,-1 g/ton	Orffa
Ropadiar GG30	E-coli	Oregano-oil	Feed 0,2-4 kg/t or 0,25-1,5 L/1000 L drinking water	Ropafarm
Duo-KruidenElixer	Improving intestinal health	120 herbs	1 litre per 900 litre drinking water	Traseco
Calsporin	Clostridium	Bacillus subtilis	50-100 ppm, feed	Orffa
CloSTAT	Clostridium	Bacillus subtilis	Feed: 500g/ton Drinking water: 25 g/1000 L	Kemin
Selko-4 Health #	Clostridium	Folic acid, acetic acid, fatty acids	Drinking water	Selko

# Not allowed in organic certification, but raw materials (acids) are allowed



*Bacillus subtilis*



## ***Coccidiosis***

### Management:

- To prevent coccidiosis, occupancy rates in poultry houses are important
- Is the litter dry? Pay attention to spillage of drinking water. What do the droppings look like? Vaccination against coccidiosis is possible early in rearing, but it is not always successful.

### Natural products:

- Herbs and derived products do not provide a full protection against coccidiosis, but can lower the disease pressure somewhat or alleviate the consequences of infection slightly. Different products work on different points of impact.
- Bitter substances from hops and oregano oil can be useful in case the coccidiosis is worsened, or followed by, a bacterial infection (see the former paragraph as well).

All products for coccidiosis prevention mentioned in the table below have given good results in farm trials.

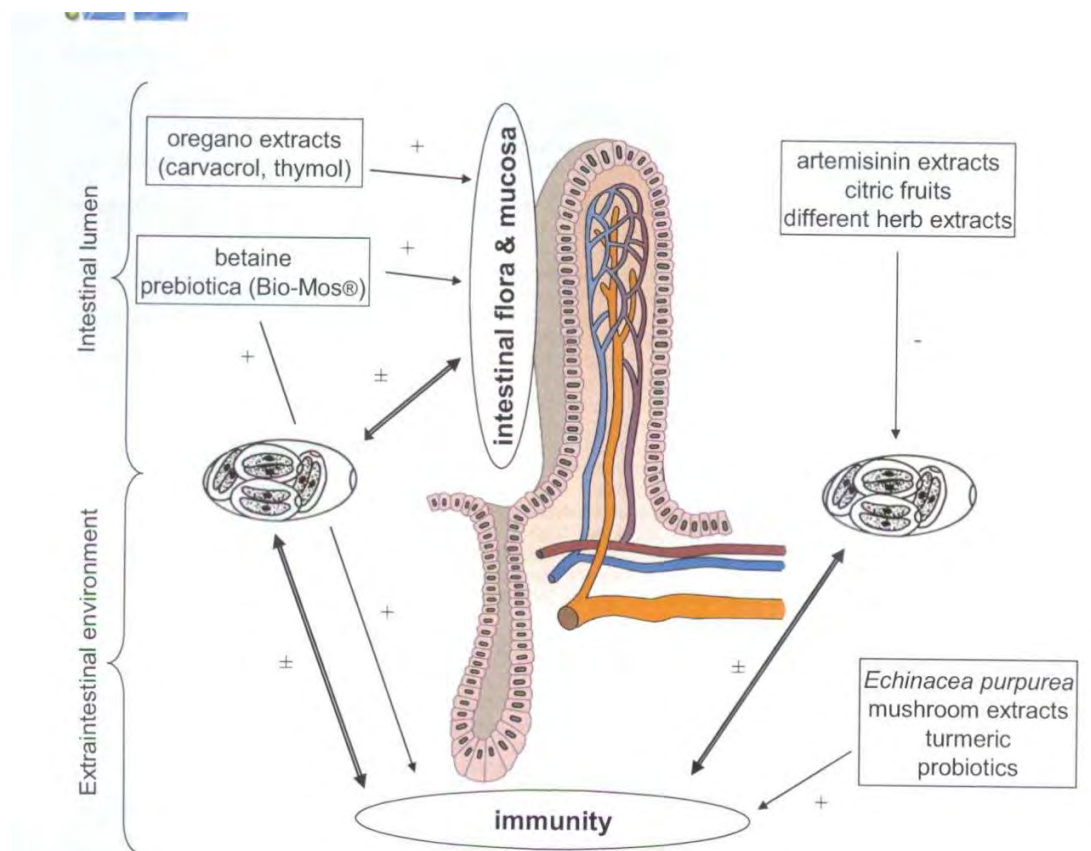
### **Coccidiosis**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Eimericox	Coccidiosis	Several essential oils	Feed, 1-1,5 kg/ton	Phytosynthese/Trouw Nutrition
Natustat	Coccidiosis	Several essential oils and yeast cell walls	Feed, 2 kg/ton	Alltech
Ropadiar GG30 # or Ropadiar Solution	Reduction of unwanted intestinal bacteria	Oregano oil (on diatomite)	Feed 0,2-4 kg/t; 0,25-1,5 l/1000 l drinking water	Ropapharm
Zicomill	Coccidiosis	5 herbs (garlic a.o.)	Feed: 0,5-3 kg/ton	Indian herbs

### **Intestinal health in case of coccidiosis**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Betafin / betaine	Protection of intestinal wall	Betaine (from molasses)		Through feed supplier
Bio-Mos and other probiotics and prebiotics	See first table on intestinal health		Feed 0,5-2g/ton	
Enteroguard	Intestinal health	Garlic and cinnamon	Feed 0,5-1 g/ton	Orffa
Xtract Immunox	Activating the immune system	Spanish pepper, turmeric	Feed 250 g/ton	Pancosma

The Animal Health Service Deventer developed the figure below, which gives an overview of how several natural products help with the fight against coccidiosis (from GD publication Peek & Landman, 2008. Werkingsmechanismen van anticox producten).



**Figure 3.** Artemisinin extracts, citric fruits, and different herb extracts seem to have an inhibitory effect on the development of *Eimeria*. Prebiotics (Bio-Mos®) and oregano have an indirect inhibitory effect on the development of *Eimeria* parasite. Betaine has an indirect effect on the development of the parasite through its osmoprotective properties on the intestinal mucosa and stimulation of the intraepithelial lymphocytes. *Echinacea purpurea*, mushrooms extracts, turmeric and probiotics have an indirect inhibitory effect on the development of *Eimeria* through stimulation of the immune system.

The development of coccidiosis parasites seems to be curbed by artemisinin, citrus and a number of specific products based on herb mixtures or essential oils. In the intestines, betaine, prebiotics, oregano, garlic and cinnamon influence the mucous membranes and the intestinal flora. A number of products that increase general resistance (such as *Echinacea* and probiotics) can also be useful, as they inhibit the *Eimeria* parasite indirectly. This effect can also be achieved using Chinese fungi such as the Shiitake mushroom and turmeric.

## *Intestinal roundworms and tapeworms*

### Management:

- Good cleaning of houses in between cycles, disinfection or the use of lime.
- In case of high infection rates, chemical de-worming remains necessary.
- Litter should remain as dry as possible; in case of heavy infection change or treat litter (see chapter 7).
- Changing outdoor runs (rotation); turning over the top layer; dusting with lime or temporarily flooding the outdoor run are other management measures that are sometimes taken.

### Natural products:

- No herbal products have so far proven to kill off worms completely. Several products from traditional medicine are thought to keep infection levels low, without actually killing all worms.
- Ground pumpkin or courgette seeds (1 gr/chicken in case of cores, or 6 g/chicken in case of husked seeds; twice within 24 hours; thereafter optionally give a single laxative (for example: rhubarb root, sorrel root or buckthorn bark 40 mg/chicken);
- Feed fresh carrots, about 10-20 g / animal, only once.
- Garlic (put allicin in the drinking water or powder in the feed, see products for intestinal health, choose maximum dosage).
- Papaya latex (papain): this milky substances comes from unripe fruits or leaves and branches. After drying and grinding a 20% solution is made by dissolving the powder in water. The solution is to be used for 3 days, 400 mg / chicken / day. In Nigeria a test showed a 78% reduction in worm eggs in chicken faecal samples.
- Diatomite (1,5% in feed).
- Plant a mixture of herbs in the outdoor run, such as mugwort, absinthe wormwood, sorrel, lovage, Mexican tea and burnet, so the animals can take what they need.

## *Histomonas (blackhead)*

### Management:

- Poultry roundworm (*Heterakis gallinarum*) can carry *Histomonas* protozoa and needs to be treated.

### Natural products:

- Research has shown that Protophyt A is a promising product. This product is made by Phytosynthese and is similar in composition to Eimericox (see table on coccidiosis).

### Traditional medicine:

- Change outdoor runs and plant mustard plants in the outdoor run that was previously used by the infected animals, to prevent new outbreaks.
- Stinging nettles can be fed as a preventive measure (good for general health as well).

The following products can be applied to prevent *Histomonas* infections:

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Allicin	Supports intestinal health in case of endoparasites	Garlic extract	1,5 l of a 1000 ppm solution per 1000 l drinking water	Lankerenhof
Diamol	Reduction of endoparasites	Diatomite	1,5% in feed	Ropafarm
Enteroguard	Supports intestinal health in case of endoparasites	Garlic and cinnamon	1-2 kg/ton in feed	Orffa
Protophyt	<i>Histomonas</i>	Mixture of essential oils and saponins	Via drinking water, dosage on label	Phytosynthese/Trouw Nutrition



*Garlic in flower*

## ***FLS: Fatty Liver Syndrome***

### Management:

- Two risky periods exist: the first is when the hen starts laying (25 to 35 weeks old), the second is when the animal gets older. In the former case laying costs too much energy and body fat is broken down. In older hens FLS can appear when the energy-content of feed is too high.
- Management should focus on preventing the above mentioned causes: give energy rich feed at the start of laying and less energetic foods to older hens.
- Choline, Betaine and Vitamin B-complex are commonly used, in FLS mix for instance.

### Natural products:

- Seeds of milk thistle (*Silybum marianum*) or an extract (silymarine) works both preventive and curative. It is also used against intoxication by mycotoxins. Other effects are: a higher resistance to stress and a decreased level of saturated fat in eggs and meat.
- In Eastern Europe the following dosages are recorded: 1 ml extract/1 l drinking water for 4-5 days; or 40 to 80 ppm in feed.
- No specific product with milk thistle seed is on the market yet, but it is used in some mixtures.
- Molasses are a good source of choline and Betaine; both these substances protect the liver.
- Supplier Indian Herbs has the product Epatomill / Hepateggs, which consists of turmeric and other herbs, and can support the liver in laying hens 26-36 weeks old.



*Turmeric in flower*

## ***2.2 Respiratory system***

### ***Sniffing, coughing and breathing difficulties***

#### Management:

- Proper ventilation allows for enough oxygen in the house.
- Proper ventilation and low levels of dust reduce the number of pathogens.
- Sprays can be used for temporary relief (but will not be a solution if ventilation is insufficient).
- Vaccines are available against most respiratory (infectious) diseases.
- After vaccination the animals may have vaccination-reaction, but this can be reduced by using natural products to increase general resistance and restoration of mucous membranes. Also use antibacterial products to prevent secondary infections.

#### Natural products:

- Some sprays containing essential oils are supposed to disinfect the air. The value of these has not been proved in on-farm situations, however.
- Indian Herbs provides Animon Plus, which contains turmeric, among other herbs. In the Netherlands this product has not been tested yet.
- In traditional medicine elderberry blossom or elderberries, dried Nettle leaf and black cumin (Black seed) is used.
- Products that improve general disease resistance such as Echinacea and products that protect the mucous membranes of the respiratory system (such as thyme and violets) are used in herbal mixtures. No research has been carried out into these mixtures yet, but some positive results have been reported in farm situations.
- Garlic and oregano have strong antibacterial effects on for instance E-coli and Salmonella respectively. A number of other plants also have antibiotic properties and improve resistance and egg quality as well.

### ***Infectious diseases (viruses, bacteria like mycoplasma, and fungi)***

#### Management:

- As birds do not have a diaphragm, respiratory infections can easily spread through the lungs and air sacs into the peritoneum and the abdominal organs. For that reason it is important to keep a close eye on respiratory infections and address them immediately.
- A healthy climate in the house is important, with little dust, good ventilation and an appropriate stocking density.
- Use vaccinations against all common respiratory diseases, viral infections especially.
- In case the particular pathogen of a disease is known, it can be dealt with directly, but it is always better to prevent than to have to cure.
- In serious cases antibiotics are to be prescribed by a veterinarian.
- If possible, it is preferable to use natural products.



### Natural products:

- General products that increase disease resistance such as Echinacea are useful, especially in the case of viruses.
- Allicin (garlic), carvacrol (oregano) and cinnamaldehyde (cinnamon) have antibiotic properties and are to be used orally.
- Eucalypt, tea tree en menthol (mint) are used in sprays.
- Refer to the table on adverse reactions to vaccinations as well (next paragraph).

### **Respiratory problems**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Aeroforte	House climate	Mint, eucalypt, menthol	Environment spray	Kanters
Atemfrei	Antiviral	Melissa oil (lemon balm)	Environment spray	Ecostyle
Allicine	Respiratory infections	Garlic extract	1,5 L of a 1000 ppm solution per 1000 L drinking water	Lankerenhof
Animon Plus	Breathing difficulties	Indian herbs such as turmeric and pepper	feed	Indian herbs
Blackseed	Anti-inflammatory and pain reduction.	Black cumin	Whole seeds 1,5% in feed	Herman Import
Bronchimax	Respiratory problems	Plant extracts from Echinacea, thyme and milk thistle, among others	1 litre/1000 L, for 8 hours	Herbavita
Colinex	Increasing resistance	3 herbs (2 species of Echinacea)	20 ml/1000 L	Mercordi
Ropadiar GG30 or Ropadiar Solution	Respiratory infections	Oregano oil	0,2-4 kg/ton or 0,25-1,5 L/1000 L	Ropapharm



## ***Vaccination reactions***

### Management:

Immunisations or vaccinations provoke a response of the immune system of young animals. Reactions to vaccinations with live vaccines (using sprays, eye drops or drinking water) can be:

- Decreased appetite as a result of swollen or damaged mucous membranes (of eyes, throat, wind pipe, bronchial tubes and airsacs).
- Bacteria can cause (secondary) infections on damaged mucous membranes, leading to even more damaged tissues.
- Stress caused by the process of vaccinating a flock as such, is also bad for resistance and immunity.
- If the animals do not receive the vaccine simultaneously, vaccination reactions can 'roll' through the flock and last a lot longer as a result.

### Natural products:

- In case of swollen mucous membranes, products with anti-inflammatory herbs (such as turmeric, willow, plantain, black currant and cloves) can be useful.
- Bacterial infections can be prevented either with products for a higher resistance (such as Echinacea) or with disinfectants (such as eucalypt or menthol). A number of poultry farmers have noticed that disinfectants can cause aggravation of respiratory symptoms if they are given to animals with respiratory damage. They should only be used preventively!
- Adaptogenes are herbs that cause reactions to stress to be adequate without the animal overreacting. Examples are ginseng, Russian ginseng Rhodiola and Schisandra. For poultry, no products of this kind are on the market yet.

### **Vaccination reactions**

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Aeroforte	Disinfection of house air	Mint, eucalypt, menthol	Spray	Kanters
Eucamenth	Vaccination reactions, disinfection	Eucalypt, mint	Drinking water , 250 ppm, 2-4 days	Mercordi
Colinex	Vaccination reactions, increasing resistance	Two types of Echinacea	Drinking water, 20 ppm, for 35 days	Mercordi
PK080	Anti-inflammatory and "feel good"	Eugenol (from cloves) and extract of 4 plant	Drinking water 500-1000 ppm, 3-5 days	Mercordi
MercoFluForte Oral Solution	Vaccination reactions, high infection pressure	Lactic acid and citric acid	1 L/1000 L drinking water	Mercordi
Bronchimax	Respiratory problems	Plant extracts: Echinacea, thyme, milk thistle, a.o.	1 L/1000 L drinking water, 8-10 hr/day	Herbavita
Pulmoneggs	Respiratory problems	Galangal, turmeric, eucalypt	2-3 kg/ton in feed, 2-3 weeks	Indian Herbs

## 2.3 Egg production

### General, and infectious diseases

#### Management:

Causes of production problems in laying hens:

- Low feed quality (mycotoxins, salt levels, etcetera), low quality drinking water;
- Reduced feed intake and/or digestion due to climate (high temperatures cause decreased feed intake), stress, commotion, ectoparasites and feather pecking.
- Infectious and other diseases. Many poultry diseases cause reduction in laying percentage. Infections with IB-virus (Infectious Bronchitis), EDS-virus (Egg Drop Syndrome) and Mycoplasma bacteria can cause both reduced laying and aberrations in the eggs. Abnormalities can consist of: discolouration or bad shell-quality. Shells can be ridged, have glassy tips or be absent (windeggs); all of which causes more eggs to break. Sometimes internal abnormalities occur, like blood or flesh specks in the egg, deviating yolk colour or watery egg whites.
- Eggs can become dirty with manure (diarrhoea caused by intestinal problems or too much drinking), blood (vent-pecking or red mites), wet or dirty litter or egg pulp caused by breakage;
- Older hens lay heavier eggs that may have thinner shells and break more quickly.

#### Prevention:

- A number of infectious diseases can be vaccinated against during rearing;
- Encourage good feed intake, prevent stress and commotion caused by management and ectoparasites and prevent intestinal problems;
- When eggs are dirty; check nest boxes, feed, water, housing, etc.;
- Check drinking water, feed and egg transport systems on a regular basis.

#### Natural products:

- A number of essential oils – like oregano, anise, thyme, sage and rosemary – have shown to improve egg production without increasing feed intake. Egg shells were also about 14% thicker.
- Lime and perhaps other re-mineralising substances are important for shell quality.

Product	Application	Composition	Use	Supplier
Basaleggs	Calcium intake, laying production	Mango, ginger	Feed, 1-2 kg/ton, 2-4 weeks	Indian Herbs
Stypteggs	Prevents dirty eggs (diarrhoea)	Polygonum, ginger, a.o.	Feed , 2-3 kg/ton; 2-3 weeks	Indian Herbs
P.E.P. 1000 of P.E.P. Liquid (sol)	Increases production	Oregano, anise, and citrus oils	Drinking water or feed (1000 ppm)	Biomin
Duo-kruidenElixer	Improving intestinal health	120 herbs	1 litre per 900 litre drinking water	Traseco
Redress	Shell quality	Witch-hazel, acids, , sarsaparilla, stinging nettle and vitamins	Twice a week, max 6 per hr, 200-1000 mL per 10.000 hens	Herbavita
Phytolayer	Shell quality	Herbal mixture	In premix (through feed supplier)	Phytosynthese/Trouw Nutrition

## ***Egg properties and quality***

### **Management:**

- Quality of feed influences egg quality (egg white proportion, fatty acids, yolk colour, taste)
- Before giving animals additional herbs, you should ask your feed supplier whether any herbs (f.i. oregano or carvacrol) are already present in the feed.

### **Natural products:**

- A number of essential oils, such as those derived from oregano, thyme, sage and rosemary, reduce the egg yolk percentage and slightly increase the egg white content.
- The 'oxidative stability' (indication for the rate at which unsaturated fatty acids are converted to saturated fatty acids) of eggs and egg products improves when van 50 mg /kg oregano oil is added to the feed.

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
P.E.P. 1000 or P.E.P. Liquid (sol)	Egg quality	Oregano, anise, and citrus oils	Drinking water or feed (1000 ppm)	Biomin
Hepateggs	Egg quality	Andrographis, Boerhaavia a.o.	Feed 1 kg/ton; 2-4 weeks	Indian Herbs
Dosto	antioxidant	Oregano oil	Feed 4 kg/ton	Dostopharm
Ropadiar GG30 of Ropadiar Solution	antioxidant	Oregano oil	Feed 4 kg/ton or 1,5 L/1000 L drinking water	Ropapharm

## ***2.4. Skin and feathers***

### ***Wounds and injuries***

### **Management:**

- Chicken like to have a healthy coat of feathers and keep themselves clean from an early age with preening and sand baths. This means that sand baths need to be available very early on in the rearing stage (part of the sand is eaten).
- Feed has to contain sufficient vitamins and minerals needed for a proper development of the plumage.
- Improper housing and equipment, unhealthy climate and dehydration can also cause damage to plumage.
- Try to prevent intestinal problems; when vitamins and minerals are not taken in completely, this may lead to more feather pecking (see chapter on intestinal health).
- Treat skin parasites (see last paragraph).
- Prevent feather pecking; the more damaged the plumage, the more vulnerable the skin.
- Consequences of damage to skin and feathers – such as cannibalism, loss of blood, inflammations and bacterial infections – need to be dealt with.

### Natural products:

- In traditional medicine, growth of feathers is enhanced using plants containing high levels of silicic acid, such as plantain, nettles, polygonum, sanicle and diatomite (base for many mixtures).
- Marigold and chamomile contain substances that heal wounds.
- Acareggs (see next paragraph) was developed as a nutritional additive in cases of damaged skin, skin infections and ectoparasites.
- Duo KruidenElixer is supposed to have a positive effect on plumage.



*Marigold*

### *Ectoparasites*

#### Management:

- In commercially held poultry, red mite causes a lot of damage because of irritation, feather pecking, anaemia and decreased production.
- Red fowl mites and fleas move from animals to other places in the house, which means it is also useful to treat the environment.
- Lice and scabies mites live on poultry permanently, and need to be dealt with on the animals.
- The scaly-leg mite is mainly found in older poultry kept by hobby farmers.
- Chemical products are largely prohibited for organic poultry.

### Natural products:

- Feeding garlic and vitamin B2, makes poultry less attractive to bloodsucking parasites such as red mites.
- Diatomite (made from fossil plankton or silica) damages the mites' skin and causes them to dehydrate. Some specific products have been developed in combination with essential oils.
- Products such as green soap with white spirit (many repeat treatments needed), biodiesel, and a number of plant extracts containing for instance absinthe wormwood are also used, or even Coca Cola.
- Natural enemies that can be used against mites, lice and fleas are the lesser mealworm and predatory mites. Pheromones may also be used to attract and catch ectoparasites.

## Ectoparasites

Product	Application	Composition	Use	Supplier
Diamol	Against ectoparasites	Diatomite	In sand bath	Ropadiar
Allicine	Makes blood less 'tasty' to mites	Garlic	Drinking water 1,5 L of a 1000 ppm solution per 1000 L	Lankerenhof
Acareggs	Ectoparasites and skin infections	Cedar, ginger, turmeric, pepper	Feed: 200-300g /ton for 2-4 weeks	Indian Herbs
MMite	Against poultry mites	Diatomite and essential oils	Powder to be used in a special spray in the house	Olmix
Flybusters	Against flies and poultry mite	Pyrethrum and Piperonylbutoxide	Spray in the house	Flybusters

## 2.5 Behaviour

The early stages of diseases or infections are often recognisable in animal behaviour. It is important to stay alert and watch for behavioural changes. It is often not a good idea to try to change behaviour with medication or natural products.

### *Fear and panic*

#### Management:

- Predatory birds and predators (foxes) can cause fear and panic so it is essential to provide shelter (vegetation or artificial) or keep your poultry together with some larger animals.
- Stay calm when handling the animals, go into the house regularly, scatter grain, etcetera.

### *Commotion and aggression*

#### Management:

- Stress can be caused by problems concerning housing, feed, climate (heat stress), pests or ectoparasites. Management consists of removing these causes of stress.
- Stress often starts after transfers: create a distraction with 'environmental enrichment' and scatter grain.



## ***Feather pecking and cannibalism***

### Management:

- An important cause of feather pecking is that young chicks do not learn to peck the ground during rearing.
- Other causes can be: boredom, stress (see above), agitation as a result of ectoparasites, too much light in laying boxes, deficient feed.

### Natural products:

- Adaptogenes are herbs that cause reactions to stress to be adequate without the animal overreacting. Examples are ginseng, Russian ginseng Rhodiola and Schisandra. For poultry, no products of this kind are on the market yet.

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Calmeggs  Can be combined with:	Agitation, stress caused by heat or transport, feather pecking, cannibalism	Indian gooseberry, basil, mango, ginger	0,5-1 kg /ton feed 2 weeks before and 2 weeks after stress moment	Indian Herbs
Hepateggs	Feed intake	Andrographis, Boerhaavia a.o.	Feed 1 kg/ton; 2-4 weeks	Indian Herbs
PK080	Stress, diminished appetite, disease after transfers, 'feel good' effect	Eugenol (from cloves) and 4 plants extract	Drinking water 500-1000 ppm, 3-5 days	Mercordi
Mercoprobal WSP	General stress situations	Prebiotics (Enterococcus faecium) and vitamin C	Drinking water 200-400 g / 1000 L	Mercordi
Sedafit	Stress caused by transport	Valerian, passion flower	Through feed supplier	Phytosynthese



### 3 Other

#### *Housing*

##### Management:

- Hygiene: professional cleaning and disinfection between cycles help keep the number of pathogens down.
- Some poultry farmers deliberately refrain from wet cleaning after a good cycle, to preserve the favourable bacteria.
- The products mentioned below could be useful, should problems exist.

##### Natural products:

- Products based on enzymes can slow the growth of bacteria and break down biofilms in which pathogenic bacteria can survive.
- After cleaning and disinfection of the house you can add a mixture of good bacteria (effective micro-organisms or EM). This helps maintain a healthy balance between 'good' and 'bad' bacteria. Products based on EM also reduce ammonia emissions and can lower the risk of diarrhoea.

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Panazym	Stops bacteria and breaks down biofilm	enzymes	Foam	Panagro
Orgaferment	Treatment of litter	EM and yeasts	Sprays	Panagro
Orgabase	Treatment of litter	EM and bran	Sprinkle	Panagro
Biofilm + WS Spray	Treatment of litter	EM	Spray (500 g in 10 litre water per 1000 m <sup>2</sup> ) on day 7 and day 21	Mercordi
Easystro	Drying effect, fixates ammonia	Prepared straw	Litter	Sambed B.V.
Aerocid	Neutralises ammonia, reduces susceptibility to stress	Organic acids, herbal extracts, pine tree, thyme, eucalypt, cloves	1 L to 3 L water of 70°C, spray 5 ml per m <sup>3</sup> (1 meter above the animals) , twice a week	Herbavita

## *Flies and mosquitoes*

### Management:

- Flies and mosquitos can cause a lot of agitation and irritation and transfer pathogens.
- Environment is very important (no wet litter, no dead animals).
- Climate: make sure the house is well-ventilated and fresh.

### Natural products:

<b>Product</b>	<b>Application</b>	<b>Composition</b>	<b>Use</b>	<b>Supplier</b>
Agra predatory fly	Natural enemy of stable flies	Predatory flies and pupas	Introduce into house	Agrapharm
Agra predatory / parasitic wasps	Natural enemy of stable flies	Parasitic wasps and pupas	Introduce into house	Agrapharm
Exfly cattle spray	Deter flies with odour	Organic odour	spray	Prolako
Flybusters	Against flies and poultry mite	Pyrethrum and Piperonylbutoxide	Spray in house	Flybusters

## *Herbs in the outdoor run*

A large number of herbs is useful for sowing in or next to the outdoor run (in the latter case young plants have a higher survival rates). Other options include trees and shrubs that provide shade and drop their blossoms and leaves into the outdoor run. Willow, elder, walnut, hawthorn, chestnut, European barberry, Oregon-grape, grape and blackberry are suitable. All these herbs can have a direct positive effect on poultry health, but may also contribute indirectly. For instance, by increasing the amount of minerals that poultry eat.



*elder*

## Annex 1: Products (alphabetical order) and suppliers

\* = Organic product

# = Not allowed under (Dutch) organic certification, but raw materials are allowed

product	supplier	website
Acareggs	Indian Herbs	www.indianherbs.at
Active MOS	Orffa	www.orffa.com
Aerocid	Herbavita	www.herbavitae.eu
Aeroforte	Kanters	www.kanters.nl
Agra predatory flies Agra parasitic wasps	Agrapharm	www.veeserviceidac.nl
Allicine/Allimax **	Bok /Borren	www.lankerenhof.nl
Animon Plus*	Indian Herbs	www.indianherbs.at
Appelazijn (Polli Sani)	Wijnen, Odiliapeel	http://www.wijnendegroot.nl/Sani-plus/sani.htm
Asimill*	Indian Herbs	www.indianherbs.at
Atemfrei	Ecostyle	www.ecostylevoordieren.nl
Avicox	Mercordi	www.mercordi.com
Basaleggs	Indian Herbs	www.indianherbs.at
Betafin/betaïne	via mengfeedbedrijf	
Biofilm+WS spray	Mercordi	www.mercordi.com
Bio-Mos	Alltech	www.alltech.com
Biostrong	Delacon / Green Valley	www.delacon.com; www.greenvalleyinternational.nl
Blackseed*	Herman Import	www.blackseed.nl
Bronchimax	Herbavita	www.herbavitae.eu
Calmeggs	Indian Herbs	www.indianherbs.at
Calsporin	Orffa	www.orffa.com
Caromic	Euroduna	www.euroduna.com
Chestnut Extract	Silvateam	www.silvateam.com
CloSTAT	Kemin	www.kemin.com
Colinex	Mercordi	www.mercordi.com
Cuxarom Spicemaster P*	Lohmann	www.lah.de
De-Odorase	Alltech	www.alltech.com
Diamol*	Ropapharm	www.ropapharm.nl
Diamond V XP	Speerstra Feed Ingredients BV	www.speerstra.com
Digestamine*	Speerstra Feed Ingredients BV	www.speerstra.com
Dosto** & D. mineral	Dostofarm	www.dostofarm.de

product	supplier	website
Duo KruidenElixir	Traseco B.V. or Jan Smit, Veendam	www.traseco.nl
Easy-stro	Sambed B.V. Dhr. A. Wijne Dansk Dyrestimuli A/S	<a href="http://www.strawbase.nl">www.strawbase.nl</a> <a href="http://www.easy-stroe-shop.dk/">http://www.easy-stroe-shop.dk/</a>
Eimericox	Phytosynthese/Trouw Nutrition	www.phytosynthese.com
Enteroguard*	Orffa BV	www.orffa.com
Epatomill*	Indian Herbs	www.indianherbs.at
Eucamenth	Mercordi	www.mercordi.com
Exfly veespray	Prolako	www.prolako.nl/
Flybusters	Flybusters	www.flybusters.nl
Fructomix	Phytobiotics	www.phytobiotics.com
Hepateggs	Indian Herbs	www.indianherbs.at
Hydroprotein+C	Mercordi	www.mercordi.com
Immunall (vh Biolitan)	Natural Food Suppl. UK	www.immunall.com
Livol	Indian Herbs	www.indianherbs.at
MacroGard	Orffa BV	www.orffa.com
MercoFluForte Oral Solution	Mercordi	www.mercordi.com
Mercoprobial WSP	Mercordi	www.mercordi.com
Microbioticum**	Ineko bv	www.microbioticum.com
MMite	Olmix	www.olmix.com
Mycosorb	Alltech	www.alltech.com
Natustat	Alltech	www.alltech.com
Orgabase	Panagro Health and Nutrition	www.panagro.be
Orgaferment	Panagro Health and Nutrition	www.panagro.be
Panazym	Panagro Health and Nutrition	www.panagro.be
Paramaxin	Indian Herbs	www.indianherbs.at
P.E.P. 1000 * on carrier or other concentration or P.E.P. 1000 Liquid	Biomin	www.biomin.net
Phytolayer	Phytosynthese/Trouw Nutrition	www.phytosynthese.com
PK080	Mercordi	www.mercordi.com
Polli sani	Wijnen	<a href="http://www.wijnendegroot.nl/Sani-plus/sani.htm">http://www.wijnendegroot.nl/Sani-plus/sani.htm</a>
Prebiofeed	Speerstra	www.speerstra.com
Progut	Progut	www.progut.com

<b>product</b>	<b>supplier</b>	<b>website</b>
Pro-mac	Kanters	www.kanters.nl
Protophyt	Phytosynthese / Trouw Nutrition	www.phytosynthese.com
Ropadiar GG30* or Ropadiar Solution	Ropapharm	www.ropapharm.nl
Pulmoneggs	Indian Herbs	www.indianherbs.at
Redress	Herbavita	www.herbavitae.eu
Sangrovit	Phytobiotics / Jadis	www.jadis-additiva.eu
Sedafit	Phytosynthese/Trouw Nutrition	www.phytosynthese.com
Selko-pH or Selko-4 Health #	Selko	www.selko.com
Sel-Plex	Alltech	www.alltech.com
Sheldelder premix	Protection	www.protectionsrl.com
Silvafeed ENC	Silvateam/Hagebo	www.silvateam.com
Stalspray	Dr. Schaette/Ecostyle	www.ecostylevoordieren.nl
Stypteggs	Indian Herbs	www.indianherbs.at
Urkraft Geflügel	Dr. Schaette/Ecostyle	www.ecostylevoordieren.nl
Xtract-Immunox	Pancosma	www.pancosma.com
Yucca plus	Jadis	www.jadis-additiva.eu
Zicomill	Indian Herbs	www.indianherbs.at
Herbal tinctures	Marleenkruiden	www.marleenkruiden.nl
Dried herbs*	VNK Elburg	www.vnk-herbs.nl
Herbal seeds for outdoor run	Pure graze	www.puregraze.com

\* = Organic product

# = Not allowed under (Dutch) organic certification, but raw materials are allowed



## **Annex 2: Background information on natural products**

### ***Choosing natural products***

Organic agriculture prefers natural products when treating animals. But what exactly is a natural product? The distinction between natural and non-natural products can be made in two ways; based on technical properties of the product or based on the motivation of the user.

#### ***Technical distinction: production methods***

The raw materials for natural products are derived from nature. This means: the molecules have not been changed in a laboratory, the product is of *biogenic origin*. A simple example is willow bark. This is a natural product that has been used for thousands of years to boil a tea that treats fever and pain. This tea contains many active ingredients. One of these was isolated - salicylic acid – and from 1900 onwards sold as medication. This isolated substance caused severe stomach aches, so improvement was necessary. An acetic group was added to the salicylic acid; we still know this combination as aspirin. This is no longer a natural product; these days it is made entirely out of synthetic substances.

Another example: To isolate carvacrol (a disinfectant) from oregano we also need a laboratory. To some people that means this substance is no longer natural. The distinction is not made in the same manner by everyone. Carvacrol can be produced synthetically from different raw materials than oregano. In those cases it certainly isn't a natural product, but there is no chemical difference with 'naturally produced' carvacrol.

Phytotherapy uses plant products that still have a natural complexity. The willow bark example shows that natural products are not always harmless. It is also important to know which parts of the plant can be used and how to prepare them.

#### ***Differences in motivation: different objectives***

Natural products can be opted from for a variety of reasons. Some examples are:

- Supporting the 'green' company image;
- Preventing or curing diseases without leaving harmful residues (no waiting time before products can go to market);
- Improving product quality (f.i. by increasing the unsaturated fatty acid content);
- Improving animal health without using environmentally harmful substances;
- Using methods and materials that would be available to the animal in the wild;
- Promoting animal health through management and relying as little as possible on medical treatments;
- Dealing with health issues while they are still small (instead of waiting for the situation to get out of hand and only treatable with fast-working medication).

Usually, complex natural products such as phytotherapeutics are chosen in organic animal husbandry. Singular synthetic products such as carvacrol or synthetic vitamins are a lot less popular. Preference lies with organically grown herbs. The sector aims to use 100% organically produced feed by 2012. Feed additives used to improve health should also be fully organic by then.

## ***Important groups of natural products***

**Herbal mixtures or phytotherapeutic products** are generally made from parts of herbal plants but can also be prepared from trees, algae, seaweed, lichen, yeasts or fungi. These products are often added to feed to improve taste and smell. Fragrant plants are used mostly, although odourless herbal mixtures do exist.

Because each plant can contain a variety of active substances (Annex 4), one herb or herbal mixture can have a number of effects. One plant can - for instance - increase appetite, have antibiotic and anti-inflammatory properties and calm coughing. A herb can be used in the form of dried or ground seeds, flowers or roots. It is also possible to derive an extract from it, with a high concentration of active ingredients and thus a stronger effect. Essential oils consist of isolated volatile (fragrant) components. Oregano oil is currently a much-used additive in animal feed.

A number of plant products cause very different reactions in different animal species. Poultry, for instance, has no problems with henbane, which is poisonous to many mammals. But poultry is also much more sensitive to saponins. Different products from the same plant, may cause very different reactions. Also, preparation and dosage influence the effect of the product.

Some herbs – garlic and cinnamon for instance - contain active substances that also act against pathogens when they have not (yet) been absorbed in the intestines. They resemble prebiotics in the sense that they hardly influence ‘good’ intestinal bacteria, such as lactic acid bacteria.

**Phytogenic substances** are very pure products that have been distilled from a plant extract (up to almost 100% purity). Examples are allicin from garlic, inulin from chicory, lignin from straw or wood and carvacrol from oregano. An interesting group of phytogenic substances are beta-glucanes, which are derived from the inside of yeast cell walls and from certain fungi. Beta-glucanes are used to increase resistance and bind toxins.

### **NGPs**

A new group of additives is called ‘Natural growth promoters’ (NGP). These substances are also used in conventional agriculture to replace antibacterial growth promoters. NGPs often contain herbs that have long been used in natural medicine and organic agriculture. Examples are yarrow and garlic. A new phenomenon is the large-scale use of oregano oil and one of its substances, carvacrol.

**Probiotics** are feed supplements that consist of live micro-organisms, such as lactic acid bacteria, enterococci or beer yeast cells. Probiotics are used to support or recover the natural microbiological balance in the human or animal intestinal tract. Using probiotics is particularly helpful after an intestinal infection and possible use of antibiotics. A healthy intestinal flora can lead to a better general health, better growth and higher production, thanks to improved digestion and immunity.

**Prebiotics** are substances that enhance the development of the intestinal flora, without being absorbed by the animal. Indications are, that prebiotics also stimulate immune responses and prevent harmful bacteria from sticking to the intestinal walls. Prebiotics are generally phytogenic products. Examples are:

- Carbohydrates from yeast cell walls (MOS: Mannose oligosaccharides);
- Carbohydrates from plants, such as the decomposition products of inulin from Jerusalem artichoke or chicory roots (FOS: Fructo-oligosaccharides). FOS improves calcium uptake, but may be less specific for certain bacteria than MOS;
- Pectins (heterosaccharides) from citrus fruits, apples, potatoes or carrots.

Prebiotics and probiotics combine well; when used together they are called synbiotics or symbiotics.

**Organic acids** are used to improve digestion and added to feed or drinking water. Examples are folic acid, citric acid and long-chain fatty acids. These acids are often given as a salt. Organic acids lower the pH of the stomach and make feed more tasty and less perishable. In a more acid intestinal tract, the multiplication of bacteria such as E-coli and Salmonella slows down. Herbal products such as apple cider vinegar, wine vinegar and citrus extract work in the same way, because they mainly consist of organic acids.

**Enzymes** are proteins that work as catalysts. These substances manage a chemical conversion without being converted themselves. Examples are the enzymes that split starch, fat and proteins in the stomach, to help digest food. Enzymes are usually provided as chemically pure products. Herbal mixtures of papaya and pineapple also contain protein-splitting enzymes; these are generally used against worms which are damaged by these enzymes. Enzymes for disinfection of the house are also available on the market.

**Other products** mentioned in this guide are used for cleaning and disinfection and to improve the floor and litter. These are products taken from nature without much processing, such as clay, sand, minerals, enzymes and acids.

### **Final remarks**

Please note that homeopathy is not included in this booklet, because it operates based on a specific philosophy.

Increased welfare and well-being of animals have a proven positive influence on disease resistance. This means that many simple and easily used products can be effective; including attention and care.

## Annex 3: Alphabetical list of herbs

### **The following pages contain an alphabetical list of herbs.**

The list is not definitive or complete, as products change continuously. Not all products are available everywhere (yet) and each plant contains more active substances – such as vitamins or minerals - than those that are mentioned here. The list gives a general indication of the herbs in natural products and cannot be used as the only guide for using a certain herb or natural product.

### **Additional information on the active substances mentioned in the list:**

**Alkaloids** are small molecules that contain nitrogen. Often these substances influence the nervous system, sometimes in such a powerful way that are considered poisonous (i.e. caffeine or nicotine).

**Bitter substances.** Some plants have a bitter taste and increase the excretion of saliva and other digestive fluids through their effect on the taste buds. These bitter substances are small compounds that are poisonous in high dosages; the bitter taste signals danger. Bitter substances do not belong to a single chemical group.

**Essential oils** of plants are mixtures of volatile substances; they are what gives the plant its fragrance. These substances can differ enormously, but they are all small compounds. Some are very strong (like camphor) or very antibiotic (carvacrol or thymol). Some fragrances increase appetite, because they stimulate the secretion of digestive fluids. Other stimulate urine or sweat production.

**Flavonoids** provide flowers with a yellow or pink colour. Many flavonoids work as antioxidants (anthocyanin is an example). Some (isoflavones) are similar in chemical structure to oestrogen. In the plant, flavonoids are attached to sugar molecules.

**Silicic acid** hardens plants; it can be found in wheat stems, plantain, polygonum and horsetail for instance. In popular medicine silicic acid is used for stronger hooves, horns, hair, skin and feathers. Not much research has been done into this substance.

**Tannins** are large, somewhat acidic compounds, often made up of flavonoid-like substances. Tannins cause proteins and alkaloids to precipitate. This way, food becomes less digestible and tannins can have a detoxifying effect. They reduce diarrhoea and have antibacterial properties.

**Saponins** cause a soapy foam; when you rub plants containing saponins between your hands with water they de-grease your hands. Saponins bind both fat and water. When used in a herbal mixture they cause other substances to get absorbed. Saponins can irritate mucous membranes. Saponins from plants are often very large and complex molecules that are not absorbed themselves. In plants they often derive from hormone-like (steroid) compounds.

**Mucilage** consists of long carbohydrate chains that can create a gel with water (like linseed when it gets boiled). Plants containing mucilage have a soothing effect on, for instance, sore throats. In a high dosage, these substances have a laxative effect.

English common name	Botanical name	Part of the plant used	Main active substances	Products	Application
Absinthe wormwood, Wormwood, Absinthium	<i>Artemisia absinthium</i> ; <i>A. spp.</i>	herb	Bitter substances (f.i. artemisinin), essential oil (mainly thuyon and azulene)	No product available for poultry, but known in Canadian popular medicine. <i>A. annua</i> is used against malaria. Plant Absinthe wormwood in outdoor run.	Digestion, increases appetite, against parasites.
Algae	<i>Diatomeae spp and Fucus spp</i>	cells	chlorophyll, silicic acid (Diatomea) and iodine (Fungi).	Spicemaster, Ropadiar GG30 (D), Diamol	Increased uptake of feed, appetite and growth. Used against stress, endoparasites (Diatomeae), to support resistance and metabolism.
Angelica	<i>Angelica sp.</i>	Root, seeds	Essential oil 1%, cumarine 0,08%, bitter substances	Melissengeist-Ademspray	Disinfects the air, relieves respiratory problems
Anise	<i>Pimpinella anisum</i>	seed	2-6% essential oil (containing 90% transanethol), 10-30% fatty oil and 20% proteins	Colosan (anise oil), Cuxarom, Digestamine, Multicon, P.E.P. 1000	Appetite, production, growth, intestinal problems
Beets	<i>Beta vulgaris</i>	molasses, pulp	50% sugar, 5,5% betaine, several minerals	Provimi betaine, FLS mix	Protection of liver (against fatty liver syndrome, for instance)
Black seed	<i>Nigella sativa</i>	Seed	0,4-1,4% essential oil, 33% fatty oil, saponins	Black seed	Increases removal of bile from gallbladder, reduces cough reflex
Calamus or sweet flag (do not gather in the wild – poisonous chemotype)	<i>Acorus calamus</i>	Root	Essential oil, 5% (mainly asaron), bitter substances	IHP-250C (Zicomill/Zycox), Powder nr. 3, Powder nr. 4, Fyto-stop	Stimulates stomach, against diarrhoea, improves intestinal flora, against coccidiosis
Camomille	<i>Matricaria chamomilla</i>	Flower	0,3-1,4% essential oil, (containing chamazulene and bisabolol), flavonenes, coumarines	Microbioticum, Cleanspray	Wounds, general health and production, resistance, infections
Carob	<i>Ceratonia siliqua</i>	seed pods	Sugars, mucilage, tannins	Caromic	Diarrhoea, irritation of the intestines.
Cat's claw	<i>Uncaria tomentosa</i>	Root, bark	Alkaloids (differs between chemotypes, up to 3%), $\beta$ -sitosterol, flavonoid, tannins	Immunall	Resistance, prevention of diseases
Cayenne	<i>Capsicum frutescens</i>	Fruit	0,3-1% capsaicinoids, flavonoids, fatty oils	Xtract, Repaxol	Infection, itching, pain, circulation. Note: can cause irritation to skin and mucous membranes

Centaury	<i>Erythrea centaurium</i>	Herb	Bitter substances	Urkraft Geflugel	Digestion, improves appetite, general wellbeing and health.
Chicory	<i>Cichorium intybus</i>	roots	Bitter substances, flavonoids, inuline 30%	Fructomix, P.E.P. 1000, Chichory pulp, Prebiofeed	Optimising intestinal flora (prebiotics)
Cinnamon	<i>Cinnamomum zeylanicum</i>	Bark	Essential oil 1-2% (containing 75% cinnamaldehyde and 5% eugenol), tannins 2%	Enteroguard, Melissengeist-Ademspray (oil), Protophyt B, Protophyt SP, Rurex (Chinese cinnamon oil), Cinnatube, RepaXol (oil, mixture of oregano, cinnamon, thyme and capsicum)	Stability of intestinal flora, watery manure, histomonas, coccidiosis, enhances growth, improves housing climate, improves digestion and assimilation of nutrients.
Cloves	<i>Eugenia caryophyllata</i>	Flower	Essential oil 20% (containing 90% eugenol), tannins 10%, flavonoids	Melissengeist-Ademspray (olie), Digestamine	Disinfects the e air, relieves respiratory problems
Coriander	<i>Coriandrum sativum</i>	Seed	Essential oil 0,2—1,6 % (70% linalool), fatty oil 15-25%, proteins 11-17%	Melissengeist-Ademspray (oil)	Disinfects the air, relieves respiratory problems
Dandelion	<i>Taraxacum officinale</i>	Root or herb	Inulin (root contains up to 40% in autumn), bitter substances, flavonoids, several vitamins and minerals	No product available for poultry, may be grown in outdoor run	Digestion, liver, prebiotic, vitamins, minerals
Echinacea, purple coneflower	<i>Echinacea purpurea</i>	Root	Essential oil, polysaccharides, inulin	Microbioticum, Immulon, Immunall, Colinex	General health and production, resistance, respiratory tract, stabilises intestinal flora
Elder	<i>Sambucus nigra</i>	Flower, berry	Essential oil 0,02-0,15%, flavonoids	No product available for poultry, may be grown in outdoor run	Resistance, metabolism, circulation
Eucalypt	<i>Eucalyptus globulus of saligna</i>	Leaves	Essential oil 0,5-7% (75% cineol), tannins	Bremsen-Frei Plus, Aeroforte	Respiratory tract, reduces slime, protects against flies
Fennel	<i>Foeniculum vulgare</i>	Seed	Essential oil 2-6% (containing 60% trans-anethole), 15% fatty oil	Cuxarom, Digestamine, Heryumix (fennel seed oil), Melissengeist-Ademspray (fennel oil)	Digestion, growth, respiration, housing climate
Fenugreek	<i>Trigonella foenum graecum</i>	Seed	Mucilage 30%, protein, fatty oil, saponins 3%, bitter substances	No product available for poultry	General resistance and energy, digestion
Garlic	<i>Allium sativum</i>	Bulb	Several sulphur compounds (allicin, thiocyanates), vitamins (A, B1, B2 , C), minerals ( K, Fe, S, J, C, P, Se)	Enteroguard, Allicin/Allimax, Cuxarom, IHP-250C (Zicomill), Protophyt B, Protophyt SP, Urkraft Gefugel, Zycos, Immunall, Microbioticum	Stability of intestinal flora, against endoparasites, coccidiosis, histomonas, assimilation of nutrients, activates immune system, general resistance, anti-bacterial, promotes growth
Ginger	<i>Zingiber officinale</i>	Root	Essential oil, up to 3,3%, resin, minerals	Stypteggs	Against nausea and (intestinal) infections

Ginseng	<i>Panax ginseng</i>	Root	Saponins, 1,5 % specific sugars, essential oil	Immunall	Growth, general resistance and energy levels
Heartsease	<i>Viola tricolor</i>	Herb	saponins, flavonoids, salicylates	Microbioticum, Immunnall	Resistance, activates immune system, prevents disease
Horse chestnut	<i>Aesculus hippocastanum</i>	Seed	3-10% saponins	Cothivet	Skin lesions, swellings
Lavender	<i>Lavendula officinalis</i>	Flower	Essential oil 1-3% (containing camphor and cineol a.o.), 12% tannins	Bremsen-Frei Plus (lavender oil), Cothivet (lavender oil), Septobion (lavender oil)	Skin lesions, protection against flies
Lemon	<i>Citrus limon</i>	Peel	Essential oil, 2,5% (terpene, $\alpha$ -limonene), flavonoids	Melissengeist-Ademspray (oil)	Disinfects the air, relieves respiratory problems
Lemon balm	<i>Melissa officinalis</i>	Leaves	Essential oil, 0,05-0,8% (citral 50%), tannins 4%, flavonoids	Melissengeist-Ademspray (oil), Digestamine	Disinfects the air, relieves respiratory problems
Linseed, flax	<i>Linum usitatissimum</i>	Seed and linseed oil	Seed: 25% indigestible carbohydrate, 40% fatty oils (containing a lot of unsaturated fatty acids), 25% proteins	No product available for poultry, but is a good source of unsaturated fatty acids.	Increases the content of omega-3 fatty acids in meat and Alpha-linolenic acid in eggs.
Marigold	<i>Calendula officinalis</i>	Flower	triterpene glycosides, flavonoids, luteins (carotenoids)	No product available for poultry, but well-known in popular medicine	Mild disinfectant for wounds, skin lesions
Meadowsweet	<i>Filipendula ulmaria</i>	Flowers, leaves	Salicylates, flavonoids (5%), tannins	No product available for poultry, may be grown in outdoor run	Against pain, infection and fever
Milk thistle	<i>Silybum marianum</i>	Seed	Silymarine (mixture of 3 flavonollignans), 25% fatty oil, 30% proteins	Urkraft Geflügel, Immunall, Bronchimax	Digestion, liver function, circulation, resistance
Mint	<i>Mentha piperita</i>	Herb	Essential oil 1-3 % (variable, usually 50% menthol), tannins about 10%, flavonoids	Aeroforte, Digestamine	Reduces mucous in respiratory tract
(Stinging) nettle	<i>Urtica dioica</i>	leaves	Folic acid, acetic acid, histamine, choline, silicium (in the nettles) and many vitamins, minerals (mainly iron) and tannins	Redress, in popular medicine: plant in outdoor run	Improves calcium metabolism, improves bone development, protects intestines, vitalises, adds minerals and trace elements, supports respiratory tract, general health.



Nutmeg	<i>Myristica fragrans</i>	Seed, Seed aril (mace)	Essential oil 7 - 15 % (containing 80% pinene en camphene, 6% borneol), 35% fatty oil, 30% starch	Melissengeist-spray (oil)	Respiration, housing climate (do not use separately, only in spray)
Oak	<i>Quercus sp.</i>	Bark	Tannins	Rurex, Fyto-stop, Urkraft Gefugel, Digestamine	Against diarrhoea, improves digestion
Oregano, wild marjoram	<i>Origanum vulgare</i>	Herb	Essential oil (especially carvacrol and thymol), tannins	Dosto (oregano oil), Heryumix (oregano oil), Orego-STIM (volatile oil), P.E.P. 1000, Ropadiar (oil), RepaXol (oil, mixture of oregano, cinnamon, thyme and Spanish pepper)	Improves digestion, antibacterial, promotes growth, against coccidiosis
Oregon-grape	<i>Mahonia aquifolium</i>	Bark, root (fruit)	Alkaloids	No product available for poultry, but well-known in (Canadian) popular medicine	Infections, respiratory system
Plantain species	<i>Plantago species</i>	Herb	Silicic acid, tannins	No product available for poultry, well-known in popular medicine (Germany), may be planted in outdoor run	Against diarrhoea, optimising metabolism
Polygonum	<i>Polygonum aviculare</i>	Herb	Silicic acid, tannins, flavonoids	Stypteggs; well-known in popular medicine (germany), may be planted in outdoor run	Strengthens plumage during moulting
Rosemary	<i>Rosmarinus officinalis</i>	Leaves	Essential oil 1 - 2,5% (mainly camphor, borneol, cineol), tannins	Cothivet (oil), Protophyt B, Protophyt SP	Skin lesions, circulation, metabolism, histomonas, appetite and digestion
Sage	<i>Salvia officinalis</i>	Leaves	Essential oil 0,5 - 2,5% (mainly thuyon and cineol), tannins, phyto-oestrogens	Heryumix (oil)	Production, anti-parasitic, anti-bacterial
Sand plantain	<i>Plantago psyllium</i>	Seed	10-20% mucilage	Isogel	Diarrhoea, irritated bowel
Sarsaparilla	<i>Smilax officinalis</i>	Root	Saponins, bitter substances	Redress	Anti-fungal, increases feed intake, against skin problems
Sweet chestnut	<i>Castanea sativa</i>	Leaves, bark	Tannins 10%, flavonoids	Chestnut Extract	General health and production, stimulates resistance, digestion, liver
Thyme	<i>Thymus vulgaris</i>	Leaves	Essential oil 1-4% (thymol about 50%, carvacrol about 10%), flavones, tannins	Cothivet (oil), Cuxarom, Digestamine, RepaXol (oil, mixture of oregano, cinnamon, thyme and capsicum)	Disinfects wounds, cares for skin, improves digestion and intestinal health
Turmeric	<i>Curcuma species</i>	Root	5% curcumines (yellow colour, polyphenols), 10% essential oils	Animon Plus, Xtract	Liver function, digestion, general productivity, chronic obstructions of respiratory tract
Valerian	<i>Valeriana officinalis</i>	Root	Essential oil and several plant-specific substances	Sedafit (combined with Passiflora off.)	Relaxing, stress reduction
Walnut	<i>Juglans regia</i>	Leaves	Naphthoquinones, flavonoids, tannins	Immunall	Activates immune system, prevents diseases

Willow	<i>Salix spp (a number of species are used)</i>	Leaves, bark	1 to 11% salicylates, tannins, flavonoids	No product available for poultry, may be planted in outdoor run	Against pain, fever and infection
Witch-hazel	<i>Hamamelis virginica</i>	Bark	Tannins, flavones	Redress	Arteries
Yarrow	<i>Achillea millefolium</i>	Herb	Essential oil 0,2% (up to 40% chamazulene), bitter substances	No product available specifically for poultry, but this herb is well-known in popular medicine; plant in outdoor run	Improves digestion, metabolism, circulation
Yeast	<i>Saccharomyces spp</i>	Cells	Used as a probiotic (living organism), source of vitamin B, or as a prebiotic (only cell walls – beta glucanes)	Avi-Mos, Bio-Moss, Progut, Sel-Plex, Urkraft Geflugel, Diamond, Fyto-stop, Safmannan	Probiotic, supports resistance, metabolism, building of vitamin reserves, increases appetite, supports respiratory system, general health, against diarrhoea, improves intestinal flora, improves growth and production.
Yucca	<i>Yucca species</i>	Root	Saponins	Norponin, De-odorase, Yucca plus	Reduction of ammonia smell in urine and manure, improves utilisation of feed