

Organically Grown? Substantiating the Claim

Anthony C. Dweck FLS FRSC FRSH
Consultant, Dweck Data

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Introduction

The statement on cosmetics that the ingredients were “organically grown” started to appear as little as a year ago. It is to be supposed that the illegal use of the words “not tested on animals” left a hole in the pack copy or a vacant space on the carton, and besides, it was becoming as common a sight on products as the weight declaration and so not much of a marketing advantage any more. There had to be something to put in that annoying void.

Organically grown

You might suppose that being organically grown confers some exceptional benefits to the end product, but sadly it has to be said to our marketing colleagues that this is not so. An organically grown carrot is identical to one grown in normal fields using herbicides, pesticides and other agrochemicals. Try as hard as it may, the β -carotene residing in the *Daucus carota* is the same whether the source was organic or not.

However, there is one difference that one might notice about the organic carrot and that is that it is more likely to have been damaged by little weevils, may be deformed by the roots of close living weeds or just plain ugly. Supermarkets do not like vegetables to be individuals with character and like to see a well turned out platoon, every carrot should be impeccable and totally devoid of any character. So the good news for organic lovers is that the chances of finding a “little boy” carrot with all the appropriate appendages are likely to increase. The downside to this sudden euphoria, is that you are going to have to pay double the normal price to have it.

From a gastronomic position the chances of being poisoned slowly by trace amounts of agrochemical residues is reduced, which is bad news for the undertaking business.

Organically grown extracts

An organically grown plant may provide an extract with a lower pesticide residue, but this was never an issue to our industry in the past because levels were measured in parts per billion (ppb) if at all. The end result is that our extract is chemically identical, far more expensive, but can be tagged “organically grown”.

Definitions set by the Soil Association for “organic”

Visit their web site at www.soilassociation.org. This section has been quoted *verbatim* from their pages.

Food of vegetable origin SHOULD BE:

- Grown by organic husbandry methods.
- Grown without fungicides, herbicides or pesticides, other than those on the "permitted" list.

- Free from synthetic additives.
- Processed or cooked to retain the highest possible nutritive value in the finished product.
- Milled to preserve the germ in its natural state.

In addition, there has to be a standard of

SOIL HUSBANDRY

Recommended:

- Use of alternate husbandry with complex herbal leys and/or established permanent pasture, and preferably mixed stocking, or of varied rotations.
- Use of green manure crops with or without sheet composting.
- Use of the following organic manures:
 - Natural compost and farm manure
 - Dried blood produced on the farm itself
 - Fishmeal (unfortified)
 - Feather meal
 - Hoof and horn meal
 - Seaweed meal and liquid extract
 - Pig bristles
 - Shoddy
 - Sawdust
 - Bonemeal (unfortified)
 - Sheep's trotters
 - Wood shavings
- Use of the following mineral fertilisers:
 - Basic slag
 - Limestone
 - Chalk
 - Rock phosphate
 - Granite dust

Permitted:

- If the material is known to be free from chemical and antibiotic residues when applied to the land:
 - Battery manure
 - Municipal compost (recognised)
 - Farmyard manure (bought in)
 - Slaughterhouse waste
 - Mushroom compost
 - Tannery waste
 - Recognised proprietary organic deep litter manures eg Grancreta and Regenor

Prohibited:

- All soluble chemical fertilisers.
- The continuous growing of cereals

CROP HUSBANDRY

Fungicides

Permitted:

- Copper fungicides in leaf stage only.
- Dispersible sulphur.
- Herbal sprays.

Prohibited:

- All other fungicides.

Herbicides

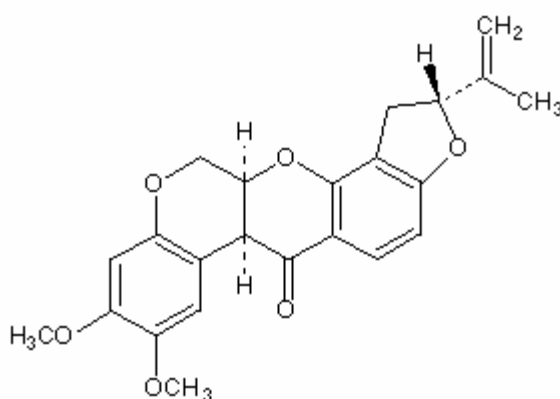
- All herbicides are questionable and should not be used on crops to be sold as Organically Grown.

Pesticides

Permitted:

- Insecticides of vegetable origin such as:
- Derris – from *Derris elliptica* and *D. malaccensis*

LD₅₀ 350mg/kg and is used as an insecticide as a source of rotenone and rotenoid compounds. Inhalation or ingestion of large doses may cause numbness of oral mucous membrane, nausea and vomiting, muscle tremors, tachypnea. With lethal doses respiratory paralysis occurs. Death may be preceded by convulsions. Chronic poisoning may produce fatty changes in liver, kidney. Direct contact occasionally causes mild irritation of skin or conjunctiva. More toxic when inhaled than when ingested. [Merck]



Rotenone

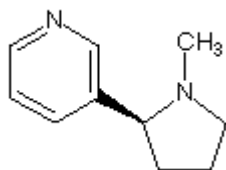
Rotenone can also be extracted from *Lonchocarpus spp.* roots. Rotenone is an effective killer of aphids, thrips, caterpillars, sawflies, beetles and mites. (It is especially effective on leaf eating insects.) Rotenone breaks down rapidly, within days.

Rotenone is more acutely toxic than many synthetic pesticides. Chronic exposure to rotenone has been tentatively linked to Parkinson's disease in humans. It is fairly toxic to mammals and birds. It is very toxic to fish. (It has been used for centuries to stun fish.) It is not quick acting and may take several days to actually kill insects and mites, after they ingest it. Rotenone, made from the roots of tropical plants, is probably the most widely-available botanical insecticide. Many formulations are synergized by the addition of PBO. Rotenone lasts a week or less after application because it is rapidly degraded by sunlight. [White]

Rotenone has the lowest DL₅₀ value of the commonly-used botanicals, making it the most toxic. Like most synthetic pesticides, Rotenone acts on the nervous system. Small doses may be irritating to mucous membranes. This product is highly toxic to fish and other aquatic life. It has been commonly used as a fish poison.

- Nicotine – From the dried leaves of *Nicotiana tabacum* and *N. rustica* where it occurs to the extent of 2 to 8%, combined with citric and malic acids. Commercial nicotine is entirely a by-product of the tobacco industry.

Nicotine can be absorbed from the alimentary canal, the respiratory tract and intact skin. Percutaneous absorption of the free alkaloid is much more rapid than the acid salts. Local effects due to overexposure are burning sensation in mouth and throat, salivation, nausea, abdominal pain, vomiting and diarrhea. GI reactions are less severe but do occur after cutaneous and respiratory exposure. The major systemic effects are a transient stimulation and subsequent depression or paralysis of the CNS. Symptoms include agitation, headache, sweating, dizziness, auditory and visual disturbances, confusion, weakness and incoordination. At first respirations are deep and rapid, the blood pressure is high and the pulse is slow. CNS excitation may be evidenced by tremors or clonic-tonic convulsions. As depression develops, the pupils dilate, the blood pressure falls, and the pulse becomes rapid and irregular. Faintness, prostration, cyanosis and dyspnea progress to collapse. Death from paralysis of respiratory muscles usually follows shortly after collapse. [Merck]

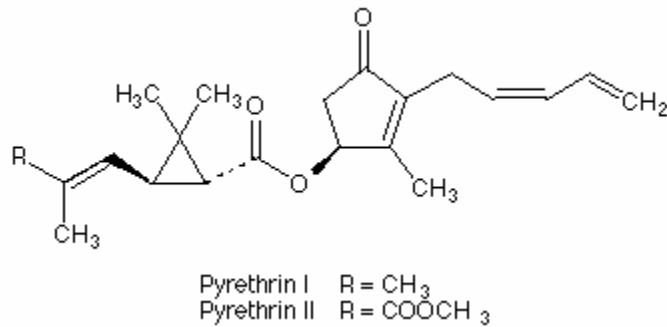


Nicotine

Nicotine is a natural insecticide from *Nicotiana spp.* (tobacco) stems and leaves. Very toxic to insects as a contact insecticide. On a per dose basis it is 30 times as toxic as rotenone. Useful for knocking down chafers and other leaf eating insects in an emergency. On a per dose basis it is 30 times as toxic as rotenone. Basically, nicotine is considered too toxic, to birds and mammals, for agricultural or garden use. The use of nicotines is discouraged by toxicologists. For certain applications the use of nicotine, a 'level 1 insecticide', is illegal.

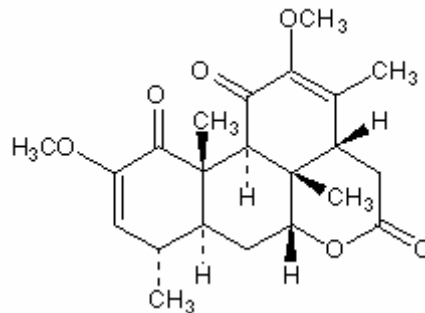
- Pyrethrum - from the flowers of *Chrysanthemum (Pyrethrum) cinerariaefolium*

Direct skin contact or inhalation may cause severe allergic attacks in sensitive people. Potential symptoms of overexposure are dermatitis, asthma, vasomotor rhinitis, anaphylactic reactions; numbness of lips and tongue, sneezing, vomiting, diarrhea; tinnitus, headache, restlessness, incoordination, clonic convulsions, stupor, prostration; death due to respiratory paralysis.



Pyrethrum extracts have very low toxicity to mammals. If they do not kill insects outright, they 'flush out' insect pests. Pyrethrins have been intensively studied by toxicologists, therefore their Lethal Doses (LD50s) for various target and non-target species are well known. Pyrethrins also breakdown rapidly after application. They breakdown so quickly that they are widely considered safe for use on fruits ready for harvest. Unfortunately, pyrethrins knockdown, flush out or kill most insects, beneficial or otherwise. This can leave the plants open to re-infestation in a milieu devoid of natural predators. It is toxic to bees and fish.

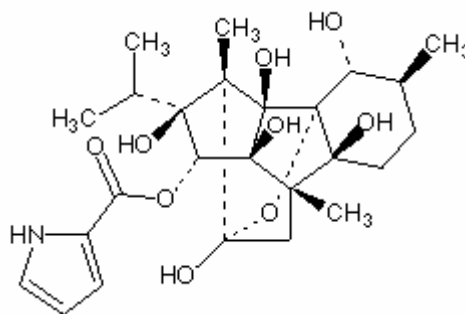
- Quassia – from the wood of *Picrasma excelsa*



Quassin

- Ryania – from ground stem wood of *Ryania speciosa*

Ryania is effective in controlling codling moth caterpillars, leaf eating beetles and thrips. It has relatively low toxicity to mammals. Ryania also kills 'beneficial' insects as well as 'pests'. It breaks down fairly slowly. Therefore, it should not be used on fruits near harvest time. [White]



Ryanodine

Ryanodine is more persistent and more selective than rotenone and pyrethrum. It is generally not harmful to parasites and predators, but there is some indication of toxicity to certain predatory mites.

- Herbal sprays

The following are not mentioned specifically on the Soil Association summary, but could come under the herbal category.

Sabadilla - Sabadilla comes from the roots of *Schoenocaulon officinales* a tropical lily. It is effective at controlling sucking bugs, leaf eating caterpillars, beetles and thrips. It is not very toxic to mammals. However, while it is of low toxicity to mammals, it is still a lung irritant. It can cause depression of blood pressure in mammals [White]. Sabadilla dust has a powerful short-term effect. It has a short residual, breaking down quickly in the environment. Sabidilla dust is believed to have little effect on most predators and parasitoids. It was found to be highly toxic to *Typhlodromus pyri*, a predatory mite active in some apple orchards. Because sabadilla dust kills honeybees, it should not be applied to crops in flower. It has an even lower mammalian toxicity than pyrethrum. The dust can irritate the mucous membranes of people and pets and cause sneezing fits.

Neem - Neem is an extract from the seeds of *Azadirachta indica* trees. It interferes with the hormonal system in insects. It causes insects to moult improperly, thus killing them. Neem works best against chewing insects. Sucking insects such as aphids are less susceptible. It has been recently approved by the US EPA [White].

Prohibited:

- All pesticides that are persistent, cumulative or toxic to other species.

Seed Dressings

- Most seed dressings are questionable and should not be used on crops to be sold as organically grown, with the possible exception of Copper Sulphate Fungicide.

It is quite clear from all of these definitions that organic does not mean free of chemicals and it might certainly upset a number of vegans and vegetarians to know that animal waste from slaughterhouse and manure heaps is being put on these crops.

CERTIFICATION OF GROWERS

The main components of an organic farming system are the avoidance of artificial fertilisers and pesticides, the use of crop rotations, and other forms of husbandry to maintain fertility and control weeds, pests and diseases.

The management of organic soil and crops requires special care in nurturing positive health and vitality.

Rotations

A correctly designed and implemented crop rotation is at the core of organic crop production. The rotation contains the following key elements:

- Provides sufficient crop nutrients and minimises their losses.
- Provides nitrogen through leguminous crops.
- Aims to control weeds, pests and diseases.
- Maintains the soil structure and organic matter content.
- Provides a profitable output of organic cash crops and / or livestock.

Fertility is generally provided by animal manures and leguminous nitrogen. The aim of the organic system is to be self-sustaining, although in some instances it is allowed to bring in organic fertilisers or mineral products like rock phosphate.

Crop Protection

No synthetic products can be used in organic farming although, where direct intervention is required, non-synthetic substances like sulphur, and biological pest controls may be used. Pest, weed and disease control are achieved through the rotation, choice of varieties, timing of cultivations and habitat management to encourage natural predators.

Standards

The Soil Association's *Standards for Organic Food and Farming* is a comprehensive guide to the production of organic food to qualify for the symbol.

All standards for organic farming, horticulture and food processing are subject to EU regulation. In the UK they are regulated by the government organisation, the UK Register of Organic Food Standards (UKROFS). Inspection and certification are carried out by five approved organisations of which the Soil Association is by far the largest.

Similar schemes now operate in many other countries throughout the world. Only certified produce may legally be sold as 'organic' within the EU.

Conversion

Under Soil Association rules, land must be managed organically for a minimum period of two years before it is eligible for organic certification. A conversion plan including detailed cropping plans, rotations and budgets is an essential part of a successful move into organic farming and is a requirement for certification.

WILD CRAFTED HERBS

We now reach the difficult part, since there are now an increasing number of herbal and plant materials being collected from the wild (a process commonly called wild-crafting). These plants grow in naturally occurring "stands" and are carefully harvested by trained pickers (usually government certified) and the crops taken to a central location for processing. Strict quota restrictions are applied to these crops and the collection is restricted to a percentage of the plant at any one location, to ensure

that the crop may be harvested on an annual basis and naturally sustained. Clearly this is as organic as you could possibly wish, since the plants flourish in patches of their own choosing and generally thrive in their chosen location. It is often noticed that the active drug levels within the plant are higher than those plants that have been grown artificially in an agricultural environment.

Since these plants often grow in wild and unmanaged areas, they have never had the luxury of an artificial fertiliser, but have to rely on the natural fauna to provide manure and/or for other rotting vegetation to provide essential nutrients and/or river flooding to provide organic replenishment. Clearly such areas are outside of the scope of organic certification, yet fully meet all the criteria. There is no answer in legal terms. Those plants that grow on the fringes of normal agriculture may receive the artificial benefits of that environment and not satisfy the organically grown description at all.

Many materials used in the production of essential oils such as Myrrh, Frankincense, Tolu Balsam and other resinous 'tears' are collected from remote areas that have hardly seen the presence of man, let alone his synthetic chemicals and fertilisers.

Likewise, the collection of lichens, mosses and other remote materials could never be achieved in a managed and farmed environment.

Conclusions

There is no chemical benefit from organically farmed plants and herbal materials, since the process in no way enriches the drug yield of the final product. The best herbal material generally comes from the wild, because the plant has chosen the optimal place to grow and flourish, where the exact requirements for optimal growth are found, but this is not a "certified" source. Perhaps the organically grown material contains less unwanted residues, however, manure (by its very nature) has concentrated heavy metals and other toxins present naturally in animal feeds.

Honey may be obtained organically, but where the bees have chosen to hive close to *Rhododendron ponticum* or *Rhododendron flavum* as in the Black Sea area of Turkey, then this honey can be positively poisonous and is known as Mad Honey.

As has been said on many occasions "natural does not mean safe", perhaps the same can be said of the sweeping category "organic".

Further reading and definitions of organic

An excellent publication issued by the Joint FAO/WHO Food Standards Programme *Codex Alimentarius Commission* entitled "Guidelines for the production, processing, labelling and marketing of organically produced foods" [CACIGL 32-1999] is available from the internet - this is a 49 page document.

ftp://ftp.fao.org/codex/standard/organic/g199_32e.pdf

Another useful document is issued in Eur-Lex Council Regulation EEC No 2092/91 of 24th June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs.

http://europa.eu.int/eur-lex/en/lif/dat/1991/en_391R2092.html

The American regulations are also comprehensive and you can visit their web site, which is the National Organic Programme. This leads to a very lengthy document (554 pages) issued by the Department of Agriculture coded 7 CFR Part 205
<http://www.ams.usda.gov/nop/>,

The Ministry of Agriculture Forestry and Fisheries (MAFF) has the Japanese definition of organic. The document is entitled Japanese Agricultural Standard of Organic Agricultural Products (Notification No.59 of the Ministry of Agriculture, Forestry and Fisheries of January 20, 2000) – an easily read 9 pages.
http://www.maff.go.jp/soshiki/syokuhin/hinshitu/organic/eng_yuki_top.htm

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<http://www.ontarioprofessionals.com/organic.htm>