

# HFMA Bulletin

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## Natural or synthetic: which is best?

When I was asked to submit this article, I decided to call upon my experiences as a chemist working in the health food industry to pose, and try to answer, this question. You may wonder what is the point, as surely 'natural' is best – but is that simple answer actually correct?

There is very little legislation where a definition of the term natural is given. The EU provides one only in regulations on natural mineral waters and flavourings. For other foods there is no definition. This has led to different interpretations and to derivative terms like 'natural source' and 'nature identical'. General food law does, however, require that labelling, advertising and presentation of food shall not mislead consumers. The FSA has issued some guidance on the use of the term natural as essentially being products containing ingredients made by nature, not man.

If a compound found in nature can be extracted as pure and established to be chemically identical to an equally pure synthetic version, there should be no difference between the two. The term 'nature identical' has been coined for the synthetic version. In such a case, factors on costs and consumer perception may become important.

There are cases where the synthetic version of a substance is not identical to that found in nature, which can have an effect on the activity of that substance, eg synthetic vitamin E (dl-alpha tocopherol) is not the same as natural vitamin E (d-alpha tocopherol), which is considered to have 35% greater biological activity.

Safety must be the most important consideration for any food component, be

it natural or synthetic. There should be no preconception that either is safe. Plants can form natural toxins or can become infested with toxin-producing mold. Some common foods such as potatoes and apples contain toxic substances, fortunately at very low levels which do not cause any toxic effects on consumption. Toxicity is very much dose-dependant, and regulations take that into account when setting limits for known toxins. Synthetic compounds are able to be highly purified but may still contain trace impurities. The safety of these compounds also needs to be assured. It's for that reason all new food components undergo safety assessments as part of the requirements of the EU Novel Food regulation, irrespective of whether they are natural or synthetic.

In general, the ability to synthesize compounds on a large scale can bring cost benefits compared to natural analogues which are contained in plants at relatively low levels, requiring expensive extraction, concentration and purification processes to fully isolate them.

From a regulatory point of view, natural products are required to comply with more contaminant type limits than synthetic. This is a result of natural toxins that may be found or formed in plants and due to the effect of agricultural chemicals, environmental pollutants or compounds formed during processing. It's much easier and cheaper to check for regulatory compliance of a synthetic compound.

In conclusion, there is no simple answer to the question of which is best. It depends on the criteria and has to be looked at on a case by case basis.

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