Many components naturally present in vegetable oils have been shown to have beneficial properties. Once isolated and concentrated, a number of these compounds have proven effective in treating a wide range of conditions ranging from irritable bowel syndrome to chronic liver disease (1). Similarly, many of the fatty acids and other compounds present in vegetable oils have long been known to benefit our health. There is clearly great potential for developing functional vegetable oils.

The active ingredients

The number of active ingredients so far identified in oil seeds is impressive. Many of these compounds make it through to the final salad or cooking oil whilst others may be partially or wholly removed during the oil refining process.

Vitamin E is a powerful antioxidant and vegetable oils are a major dietary source of this vitamin. Each fatty acid also has its own specific properties (2). Linoleic acid is a polyunsaturated fatty acid with cholesterol-lowering properties and a-linolenic acid is also linked to heart health. Ricinoleic acid is the active ingredient in castor oil and is a powerful stimulant laxative, whilst γ-linolenic acid provides the main benefits of evening primrose oil, used among other things, to treat breast pain and atopic eczema.

Phytosterols are found in vegetable oils, particularly germ oils. Margarines fortified with sterols have recently hit the headlines because their cholesterol lowering capacity is as effective as many drugs (3). It is now also suggested that natural levels of phytosterols found in many vegetable oils (maize oil: 968mg/100g, wheat germ oil: 553mg/100g and olive oil: 221mg/100g)* may also make a significant contribution to cholesterol lowering (4).

Plenty of other beneficial compounds are also extracted and concentrated from by-products of the refining process including; β-carotene, Vitamin K, phosphatidylcholine which is used in the treatment of liver conditions, phophatidylserine which is mainly used to prevent brain deterioration (1).

Functional possibilities

Since many compounds in oil seeds already have proven nutritional benefits, there are great possibilities for using them to develop new functional vegetable oils. Vegetable oils containing enhanced levels of beneficial active ingredients could have a substantial impact on human health considering the amount of cooking and salad oils consumed in most industrialised countries. In fact in Japan this is already happening and oils are now available with improved levels of vitamin E and phytosterols.

The fortification route
One way to develop functional oils is to fortify ordinary vegetable oils with additional amounts of specific functional ingredients. This concept is similar to the fortification of white flour, which was successfully introduced many decades ago. This route allows the addition of precise amounts of particular beneficial components while at the same time maintaining the original sensory qualities of the food that consumers already know and enjoy.

Gently does it

Another way to increase the beneficial qualities of vegetable oils would be to develop a gentler production process so that more of the functional ingredients naturally in the oil seeds remain in the oil. Oils produced this way are likely to be cloudier, may have an unusual colour, or could have a stronger more characteristic taste, which means they would take a bit more getting used to.

Health benefits

By combining the skills of food scientists, biologists, plant breeders and food companies it may be possible to develop reasonably priced vegetable oils with enhanced levels of functional ingredients. As most people use a vegetable oil during food preparation the health benefits to a population, for example in reducing heart disease could be substantial.

Perhaps in the future we will take the new nutritionally improved vegetable oils for granted - just as we do our daily bread and olive oil today.

* Data from USDA Department of Agriculture, Agricultural Research Service, 1997)

References