India's Colourless Revolution: Replacement of traditional oils by soy and palm oils

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The interrelationships between agriculture, food, cooking and health are highly complex and profoundly significant. A characteristic of complex relationships is that a change in any one component will have effects on the viability and functioning of the others. In India, where native seeds such as mustard, groundnut, sesame (til) and coconut are traditionally cultivated for their oil, this linkage can be clearly seen. With a high oil content, these seeds are traditionally extracted by cold pressing, an activity suited to small scale production and which utilises non-hazardous low-impact technologies. The resulting oils are nutritious, and high in natural flavours. And since they are traditionally used and stored in their unrefined state, they are long-lasting (1-4).

A large proportion of the Indian population is vegetarian and therefore, since they are the main source of dietary fats, choices of edible vegetable oil are of great importance. In each region, distinct oils are used for cooking and food preparation. In south India coconut, in the east and north mustard, in Rajasthan sesame, and in central India and Gujarat groundnut oil is used. The specific choice of edible oil in the various regions is based upon traditional eating and cooking habits which in turn depend on local availability, local soils and India's often arid climate. Thus there exists a virtuous circle in which agriculture, cuisine and health are mutually supportive.

Relatively recently, foreign oils - principally palm oil and soybean oil, but also sunflower and safflower, have been introduced into India. These oils, extracted with heat or solvents, are very high in polyunsaturated fatty acids (PUFAs) and are unsuited to Indian cooking methods or for long term storage (2, 5). Sold only in a 'pure', i.e. highly refined, transparent and almost colourless form, and often fortified with vitamins, these oils are, in nutrition and health respects, inferior to traditional oils. However, because they are heavily advertised (often with spurious health claims), they are making inroads into the Indian market. And because of these changes, indigenous farmers are now receiving reduced prices for their mustard and sesame crops, production is now decreasing, and for many the virtuous circle has already been broken.

Traditional Oils and Health

For thousands of years we have been growing distinct oilseeds such as mustard, rapeseed, groundnut, sesame, niger seed and coconut. According to our ancient Ayurvedic system, sesame oil is the best for edible purposes, though mustard, groundnut and coconut oils are not only healthy but possess medicinal properties as well (1, 2). In the last few years our native edible oils have been supplanted by introduced foreign oils such as palm, soybean, sunflower and safflower. In-depth scientific studies of these oils supports traditional

(Ayurvedic) understanding and indicate that these new oils are not only undesirable but are harmful for health, especially in Indian cuisine where they are mostly used for frying and for pickles (6-11). Thus it is generally accepted that oils with a higher percentage of polyunsaturated fatty acids (PUFAs) such as soybean, sunflower and safflower lower both harmful LDL cholesterol and useful HDL cholesterol. On the other hand edible oils rich in monounsaturated fatty acids such as olive, mustard, groundnut, and sesame lower harmful LDL cholesterol level without affecting useful HDL cholesterol and hence are better for balancing cholesterol profiles.

Moreover, in oils prepared traditionally, additional cholesterol-reducing properties are likely to come from the natural plant sterols and stanols contained in oils extracted without heat or solvents (2, 14). Sesame contains 594mg/100g of soluble phytosterols while groundnut contains 247mg/100g and olive oil 210mg/100g. Soya and corn oils also contain phytosterols when raw (380mg/100g and 580mg/100g respectively), but since these latter need solvent or heat for extraction, the sterols are invariably lost in processing (14).

The traditional Indian oils are stable non-drying or semi-drying oils, i.e. they have a low tendency to oxidise in the light. In their natural form they contain antioxidants which prevent rancidity and reversion (development of 'off' odours). In contrast, soybean and safflower oil are drying oils while sunflower oil is a semi-drying oil. Due to a higher percentage of PUFAs these are prone to oxidation in the presence of light, temperature, air and metal. Since in India edible oils are mainly used for frying (in other words subjected to light, high temperature and contact with air and metal), such oils will be harmful.

In Western countries the susceptibility to deterioration of soybean and palm oils was in the past remedied by hydrogenation. More recently, with growing evidence of the harmfulness of trans-fatty acids, rancidity and reversion are increasingly being prevented by the addition of antioxidants (11). However, according to studies conducted on soybean oil by V.K. Tyagi and Pramod Kumar at Kanpur, deterioration of nutritional quality at high frying temperatures is rapid and added antioxidants are almost ineffective at retarding this deterioration (12, 13).

Bad Science and Big Advertising

India has a population of over 1 billion people and the significance of the eating habits of such a population are hard to overestimate. Their culinary preferences are important not only for their own long-term health but also because these impact directly on farmers and the ecology of the planet. They can buy healthy and homegrown from cash-poor small farmers and small traders or they can buy their oils from international commodity traders.

Given the significance of this choice, it is important to appreciate that the recent Indian trend away from the indigenous oils is not simply an unfortunate outcome of consumer choices. The switch from native oils to (mainly) imported oils is an orchestrated one. Using scientifically unsupportable anti-cholesterol and other health claims, companies tied to the global commodity food system have driven demand for their products by advertising heavily to Indian consumers (15).

Because of the spurious nature of these health claims a ban (though unenforced) on such advertising has been imposed by the National Ministry of Health. Nevertheless, there are other ways to promote using health claims. Vitamin fortification of oils, for example, is a play on the health card, while at the same time soy importers have been attempting to target the provision of scientific advice by influencing doctors and nutritional leaders. As the Indian magazine *Businessline* reported:

'Besides, the brand [Nutrela] has also been involved with the American Soya Association, which is conducting seminars and holding soya awareness campaigns to focus on doctors, nutritionists, dieticians and consumers to spread the 'goodness' of soya. Schools and catering colleges have also been approached for the same.'

While these methods may be ethically unsound, there is evidence for still more unscrupulous methods. It seems that illegal but organised adulteration may also have been used to discredit local oils. In 1998, Delhi, India's capital, was affected by large-scale adulteration of mustard oil that affected the health of thousands and killed many. In several ways this was an unusual contamination event (15).

Firstly, adulteration of food in India is common but typical cases are restricted to particular brands and remote and marginalised regions and so go unnoticed by the media. The mustard oil tragedy however affected nearly all brands and, guaranteeing media attention, India's capital was the worst affected region.

Secondly, mustard oil contaminated with argimone (essentially weed seed contamination) is an ancient occurrence, but adulteration is never more than 1%. In these cases, adulteration was up to 30%, with argimone, diesel and waste oil as contaminants. The adulteration was therefore done in such a way that it would kill, and do so conspiciously and rapidly. Thus the tragedy was seemingly not a result of the normal business of adulteration. As the Health Minister stated, this is not possible without an organised conspiracy.

Following this adulteration incident an official and immediate ban (which still remains) on the sale of unpackaged edible oil was imposed. Under pressure from multinationals the government has also made it compulsory to add soya oil to both groundnut and mustard oils and lifted restrictions on the import of raw materials for vegetable oil production.

The uptake of western cultural and other habits, and the economic development associated with it, is frequently viewed as an unambiguous and natural advance - most typically a government-inspired victory for knowledge over ignorance and incompetence. More recently however, another, more ambivalent view of development has become prevalent, one which sees local cultures not so much as knowledge vacuums to be filled, but as highly adapted and coherent systems that enabled societies to live within their environmental means. These divergent views are epitomised most vividly perhaps by the struggle to interpret the legacy of Asia's green revolution.

Developments in the Indian food market however suggest that the colourless oil revolution embodies a distinctive and even less inspiring third model: an alliance between multinational market power and pseudo-science to engineer the displacement of traditional products and practices.

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