ally tire of long allopathic treatments and also advocates that Ayurvedic medicines have slow but definite effect[3]. In fact, it is this mystery of Ayurvedic or rather in a broad sense, Asian medicines that has brought the attention of Western science to do research on it. This attention will certainly bring fruits, flavours and the truth of Ayurvedic medicines and place it like allopathic medicines on a forefront of modern scientific platform. We should not worry about this development or feel hurt.

The philosophy, practice and the science of Asian medicine[4] and Ayurveda[5] are being unveiled utilizing modern scientific tools, techniques and the understanding and are being endorsed by modern science and its practitioners[6,7]. Therefore, if Western science and scientists are faster in their research[3], we should not worry about it.

We have been the cheap, talented and durable labour source in the past and also in the present. In this era of globalization and age of open economy, we are recognized as one of the largest consumer markets in the world. Therefore, whatever transformation and scientific improvement will take place in Ayurveda, it will come back in new form and we will applaud and accept it. Benefit to the suffering human society is of prime importance. As far as the name Ayurveda is concerned, it will remain alive as long as *Bharat* in India breathes.

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Omega-3-fatty acids in the diet

The commentary of Patil and Gislerød[1] provides useful information. However, the concluding remark about exploring alternate sources like algae and genetically engineered foods for omega 3-fatty acids since traditional sources are dwindling needs some clarification. Apart from fish, omega-3 fatty acid-alpha linolenic acid can be derived from vegetable oils such as soybean, mustard, canola, flax (linseed) and perilla. Unfortunately, mustard oil also has erucic acid, which is not good for the heart, and attempts are being made in India to genetically engineer zero-erucic-acid mustard oil. Flax seed is not being grown widely, and deserves attention from agriculture scientists. Perilla seed is available only in some northeastern regions. Currently, in India, soybean oil is the only easily accessible oil rich in omega-3 fatty acid. All other commonly used Indian oils like sunflower, safflower, groundnut, sesame, and rice bran are loaded with omega-6 fatty acid linoleic acid – also an essential fatty acid. For health, the ratio of omega-6 to omega-3 in the diet should be less than 10, but this is not possible with the presently available Indian oils unless blending is done. Indian diets tend to be very high in omega-6, omega-3 ratio. Fortunately, bound fat or invisible fat present in plant sources like green leafy vegetables (GLV) is rich in omega-3 fatty acid, linolenic acid. Increased consumption of GLV would not only supply precious nutrients like vitamin A (β carotene), vitamin C, and minerals but also healthy fat and one does not necessarily have to look for exotic sources. For most recent discussion on the subject please see ref. 2.

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Reply:

We agree with Bamji that soybean, mustard, canola, flax and perilla are sources of α-linolenic acid (ALA, C18 : 3 ω3), while sunflower, safflower, groundnut and sesame are rich in lineoleic acid (LA, C18 : 2 ω6). As referred in our commentary[1], ALA is the precursor of the eicosapentaenoic acid (EPA, C20 : 5 ω3) and docosahexaenoic acid (DHA C22 : 6 ω3) while LA the substrate arachidonic acid (ARA C20 : 4 ω6). From the point of view of human nutrition, the long chained EPA and DHA are more valuable, as these are the forms more rapidly incorporated into plasma and membrane lipids and produce more rapid effects than those by ALA. Humans are able to synthesize EPA and DHA from dietary ALA, and there is research[2,3] demonstrating this qualitatively. This conversion occurs through a series of desaturation and elongation pathways. However, Gerster[4] has suggested that the rate of conversion of ALA to long-chain metabolites is only ~6% for EPA and 3.8% for DHA in adults. Furthermore, with diet rich in ω6 polyunsaturated fatty acids (PUFA), these conversions may be reduced by as much as 40–50%. Recent studies also indicate that this conversion is inefficient[5,6]. There is a general agreement that the availability of EPA and DHA due to dietary intake and biosynthesis from ALA in many cases may be inadequate or imbalanced[7]. This may result in shortage of EPA and DHA as compared to the ω6 ARA. Scientists have therefore concluded that EPA and DHA should be obtained from the diet. With this background, we will explain briefly about the concluding remarks[1] concerning alternate sources of PUFA, viz. algae and genetically engineered foods.

The principal dietary source of EPA and DHA are marine fish. The global aquaculture production was 547 million tons in 2003 (ref. 8), and has been growing by roughly 9% annually, with trends towards intensification and greater control over nutritional input resulting in increased demand for wild fish for feed. Fish is a declining resource and there are serious environmental consequences related to the continued exploitation of fish stocks in order to meet the demands for an expanding market. Moreover, fish accumulates pollutants. The extracted oil often has an unpleasant odour and the proportion of specific fatty acids in its triacylglycerols is difficult to control. Considerable evidence has indicated that ω3 PUFA in fish oils is actually derived via the marine food chain from zooplankton consuming ω3 PUFA-synthesizing microalgae[9]. The importance of microalgae as source of PUFA has been recently reviewed[10]. The microalgae may have superior lipid stability compared to traditional PUFA because they are naturally rich in antioxidant carotenoids and vitamins and because lipids are bioencapsulated by the algae cell wall. Therefore, microalgae are some of the most important food/feed sources due to their nutritional value, and their ability to synthesize and accumulate great amounts of ω3-PUFA. Researchers and commercial producers developed several cultivation technologies that are in use today to produce microalgal biomass[10]. Martek Bioscience Corporation (http://www.martekbio.com), Columbia, USA, commercially produce DHA from fermentable strains of microalgae and this product is used in infant formulas.

The other solution to this problem is implementation of PUFA biosynthesis into oilseed crops which provide ALA and LA as suitable precursors for the production of large quantities of PUFA (C20- and C22-) for a growing human population. The past few years have witnessed the cloning and functional characterization of the genes involved in PUFA biosynthesis. The seed-specific biosynthesis of ARA, EPA and DHA has now been reported for various higher plants[11–13] including model plants (*Arabidopsis thaliana* and tobacco) and oilseed crops (soybean, linseed and mustard). Wu *et al.*[12] report that ARA reached the highest proportion of fatty acids in seeds and thus approach commercially relevant levels. The collective studies[11,12] represent a major step forward in the production of PUFA in transgenic plants and the significance of these advances has been recognized and discussed in a recent editorial[14] and review[15]. Successful accumulation of PUFA in all organs and particularly in leaves has been demonstrated[16]. This approach may result in green leafy vegetables rich in EPA and DHA along with mineral nutrients and vitamins as outlined by Bamji.

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Economics of nuclear power generation

B. P. Rastogi has conceded[1] that there are many good characteristics in the reactor concept ‘A Thorium Breeder Reactor’ (ATBR) proposed by us[2]. According to him, the single unacceptable feature of ATBR is the large fissile mass requirement in comparison to PHWR or PWR. He contends that ATBR would not be economical due to this exceedingly large Pu requirement both incore and out of core. He concludes with an ambiguous statement that *nuclear characteristics of Th cannot be wished away*.

It must be stated that the ATBR concept has been tailor-made essentially to exploit the very seemingly negative nuclear characteristics of thorium. Thorium does not have any intrinsic fissile content and is therefore ignored world over for nuclear power generation. As was brought out in our paper[2], there is a paradigm shift from the conventional nuclear power reactor designs while evolving the ATBR idea. We have suggested for the first time, to load the reactor with as much as 60% of the fuel by mass, by pure thoria rods with no externally fed fissile seed material in equilibrium core. These thoria rods, which are mere absorbers in fresh state, are prodded by the neighbouring Pu-bearing seed fuel rods, eventually to get converted into regular fuel rods. At least one batch size (120 fuel assemblies) of such pure thoria clusters are loaded in every fuel cycle. These thoria clusters after one fuel cycle irradiation occupy the third ring of every fresh seed fuel cluster and continue for three more fuel cycles. Seed in the form of reactor grade plutonium (PuO_2 in ThO_2) is considered in the inner two rings of seed fuel clusters. The Pu contents in fresh seed fuel rods are 200 g/kg and 140 g/kg in the inner and middle rings. The third ring contains thicker irradiated thoria rods with < 10 g/kg of