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Editorial

Last few months saw hectic activity in connection with the new labelling regulations and things have still not settled. The Apex court wants the government to force industry to give some information about the food products that would be in the interest of the consumers. People would like to know what they are consuming and whether it is nutritious and safe.

Earlier consumers were only concerned about the quality and purity of the food products. When they purchased butter or ghee, they wanted to know whether there was any admixture of inferior or cheaper material. When they purchased jams and fruit nectar, they wondered how much fruit content was there in those products. In case of cakes they would be wondering whether any eggs have been added or whether the cheese they purchased was vegetarian.

Things have changed now and consumers have been more aware of the safety of the food products and wondering whether milk is pasteurised, whether milk sweets are free of pathogens, whether consuming a brightly coloured product would give them allergy and whether any particular substance would cause stomach upset. Besides safety, they are recently also been asking questions about nutrients like protein, vitamins and minerals like iron and calcium. They would like their children to do well in exams and in sports so they want the foods and supplements to provide all the nutrition necessary for their balanced growth.

With the growing interest from the consumers, government is forced to ask industry to provide more information on safety and nutrients. Some in industry still doubt whether consumers can really handle all the information that is provided and whether this will have some regulatory backlash. Even today, most consumers do not read much of the information that is given on the label, but things are changing. Earlier only the MRP and the net weight was of interest, but they are already demanding to know the best before date and also looking for some claims, especially nutrition or health claims. Some are even reading the ingredients list although not very regularly. This is a healthy trend and will make industry give more emphasis on nutrition aspects of the products.

Industry has a point when they are afraid that the nutrition label information may be used by inspectors for regulatory compliance. Many ingredients have natural variations with respect to different nutrients and some also may have susceptibility to storage conditions. This is already taken note of in the regulation that is proposed. However, nobody stops inspectors from taking samples and analysing them for nutrients and finding them lower than declared may be enough to start prosecution. This may cause unnecessary harassment, so enforcement authorities need to appreciate this and educate their inspectors.

Some states e.g. Maharashtra FDA have already started training their inspectors in these various aspects to sensitise their food inspectors. This should reduce the problems due to labelling and some of the other issues, but it will take some time to properly understand and rectify the difficulties arising in implementing such new regulation. Industry has also been adopting quality and safety systems that also create some confidence in regulation.

Having created a new label, the onus of creating greater awareness about nutrition lies on both industry and government. There are many ways through which awareness may be created. Industry should not just look at labels and advertisements as means for this. There are many programmes and campaigns that could be undertaken in schools and colleges as well as on various media. These should involve innovative methods that would sustain the interest of students and common people and urge them to learn more about nutrition.

There will soon be new categories of foods including functional foods, nutraceuticals, foods for special dietary uses etc. under the new act Food Safety & Standards Act 2006. Some of these foods can reduce the risk or manage many health problems including cardiovascular diseases, diabetes, cancer, age related degenerative diseases and others. There will be multitude of labelling requirements coming that will be far more difficult to agree between industry and government than nutrition labelling. This may just be a preamble of things to come.

We welcome Envirocare Laboratories, Navhari Food Products and MIT College of Food Technology into our membership and wish them a very long and useful association with us and our other members. Let us hope that this is a better year than the last one. With season's greetings

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Fruits: Nature's Health Capsules:

by Dr. J. S. Pai

Fruits have been enjoyed since times immemorial with references in ancient scriptures. Even the health benefits were known for long. Fruits along with vegetables have now regained their prime position in a healthy diet due to essential vitamins and minerals and also due to the various nutraceuticals and phytochemicals they contain which provide all kinds of health benefits against many modern ailments like cardiovascular diseases, cancer, etc.

India has always been ahead in fruit and vegetable production and traditional Indian diet had prominent position for various food preparations made of fruits and vegetables including jams, preserves, chutneys, curries, garnishes, etc. as well as many sweets and desserts, condiments, savouries etc. India has been leading in fruit and vegetable production with over 51 million tonnes of fruit out of a total world production of 500 million tonnes and over 72 million tonnes of vegetables out of 890 million tonnes world production, standing second only to China in both. Various fruits produced in India in the year 2007 are given in the table with their production figures.

Mango is considered the king of fruits in India and has been leading revenue earner both domestically and for exports. However, banana is the leading fruit produced in India with 21.77 million tonnes being produced in 2007 forming over 24% of world production. Mango production, although much smaller than banana, is commercially most important. India produces over 12.5 million tonnes of mangoes being almost 40% of the world production. Andhra Pradesh (3.2 million tonnes) and Uttar Pradesh (2.7 million tonnes) are leading in production. In 2006-07, India exported over 2 million tonnes of fresh fruits and vegetables worth US $ 547 million of which mango accounts for just about 80,000 tonnes but valued at about US $ 30 million.

Grape export is very sizeable and fetches over US $ 60 million from around 86,000 tonnes. Grape Net, the traceability system set up for grapes has enabled rapid increase in the grape exports. Some of the other important fruits produced (with production in million tonnes) in India include apple (20), orange (4), lemons (2), grapes (1.7), guava (1.8), litchi (0.4), papaya (2.3), sapota (1.1) etc.

Although there is a great potential for processed fruits and vegetables since over 25 to 40% of fruits spoil because of lack of proper post-harvest handling and processing to various products. Just about 2-3% of fruits are processed into various products like pulp, juice, concentrates, jams, jellies, marmalades, syrups, squash, and used in a variety of other preparations like ice cream, cakes, yoghurt, muffins, cookies etc. Even the export potential is there as presently only 850,000 tonnes of processed fruits and vegetables are exported worth around US $ 550 million.

India is the second largest producer of vegetables in the world (ranks next to China). The current production level is over 73 million MT. In case of vegetables, potato, tomato, onion, cabbage and cauliflower account for around 60% of the total vegetable production in the country. Vegetables are typically grown in India in field conditions; the concept is opposed to the cultivation of vegetables in green houses as practiced in developed countries for high yields.

India produced in 2006 almost 60 million tonnes of fruits and almost 110 million tonnes of vegetables, thus ranking among the first two in the world along with China. Highest contributions in fruits came from southern states like Andhra Pradesh, Tamil Nadu and Kerala with Maharashtra topping with almost 12 million tonnes of fruits. Highest vegetable producer was West Bengal with almost 19 million tonnes followed by Uttar Pradesh, Bihar and Orissa. Although mango is known as the king of fruits in India, banana leads the production with almost 19 million tonnes produced in 2006. China's fruit production was 95 million tonnes and vegetables 450 million tonnes. The table gives production of different fruits compared to world production.

Production in million tonnes in 2007

Fruits	India	World
Apples	2.00	64.26
Apricots	0.01	3.07
Bananas	21.77	81.26
Cherries	0.01	2.00
Figs	0.01	1.06
Grapefruit	0.18	5.06
Grapes	1.67	66.27
Lemons and limes	2.06	13.03
Mangoes, mangosteens, guavas	13.50	33.45
Oranges	3.90	63.91
Other melons (incl. cantaloupes)	0.65	26.10
Papayas	0.70	6.94
Peaches and nectarines	0.15	17.46
Pears	0.20	20.11
Pineapples	1.31	18.87
Plums and sloes	0.08	9.72
Watermelons	0.26	93.17
Total	51.40	500

FAO Statistics 2009

Chemical Composition and Nutritional Value of Fruits

Fruits contain very little fat and proteins but are rich in carbohydrates including sugars and dietary fibre. There are exceptions like avocado and olives that are rich in oil. Fruits are sweet and also slightly sour as they contain good amounts of sugars and organic acids. Only a couple of fruits like banana and pineapple may contain sucrose as the major sugar but most fruits contain glucose, fructose and sucrose. Some fruits like grapes, gooseberry and lemons contain very little or no sucrose. The sourness of fruits is because of the organic acids present. Most fruits contain citric and/or malic acids as major acids. Most fruits also contain smaller amounts of other acids like tartaric, oxalic, pyruvic, fumaric, succinic, shikimic, quinic etc.

Sugar Contents (%) of Some Fruits

Fruit	Glucose	Fructose	Sucrose
Apple	1.7	6.08	3.62
Banana	5.82	3.78	6.58
Gooseberry	4.40	4.10	0.71
Grapes (black)	8.2	7.28	0
Grapes (green)	8.1	8.01	0
Grapefruit	1.95	1.24	2.14
Lemon	0.52	0.92	0.18
Musk Melon	1.16	0.83	3.26
Orange	2.36	2.38	4.70

Pineapple	2.32	1.17	0

From: Fruits by Gopalan & Mohanram, NIN, 2000

Fruits are good sources of nutrients including vitamins, minerals and dietary fibre.

Nutrient Contents of Common Indian Fruits (per 100 g edible portion)

Fruit	Moisture g	Crude fibre g	Carbo-hydrates g	Calcium mg	Iron mg	Carotene µg	Vit C mg	B_1 mg	B_2 mg	Niacin mg
Amla	81.8	3.4	13.7	50	1.2	9	600	0.03	0.01	0.2
Apple	84.6	1.0	13.4	10	0.66	0	1	-	-	0
Banana	70.1	0.4	27.2	17	0.36	78	7	0.05	0.08	0.5
Cherry	83.4	0.4	13.8	24	0.57	0	7	0.08	0.08	0.3
Grapes	79.2	2.9	16.5	20	0.52	0	1	-	-	0
Guava	81.7	5.2	11.2	10	0.27	0	212	0.03	0.03	0.4
Lemon	85.0	1.7	11.1	70	0.26	0	39	0.02	0.01	0.1
Mango	81.0	0.7	16.9	14	1.3	2743	16	0.08	0.09	0.9
Orange	87.6	0.3	10.9	26	0.32	1104	30	-	-	-
Papaya	90.8	0.8	7.2	17	0.5	666	57	0.04	0.25	0.2
Pear	86.0	1.0	11.9	8	0.5	28	0	0.06	0.03	0.2
Sapota	73.7	2.6	21.4	28	1.25	97	6	0.02	0.03	0.2
Strawberry	87.8	1.1	9.8	30	1.8	18	52	0.03	0.02	0.2

From: Nutritive Value of Indian Foods by Gopalan & others, NIN, 2004 (1 µg Retinol = 4 µg β-carotene)

Fruits are generally high in fibre, water, vitamin C and some also have good amounts of vitamin A and iron. Fruits also contain various phytochemicals including antioxidants, which have been indicated by various researchers are necessary for long-term health and disease prevention. Regular consumption of fruits and vegetables is associated with reduced risks of cancer, cardiovascular disease, stroke, Alzheimer disease, cataract and some of the age-related ailments. Since fruits and vegetables are rich in potassium it may also help reduce risk of developing kidney stones and decrease bone loss. Fruits being low in calories per volume, and having high fibre content, help lower caloric intake. Many fruits are also rich in folate that helps body form red blood cells.

Importance of Fruits in Diet

Normal diet should include fruits and vegetables as these are rich sources of micronutrients and also provide health providing factors like fibre, antioxidants etc. Most fruits are rich sources of vitamins, minerals and fibre. They contain good amounts of iron, vitamin C, folic acid, carotenoids etc.

Vitamin A is necessary for clear vision and for maintaining integrity of epithelial tissues and its deficiency may result in blindness in children. It also helps maintain resistance of body to common infections. The precursors of Vitamin A , Carotene, are plentiful in yellow and orange fruits like orange , Mango, papaya, apricot, figs, jackfruit, muskmelon, etc.

Iron is essential for formation of haemoglobin present in red blood cells playing important role in transport of oxygen to tissues. Deficiency of iron leads to reduction in haemoglobin causing anaemia characterised by fatigue and susceptibility to infections. Iron is available in many vegetables in large quantities but some fruits like black currants, dates, watermelon, raisins, seetaphal (custard apple) etc. while most fruits have fair quantities of iron.

Vitamin C is needed for healthy teeth and bones. It also promotes iron absorption. Its deficiency causes weakness, bleeding gums and defective bone growth. It is abundant in amla, citrus fruits, guava, papaya, litchi, muskmelon, pineapple, seetaphal and strawberries but all fruits have good quantities of it.

Folic acid is essential for healthy red blood cells and its deficiency leads to megaloblastic anaemia and its intake during pregnancy is essential to prevent certain congenital defects including spina bifida. Although green leafy vegetables and legumes are better sources of it, fresh fruits when consumed will provide significant quantities of it as it is degraded easily. Oranges, melons and strawberries are good sources.

Dietary fibre is important for proper bowel function, reduce chronic constipation, diverticular disease and haemorrhoids. It has protective role against colon cancer. Most fruits and vegetables are good sources of it but particular examples are amla, dates, figs, grapes, guava, pomegranate, sapota and seetaphal.

Fruits and vegetables are also good sources of antioxidants which restrict damage by free radicals to cells protecting them from various diseases including cardiovascular diseases, cancer, joint diseases, asthma, diabetes etc. Vitamin C and E, carotenoids, anthocyanins etc. are some of the antioxidants present in fruits. Anthocyanins are red and blue pigments in fruits like strawberries, dark grapes, blueberries, pomegranate, jamun etc.

Some of the fruits have medicinal properties and have been recommended in certain diseases. Amla (Indian gooseberry) is one of the richest sources of vitamin C and is used in many ayurvedic preparations. It is claimed to be useful in haemorrhage, diarrhoea and dysentery. In combination with iron it is used in treatments of anaemia, jaundice, and dyspepsia. Pomegranate is another fruit with medicinal properties. It is useful in indigestion and dyspepsia. It is also a mild laxative. It has been shown more recently to lower cholesterol. Even its bark, rind and seeds have useful properties. Kokum (Garcinia indica) and similar fruits have weight-reduction properties. Bael fruit also has certain medicinal properties useful in gut-health.

Harvesting & Processing

Fruits grow on plants and continually undergo change in chemical composition and hence nutritional value even after harvest. When the fruits are not fully developed, they have starch, many ligno-cellulosic substances, high acidity among other things. As they become mature and start ripening the sensory as well as nutritional value begins to improve. Sugars start forming at the expense of starch and many vitamins and other important phytochemicals begin to accumulate some like carotenoids and anthocyanins will make visual changes. Many flavour substances also start forming and also acidity and astringency decreasing thereby making the fruits most desirable. The fruits will then continue to become overripe and will not only start losing sensory appeal but many nutrients like vitamin C will also start reducing in amounts.

Fruits may be most desirable to consume and also most nutritious, when they are at the peak of their ripeness. However, since most markets are in urban areas and fruit are commonly grown in rural areas, the distances are large and getting even larger, so if harvested while ripe, there is extensive loss due to damage and overripening during transport and storage of fruits. So normally fruits are harvested while they are still unripe so they are harder and can easily be handled without any losses and once they reach the markets the ripening takes place so they could be sold while they reach the peak of their quality. Similarly the fruits for industrial processing also is harvested while somewhat unripe and then after they reach the processing unit, ripening is completed and then processed. Although fruits will attain the maximum sensory attributes when they are ripened on the plant itself but if not eaten immediately after harvest they rapidly lose the quality and may even become spoiled, so they are always harvested slightly before ripening.

Temperature and humidity conditions during storage and transport of fruits affect the quality of fruits as they affect the changes taking place after harvest. At higher temperatures, changes are rapid and losses in many vitamins and other phytochemicals are substantial so most fruits are kept at low temperature. Some fruits are

sensitive to chilling injury e.g. mango, banana etc. so they need cooler conditions but not refrigeration. Humidity prevents loss of moisture from the fruit but at extreme humidity fungal growth occurs. Some fruits can be kept at low oxygen and higher CO_2 conditions to slow down respiration and changes accompanying and the post-harvest life of banana and apples are prolonged. Gamma radiation also is useful in extension of shelf life of mangoes and bananas.

Since fruits are highly perishable and most are also seasonal, they are processed and preserved making various products out of them so they can be enjoyed year round. Earlier jams, jellies and preserves were made using sugar or were dried to prevent microbial spoilage. There are all kinds of products including canned, bottled and dehydrated products available. The processes like high temperature short time and aseptic technology, vacuum dehydration, freeze drying, IQF freezing, high pressure processing, ohmic heating etc. among others that strive to improve the product quality with respect to colour, flavour, appearance etc. but also the nutritional value.

Quality of Fruits

The best quality of fruits will normally go to fresh market where it fetches premium prices unless fruit is grown specially for processing. The better quality is usually used for bigger piece products like IQF or whole while lower quality goes for purees and juice. Also the products having larger pieces like pie fillings, jams with whole fruit etc. require higher grades. Higher grades command higher prices and will be used in more expensive products. Quality is measured by characteristics like colour, size, blemishes, flavour, firmness and presence of extraneous matter including skin, stem, pits and leaves.

Quality may be specified in terms of Brix or moisture content, pH or titratable acidity, microbial specs, colour, haze, size, viscosity, texture, flavour/aroma and defects. Chemical tests are done to detect contamination, adulteration or treatments. Some other characteristics specially for juice include pectin and starch levels, pulp or solid content.

Brix indicates soluble solids, primarily sugar in fruit juice and macerated products and is measured by a refractometer specially designed for this. The pH indicates amount of acid present which affects both flavour and microbial quality. Most fruits have pH below 4.5 but banana, figs and papaya have higher pH. Some high acid fruits like apples and berries have pH lower than 3.7.

Colour should be consistent and typical of the fruit in its ripened state. Colour not only depends on variety and ripeness but also if it was treated to prevent browning and the effectiveness of treatment. Some fruit juices need to be clear, free from haze that is present if pectin, starch, particulate matter etc. are not removed by enzyme or filtering. In citrus juices cloudiness is desirable indicating wholesomeness. Haze, cloud or clarity can be measured by transmittance.

Viscosity, flavour and defects are some of the other measures of quality and can be measured by instruments or sensory analysis. Chemical analysis can also measure sugar and acid content which have an impact on quality.

Preservation Methods

Fruit is seldom used fresh in most processed products like juice, jams, jellies, concentrates etc. It usually preserved by freezing, heating or dehydration after seeds, skin removal and size reduction and extraction. As fruits have high moisture content, refrigeration may only prolong shelf life by limited period. For long term storage of fruit pieces or pulp or concentrate, freezing may be necessary. Sugar, syrup and/or juice may be added sometimes to prevent damage to fruit pieces due to ice crystal formation but IQF may not need any addition.

Preservation of fruit for processing industry is usually thermally processed using canning, aseptic processing or pasteurisation. Fruit pieces are packed in liquids like sugar syrup, juice or water facilitating heat transfer. Heat may affect colour, flavour, texture and nutritional value depending on time and severity of heat process. Heat has benefit of deactivating undesirable enzymes.

Drying is another common preservation method used traditionally for dried fruits like raisins, dates, prunes, figs, apricots and apple. Excepting certain fruits with fragile structure like berries or citrus fruits, most fruits can be successfully dried using various methods from traditional sun drying to mechanical dehydration using controlled

temperature, air, relative humidity and increasing surface area to facilitate rapid drying to prevent microbial and enzymatic deterioration. Chemicals like sulphur dioxide or sulphites are used to protect from enzymatic browning and reducing losses in carotene and vitamin C.

Freezing may keep the fruit from spoilage for several months but as the ice crystals may damage the texture, sugar may be added to fruit to prevent ice formation. Sometimes fruits may be infused with sugar or fruit juice concentrate replacing water in fruit. Infused fruit become soft or chewy and may also alter flavour and colour.

Besides straight or sweetened packs of fruit, some fruit ingredients may receive additional processing and may be used in baking, confectionery and dairy industries. Jellies and preserves are just a few examples of large number of such products that may contain besides fruit, sweeteners, stabilisers, acidulants, colours and flavours. Gums, starches and pectin are some stabilisers used depending on the process, storage and final product characteristics like pH, particle suspension etc. The most widely used acidulant is citric acid, though others are used to impart particular flavour. Acid lowers pH as required by stabiliser, gives antimicrobial action and contributes flavour.

Benefits of Fruit-containing Ingredients

Fruit-based ingredients can add value to the food products as consumers like products containing fruits but many fruits can offer functional benefits. Use of whole fruit is not possible with all fruit products and a variety of fruit-based ingredients may be used like concentrates, purees, pastes, fruit essences etc. Purees may contain added sugar or may be concentrated to 42°Brix. Puree is made by washing, cooking and sometimes depectinising fruit and passing through finisher to remove seeds and stems. Sweetened, concentrated puree is sometimes referred to as paste but some pastes are prepared by chopping and grinding dried fruits. Sometimes single strength puree may be dried to yield fruit powder.

Puree's primary function is to add fruit solids to the product as some designers use them just to get fruit in ingredients list rather than its flavour or colour contribution since there is a lot of loss during concentration and economically it is cheaper to add essence or colour. Purees however can provide extra mouthfeel especially with tropical fruits. Fruit purees naturally contain hydrocolloids and humectants contributing to the product texture. In baked products they soften the crumb. They can be used to some extent as fat replacers.

Fruit juice concentrates are made by concentrating pressed juice by vacuum evaporation and can provide functional properties like sweetness, flavour and colour as well as fruit identity. As fruit colours are pH dependent, product pH may be important for colour identity to be retained. Many beverage products use concentrates but it must be remembered that concentrates not only interact with each other affecting pH and buffering systems, they can also interact with other ingredients like sugars, gums, starch etc. affecting the final beverage characteristics.

Fruit ingredients tend to be fairly stable in confections due to high levels of sugar and low water activities slowing most reactions. Fruits are also useful ingredients in dressings and sauces but its effect on stabiliser system especially one containing starch need to verified when using heating which might also affect fruit colour.

Fruit essences are natural fruit flavours created during concentrating juices or purees by condensing volatile flavour components that are flashed off. They are used not just for ingredient statement but for actual flavour contribution. As they are very volatile they are sensitive to heat and have a tendency to be lost easily.

As fat has become a big issue with consumers and fruit fillings are very low in fat, fruit fillings in various products is one way of reducing overall fat content of the product. In many dairy products like ice cream, yoghurt, shakes, soft swirls etc. adding fruit not only adds colour and flavour but helps reduce fat.

Many fruit preparations are also used in bakery foods. Some are thermally stable and can survive baking process while others may be used after baking by cold filling.

While some fruit product manufacturers use fresh fruit, there will be problems of limited shelf life. Individually quick frozen (IQF), straight pack frozen fruits and fruit purees are used by the industry that allows them to plan processing schedule without much loss in quality. From these preserves, jams, juices, concentrates etc. may be prepared. Dried fruits are commonly used in cereals, baked goods etc.

Air-dried, sun-dried and freeze-dried fruit products normally the only thing removed is water. Here most of the fibre is retained. However, to prepare beverages there is problem since fibres are not fully soluble unless one needs cloudy or pulpy beverage like orange. Purees contain some fibre but less than whole fruit as some fibre is

removed as it causes settling. Purees are hence more soluble than air-dried fruits but sometimes they may contain carriers like maltodextrin, starch etc. Spray dried juice powder is completely soluble but it may have the least fibre. Flavour-wise, the powders made from juice concentrates have more flavour than air-dried with purees in between.

Sometimes one can even replace part of the sugar using fruit juice concentrate. This will not only lower the rank of sugar in ingredients list but also presence of fruit will give health significance along with the concomitant vitamins, minerals and antioxidants. Some may add colour to the product or if not desirable apple or green grape juice concentrate could be used. Some dried fruits like plum may be able to replace part of fat in bakery and confectionery products.

Although Asians have been enjoying them, western consumers are now slowly coming around to exotic tastes of tropical fruits like guava, mango and papaya along with pineapple, passion fruit etc. Pomegranate is becoming quite popular in Europe for its medicinal properties. Fruits will thus regain its important position in daily diet as people realise its nutritional and health benefits.

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GINKGO BILOBA: Herb for Health

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Ginkgo Biloba is the world's longest living species of tree; individual trees live as long as 1,000 years. Ginkgo grows most prominently in the Southern and Eastern US and in China. The leaves of the tree are used.

One of the most prescribed herbs, Ginkgo's health benefits has made it a best-selling supplement and now a popular ingredient in functional food & drink. Used mainly in **'smart-drinks'** – Coffee, Colas, Carbonated drinks, fruit drinks and teas that promise heightened brain function, it is also found in cookies, energy bars, cereal & snacks, for example, Ginkgo Biloba Ring's from Rober's American Gourmet, dubbed 'A Memory Snack'.

Ginkgo first appeared in Yogurt late in 1998 in NZ Company Mainland's 'Naturalea'. Ginkgo biloba & peach probiotic yogurt & its applications are set to extend to bread & cakes. Ginkgo biloba has been used in connection with the following conditions:

Ranking	Health Concerns
Primary	Age-related cognitive decline Alzheimer's disease Intermittent claudication
Secondary	Atherosclerosis Depression (for elderly persons) Impotence (of vascular origin) Macular degeneration Retinopathy Vertigo
Other	Asthma Depression Diabetes Migraine headaches Reynauld's disease Tinnitus

Historical or Traditional Use:

Medicinal use of Ginkgo can be traced back almost 5,000 years in Chinese herbal medicine. The nuts of the tree were most commonly recommended and used to treat respiratory tract ailments. A tea of the leaves was occasionally used for elderly persons experiencing memory loss.

Active Constituents:

The medical benefits of Ginkgo biloba extract (GBE) rely primarily on two groups of active components: the ginkgo flavone glycosides and the terpene lactones. The 24% ginkgo flavone glycoside indicates the carefully measured balance of bioflavonoids. These bioflavonoids are primarily responsible for GBE'S **antioxidant** activity and ability to inhibit platelet-aggregation. These two actions may help GBE to prevent circulatory diseases such as **atherosclerosis** and support the brain and central nervous system.

The unique terpene lactone components found in GBE known as ginkgolides and bilobalide, typically make up 6% of the extract. They are associated with increased circulation to the brain and other parts of the body as well as exert a protective action on nerve cells. Ginkgolides may improve circulation and inhibit platelet-activating factor (PAF). Bilobalide protects the cells of the nervous system. Recent animal studies indicate that bilobalide may help regenerate damaged nerve cells.

Circulatory Actions:

GBE increases circulation to both the brain and extremities of the body. GBE regulates the tone & elasticity of blood vessels. In other words, it makes circulation more efficient. This improvement in circulation efficiency extends to both large vessels (arteries) and small vessels (capillaries) in the circulatory system.

Cognitive Function:

Recently the ginkgo extract EG b 761 was found to increase alpha waves and decrease theta wave activity following oral intake of 120 or 240 mg in healthy volunteers. These brain wave changes indicate that EG b 761 is capable of improving cognitive function as demonstrated in increased mental sharpness, concentration and memory. Three double blind studies have now shown that GBE is helpful for persons in early stages of **Alzheimer's disease** as well as the closely related multi-infarct dementia. Patients with other types of dementia also respond to GBE including problems due to poor blood flow to brain.

Antioxidant Properties:

GBE has antioxidant actions in the brain, retina of the eye and the cardiovascular system. One double blind study found that GBE could help people with **macular degeneration,** an oxidation related disorder causing decreased or lost vision. Diabetic retinopathy is also improved by GBE. Its antioxidant activity in the brain & central nervous system may help prevent age-related declines in brain function. GBE's antioxidant activity in the brain is of particular interest. The brain & Central Nervous System are particularly susceptible to **free radical** attack. Free radical damage in the brain is widely accepted as being a contributing factor in many disorders associated with ageing, including Alzheimer's disease.

Antidepressant action:

One double blind study in Germany found that elderly **depressed** people with mild dementia (who were not responding to antidepressant medications) responded well to GBE supplementation.

Nerve protection and PAF inhibition:

One of the primary protective actions of the Ginkgolides is their ability to inhibit a substance known as platelet-activating factor (PAF). PAF is a mediator released from cells that causes platelets to aggregate (clump together). High amounts of PAF are associated with damage to nerve cells, poor blood flow to the central nervous system, inflammatory conditions and bronchial constriction. Much like free radicals, higher PAF levels are also associated with ageing. Ginkgolides and bilobalide protect nerve cells in the central nervous system from damage

during periods of ischemia (lack of oxygen to tissues in the body). This action may be supportive for persons who have suffered a stroke.

Tinnitus and balance:

Ginkgo may improve **tinnitus** (ringing in the ears) and balance problems related to the inner ear, an important part of maintaining balance. Double blind studies have confirmed the benefit of GBE for people with tinnitus or vertigo.

How much is usually taken?

GBE, standardized to contain 6% terpene lactones and 24% flavone glycosides, can be taken in the amount of 120-160 mg per day in three doses. Food and drink manufacturers need to decide what's appropriate for their product. Relatively high (240 mg per day) amounts have been used in the reports studying people with age associated memory loss, mild cognitive impairment, mild to moderate Alzheimer's disease and resistant depression. GBE may need to be taken for 6 to 8 weeks before desired actions are noticed. Although nonstandardised leaf and tinctures are available, there is no well-established dosage for these forms.

Are there any side effects or interactions?

Ginkgo Biloba extract is essentially devoid of any serious side effects. Mild headaches lasting for a day or two and mild upset stomach have been reported in a very small percentage of people using GBE. GBE is not contraindicated for pregnant and lactating women. Circulatory conditions in the elderly can involve serious disease. Individuals should seek proper medical care and accurate medical diagnosis prior to self-prescribing GBE.

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Brain Food

Cognitive health is a growing concern for consumers of all ages.

- Parents are learning about the importance of omega-3 fatty acids for their babies, toddlers, and adolescents.
- Teenagers and adults need to stay mentally sharp and focused for school and work.
- Baby boomers and seniors face conditions such as Alzheimer's and cognitive decline as they age.

Foods for Thought

Ingredients and foods with brain-health boosting properties include:

- Omega-3 Fatty Acids
- Blueberries
- Grapes
- Walnuts
- Botanicals and Botanical Blends
- Phospholipids
- L-carnitine
- Citicoline

These will be explored in detail in following pages.

Omega-3 Fatty Acids

Omega-3 fatty acids such as docosahexaenoic acid (DHA), arachidonic acid, and eicosapentaenoic acid:

1. Aid development
2. Benefit certain mental conditions
3. Are a proven ingredient for brain health for all ages

Some examples of the beneficial power of omega-3 fatty acids:

- Higher DHA levels are associated with improved listening comprehension and vocabulary skills in preschool children (Ryan and Nelson [2008]).
- Omega-3 fatty acids have been linked to improvements in various clinical and behavioral conditions involving mental function, such as depression and Alzheimer's disease.
    - At present, the effects of DHA in slowing down the progression of Alzheimer's disease are being investigated by a National Institutes of Health-funded study.

Blueberries

Blueberries, high in antioxidants, are increasingly being recognized as brain-healthy foods. Effects of blueberry extract on mice with a genetic mutation were studied by the US Dept. of Agriculture Agricultural Research Service. The genetic mutation promoted increasing amounts of amyloid beta plaque in the brain (Bliss, 2007). The study found increased activity of kinases (a family of enzymes) in the brains of these mice that were fed blueberry extract. Two of those kinases are important in mediating cognitive function.

Findings of other research conducted:

- Wild-bog blueberries contain compounds that can reduce inflammation in the central nervous system associated with progression of neurodegeneration (Society of Neuroscience).
- Supplementing diet of old rats with blueberries (for 8 weeks) resulted in maintenance and rejuvenation of brain circuitry (Center for Aging and Brain Repair, University of South Florida College of Medicine, Tampa, Fla.).

Grapes

Grape-seed-derived polyphenolics was found to significantly reduce Alzheimer's disease-type cognitive degeneration (Wang et al. [2008]). Mice with Alzheimer's disease that were treated with grape seed extract were found to have significantly reduce the disease-type cognitive degeneration due to prevention of amyloid beta plaque forming in the brain.

Another study suggested that a Concord grape juice in the diet may provide benefits for older adults with early memory decline (Welch, 2008). Those who drank the grape juice showed significant improvement in list learning. Trends for these people suggested improved short-term retention and spatial memory.

Walnuts

Already associated with reduced risk of coronary heart disease, walnuts contain alpha-linolenic acid—an essential omega-3 fatty acid—and other polyphenols.

Researchers (USDA Human Nutrition Research Center at Tufts University, Boston, Mass.) showed that diets containing 2%, 6%, or 9% walnuts were found to reverse the following in old mice (Society for Neuroscience, 2007):

- Several parameters of brain aging
- Age-related motor and cognitive deficits

As found by researchers from Baldwin-Wallace College, Berea, Ohio, walnut extracts may play a role in developing novel treatments for Alzheimer's disease.

Botanicals and Botanical Blends

Traditional and modern uses of ginseng include increasing sense of well-being and stamina, and improving both mental and physical performance according to the National Center for Complementary and Alternative Medicine, Bethesda, Md. (www.nccam.nih.gov).

Research for a program oriented to validating health claims on North American ginseng will focus on various medical and health areas including:

- Metabolic syndrome,
- Stress,
- Physical endurance,
- Cardiovascular diseases,
- Immuno-modulation,
- Reproductive health, and
- Neuroprotective and psychiatric disorders

A chewing gum—a novel dietary supplement—includes a blend of botanicals touted to enhance mental performance. The gum contains a variety of herbs such as peppermint, rosemary, and the Indian herb bacopa among others, each of which is supported by studies cited by the company's website in terms of its mental benefit.

A wild green-oat extract has been shown to enhance stress-coping abilities and learning performance. Its phytonutrients are thought to affect the activity of cerebral enzymes closely related to mental health and cognitive function.

Phospholipids

Phospholipids—building blocks in the brain—are linked to improving memory and mental health. Phosphatidylcholine is a major source of choline, which is used to produce the neurotransmitter acetylcholine. Acetylcholine is a chemical messenger molecule that seems to be involved in neuron networks.

A qualified health claim (approved by the Food and Drug administration) states that soy-derived phosphatidylserine (PS), another phospholipid, may reduce the risk of cognitive dysfunction in the elderly.

L-carnitine

L-carnitine is:

- Essential for transporting long-chain fatty acids across the mitochondrial membrane for subsequent fat breakdown and energy production
- Known to benefit exercise and weight management
- Shown to have aided mental function in the elderly

The acetyl derivative of L-carnitine, acetyl L-carnitine (ALC) is found throughout the central nervous system. According to information from a New-Jersey based company—one of the world's leading suppliers to the pharmaceutical, healthcare, and life-science industries— ALC plays a broad role in central nervous system metabolism as a source of acetyl groups both for acetylcholine synthesis and energy-producing reactions.

Citicoline

A naturally occurring, water soluble molecule, Citicoline is used by the brain to make phospholipids. One way citicoline supports brain health is by increasing the activity of mitochondria in neurons to produce energy, particularly high-energy ATP according to information by a New York-based international health ingredients manufacturing company.

Research into a brand of citicoline (Silveri et al. [2007]) confirms its ability to improve brain energy by increasing levels of specific markers for ATP and increasing activity in the frontal-lobe region of the brain, which directs complex thought, decision-making, and attention.

Condensed from an article by Linda Milo Ohr in Food Technology September 2008

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Regulatory News

Fall-out from Section 912 could be "chilling," warns leading ingredients supplier

The potential impact of Section 912 of the US Food and Drug Administration Amendments Act has been described as "chilling" by ingredients suppliers. Whole classes of ingredients could be restricted, including industry bright spots probiotics and fish oils.

Section 912, which passed in 2007, creates a new section of the Federal Food, Drug, and Cosmetic Act: Section 301, entitled 'Prohibition against foods to which drugs or biologics are added.' This prevents the use of a substance in a food or supplement if it has been subjected to substantial clinical testing that has been made public. Questions remain. Does this mean that ingredients already in foods can remain, but not at new levels? Can only the probiotics currently on the market be included in foods, but not the newly developed patented stains, that

seem to be introduced on a monthly basis? If so, this would literally stifle innovation across the industry. And in the current economy, innovation is at a premium.

The FDA has been seeking views on implementing Section 912, and some have warned it could be interpreted in such a way that the marketing of certain ingredients in functional foods and supplements is banned. In its submission to the FDA, Sabinsa warned that a broad interpretation of Section 912 would potentially force off the market any functional ingredients which have undertaken the New Dietary Ingredient notification process.

It would also put up a major barrier to entry into the mainstream food market for responsible companies that undertook serious investigations of the health benefits provided by the ingredients they develop, Sabinsa claimed. "This has a potentially chilling effect on companies investing in science relating to dietary supplements," said Sabinsa CEO Jeff Lind. "Sabinsa believes that if the new law is applied to dietary supplements, manufacturers will be forced to make a Hobson's choice between conducting research on their products and marketing them as food."

Industry regulatory attorney Marc Ullman, who drafted Sabinsa's submission to the FDA, added: "That this would apply to supplements is nonsensical. A product can be a dietary ingredient even if you have had clinical investigation, as long as no one has filed an IND application. If Congress intended otherwise it would have said so at the time it put section 912 in place for foods. Any other outcome would be especially ironic in light of the constant criticisms of our industry that we do not conduct enough research."

In its submission to the FDA, Sabinsa said it had conducted nine clinical studies on its Garcinia cambogia, for which it holds two patents. This was example of a product which could be negatively impacted by a broad interpretation of Section 912, it argued.

The American Herbal Products Association also expressed its concern about the possible interpretation of the Act. "FDA must look to the intent of Congress, and narrow its implementing rules to ensure that the intended prohibitions are in place and that incentives are maintained for companies to establish the clinical efficacy of drugs and biological products," said AHPA President Michael McGuffin. "Too broad an interpretation of this statute, however, would be a disservice to American consumers if such a regulatory approach curtailed access to newly-developed beneficial food ingredients any time a marketer conducts research on its ingredients."

The Council for Responsible Nutrition said it believed Congress had not intended for the Act to prejudice functional ingredients in supplements and foods. But it also said it feared too broad an interpretation could encourage mischief. "It would create the opportunity for almost anyone to conduct a few clinical trials for a supposedly 'drug' purpose on any ingredient under development for inclusion in food and effectively thwart the ability of food manufacturers to market a product containing that ingredient," wrote President and CEO Steve Mister. "To discourage rigorous examination and study of new food and dietary ingredients certainly could not have been the intent of Congress in enacting this provision."

From: Functional Ingredients December 2008

USDA issues final country of origin label rule

The U.S. Dept. of Agriculture has issued the final regulation for the mandatory country of origin labeling (COOL) program required by the 2002 and 2008 farm bills. The full text of the final rule will be published in the Jan. 15, 2009 Federal Register. The rule becomes effective on March 16, 2009, 60 days after the date of publication.

The rule covers muscle cuts and ground beef, lamb, chicken, goat, and pork; wild and farm-raised fish and shellfish; perishable agricultural commodities (specifically fresh and frozen fruits and vegetables); macadamia nuts; pecans; ginseng, and peanuts. Commodities covered under COOL must be labeled at retail to indicate its country of origin. For fish and shellfish, the method of production—wild or farm-raised—must be specified. Commodities are excluded from mandatory COOL if the commodity is an ingredient in a processed food item. The definition of a processed food item remains unchanged from the Aug. 1, 2008, interim final rule.

Excluded from COOL labeling are items derived from a covered commodity that has undergone a physical or chemical change—such as cooking, curing, or smoking—or that has been combined with other covered commodities or other substantive food components such as chocolate, breading, and tomato sauce. Also exempt are food service establishments, such as restaurants, lunchrooms, cafeterias, food stands, bars, lounges, and similar enterprises.

The final rule outlines the requirements for labeling covered commodities and the recordkeeping requirements for retailers and suppliers. The law provides for penalties of up to $1,000 per violation for both retailers and suppliers not complying with the law. The rule prescribes specific criteria that must be met for a covered commodity to bear a "United States country of origin" declaration. In addition, the rule also contains provisions for labeling covered commodities of foreign origin, meat products from multiple origins, ground meat products, as well as commingled covered commodities.

The USDA plans to make funding available to accelerate and expand training of state cooperator employees, initiate development of an automated review tracking system, conduct a retailer survey, conduct audits of the retail supply chain, and continue conducting education and outreach activities. Currently, the USDA has cooperative agreements with 42 states to conduct retail surveillance reviews. The USDA will conduct the retail reviews in the states not covered by a cooperative agreement and perform the supply chain audits.

From: IFT Weekly Newsletter January 14, 2009

Experts set tolerable level for melamine intake

5 December 2008 | GENEVA -- International experts have established a tolerable daily intake (TDI) for melamine, the chemical found recently in contaminated milk products. The TDI is the outcome of a meeting organized by WHO held this week in Ottawa, Canada. The TDI is lower than previous TDIs suggested for melamine by some national food safety authorities. "We expect this could better guide the authorities in protecting the health of their public," said WHO Director for Food Safety, Dr Jørgen Schlundt, at the closing of the WHO expert meeting.

The international experts gathered by WHO have not set a "safe" level of melamine but they have established a "tolerable" level. Melamine is a contaminant that should not be in food. However, sometimes it is unavoidable. TDI represents the tolerable amount of unavoidable contaminant in food that a person can ingest on a daily basis without appreciable health risk. The TDI is meant to help national authorities set safe limits in food for withdrawal purposes should melamine be detected as a result of intentional adulteration.

The TDI for melamine has been established at 0.2 mg/kg body weight. Based on this, it leads a 50 kg person to a tolerable amount of 10 mg melamine per day. The TDI applies to melamine alone. The TDI for cyanuric acid alone remains at 1.5 mg/kg body weight. Co-occurrence of melamine with cyanuric acid seems to be more toxic. However, adequate data are not available to allow the calculation of a health-based guidance value for this co-exposure.

"At the same time the limits for melamine in infant formula (1 part per million or ppm) and in other foods (2.5 ppm) introduced by many countries provide a sufficient margin of safety as compared to the TDI," added Dr Schlundt. Twenty-one experts attended the meeting to review toxicological aspects of melamine and cyanuric acid.

For more information please contact: Sari Setiogi, Media Relations Officer, WHO, Geneva, E-mail: SetiogiS@who.int

World Health Organisation News Release

EC releases final Food Improvement Agents Regulations

The European Commission (EC) has published four final Regulations for the Food Improvement Agents Package (comprised of food additives, food enzymes, and food flavorings). They are:

Regulation (EC) No 1331/2008 of the European Parliament and of the Council of Dec. 16, 2008 establishing a common authorization procedure for food additives, food enzymes, and food flavorings.

Regulation (EC) No 1332/2008 of the European Parliament and of the Council of Dec. 16, 2008 on food enzymes and amending Council Directive 83/417/EEC, Council Regulation (EC) No 1493/1999, Directive 2000/13/EC, Council Directive 2001/112/EC, and Regulation (EC) No 258/97.

Regulation (EC) No 1333/2008 of the European Parliament and of the Council of Dec. 16, 2008 on food additives.

Regulation (EC) No 1334/2008 of the European Parliament and of the Council of Dec. 16, 2008 on flavorings and certain food ingredients with flavoring properties for use in and on foods and amending Council Regulations (EEC) No 1576/89 and (EEC) No 1601/91, Regulation (EC) No 2232/96 and Directive 2000/13/EC.

Each Regulation comes into force on Jan. 20, 2009 and will generally apply from Jan. 20, 2010. The Regulations were published in the Dec. 31, 2008 *Official Journal of the European Union*.

From: IFT Weekly Newsletter January 7, 2009

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Research in Food & Nutrition

Fibre-rich ice-cream gets formulation boost

Dietary fibres may control crystallisation and recrystallisation in ice creams, and offer new formulation possibilities for formulators, according to new research from Greece.

Writing in the journal Food Chemistry, researchers from the National Technical University of Athens report that fibres from different sources could be formulated into frozen dairy products with promising results. Of all the fibres tested, the researchers, led by Christos Soukoulis, report that oat, wheat, and apple fibres, and inulin can be formulated into model sucrose-polysaccharides solutions and ice cream mixes. All the fibres tested produced increases in the viscosity of the "The enrichment of ice cream with dietary fibres is an effective way to enhance nutritional and physiological aspects and to promote functionality by influencing rheological and thermal properties of the final product," wrote Soukoulis.

Study details
The Athens-bases researchers state that very little data is available about the used dietary fibres in ice creams. A previous report supported citrus fibre's ability to improve the melting quality of ice cream, but this fibre did not improve the viscosity of the product. In an attempt to fill in the knowledge gaps Soukoulis and his co-workers formulated ice creams with the four fibres. Fibres with a high insoluble fraction, like oat and wheat fibre, were found to significantly increase the viscosity of the ice cream systems. This was related to the formation of networks comprised of hemicellulose and hydrated cellulose, they said. Fibres with a high soluble fraction, like inulin, did not affect the rheology of the samples, said the researchers, but there was an indication of a potential cryoprotective action. Apple fibre was found to greatly increase the viscosity and also offered the cryprotective effect. "Our results suggest the potential use of dietary fibres as crystallisation and recrystallisation phenomena controllers in frozen dairy products," they concluded.

Ice cream market
Ice cream is leading growth in the global market for innovative dairy products as consumers increasingly associate the segment as being more of an everyday, year-round household grocery, according to Global Industry Analysts. The report expects that the global ice cream market will witness a growing number of flavour introductions as part of a shift towards premium products. Opportunities are also expected for niche segments like lower-fat ice creams, as well as advances in processing methods involving low-temperature freezing and product blending.
From: Food Ingredients India Industry Newsletter January 2009

Supplements help prevent muscle wasting-study

Children in Niger who got a daily nutritional supplement for three months lost less weight and were less likely to have muscles eaten away by "wasting syndrome," U.S. researchers said on Tuesday. Wasting affects about 10 percent of the children in the world under age five and can make them vulnerable to disease. Researchers at the Harvard School of Public Health in Massachusetts wanted to see if a ready-to-use nutritional supplement could prevent wasting in high-risk children. They said such supplements have been effective in treating wasting, but never studied as a means of prevention. Sheila Isanaka and colleagues studied the effect of distributing a three-month supply of supplements to villages with traditionally high levels of malnutrition.
They were given in the months preceding the annual harvest, when food was scarce. The study, reported in the Journal of the American Medical Association, included 3,533 children from 12 villages. The supplements were delivered to villages, not to individual children. Six villages got the supplement; six did not. After three months, the researchers found a 36 percent reduction in wasting and a 58 percent reduction in severe wasting in villages that got the supplements.

The death rate was about the same for children in villages that received supplements and those in villages that did not. Isanaka and colleagues said ready-to-eat supplements might be useful to prevent wasting in high-risk children. But Lynnette Neufeld of the National Institute of Public Health in Mexico said in a commentary it is not clear how much of the supplement the children actually ate, or whether the intervention would be cost-effective.
From: Food Ingredients India Industry Newsletter January 2009

New study backs soy's bone protection benefits

Soy protein consumption could help protect against bone loss in post menopausal women, suggests a new study that adds to previous findings linking soy to bone health in women. Published in the December 2008 issue of Osteoporosis International, the study followed over 400 perimenopausal Chinese women for 30 months to investigate change in bone mineral density and its determinants. The findings revealed that the fastest bone loss occurred in women undergoing menopause ¨C but that soy protein intake seemed to exert a positive effect on bone health, together with maintenance of body weight and physical fitness.

Soy and bone health
Limiting bone loss in post-menopausal women could ease the burden of osteoporosis, a disease that affects half of all women over the age of 50. According to the International Osteoporosis Foundation, the total direct cost of osteoporotic fractures is €31.7 bn in Europe alone. Previous studies have reported conflicting results concerning soy isoflavones (40 to 99 mg/d doses) and bone health for postmenopausal women. But a recent meta-analysis added to the debate by reporting that such doses of soy isoflavones (less than 90 mg/d) may improve bone density. Moreover, other studies from China have linked soy isoflavones to increases in bone mineral density (BMD), and a recent large study in the Archives of Internal Medicine (2005, Vol. 165, pp. 1890-1895) reported that high soy consumption was linked with a 48 per cent decrease in fractures for women who had been menopausal for less than 10 years.

New findings
The new study recruited 438 Hong Kong Chinese women, aged 45 to 55 through random telephone dialling and primary care clinic. Researchers took bone mass, body composition and lifestyle measurements at baseline and at 9-, 18- and 30-month follow-ups. Menopausal status was classified as pre- or postmenopausal or transitional. Using multiple regression analyses derived from baseline and follow-up measurements, the researchers found that menopausal status was the strongest determinant of bone changes. Premenopausal women had an annual bone loss of around 0.5 per cent. Women in the 'transitional' group had 2 to 2.5 per cent bone loss, and postmenopausal women recorded around 1.5 per cent loss.

"Multiple regression analyses, revealed that a positive regression slope of body weight was protective for follow-up bone loss at all sites. Number of pregnancy, soy protein intake and walking were protective for total body BMC. Higher baseline LM was also protective for neck of femur BMD," wrote the researchers.
From: http://www.21food.com/news/detail19434.html

Pomegranate's anti-prostate cancer potential

According to a new study, the potential of pomegranate extracts and juices to protect against prostate cancer may be due to direct interaction with genes. Researchers from the University of California, Los Angeles report that extracts of the fruit were associated with a two-fold suppression in the expression of genes linked to prostate cancer.

“This study showed that pomegranate products and their polyphenols reduced tumour cell growth and induced apoptosis in both androgen-dependent and androgen-independent prostate cancer cells,” wrote the authors in the Journal of Nutritional Biochemistry

“These anti-proliferative effects were also consistent in hormone-treated cells. This implies the potential possibility that pomegranate and its polyphenols are used as novel dietary supplements with maximum potential for androgen-dependent and androgen-independent prostate chemoprevention.”

A rich source of antioxidants, pomegranate has been associated with improved heart health, but a growing body of science shows the fruit protect against prostate cancer. Studies have also shown a role in joint health by slowing cartilage loss in arthritis.

It is these antioxidants, particularly ellagitannin compounds like punicalagins and punicalins, which accounts for about half of the fruit's antioxidant ability, that are reportedly behind the proposed health benefits.

From: NutraIngredients.com, 01/06/2009

Anti-inflammatory Effects Of Pomegranate In Rabbits: A Potential Treatment In Humans?

Oral ingestion of pomegranate extract reduces the production of chemicals that cause inflammation suggests a new study. The findings indicate that pomegranate extract may provide humans with relief of chronic inflammatory conditions. The group from the Department of Medicine of Case Western Reserve University, Cleveland Ohio, led by Tariq Haqqi, showed that blood samples collected from rabbits fed pomegranate extract inhibited inflammation.

Pomegranate extract is already used as a treatment in alternative medicine for inflammatory conditions, such as arthritis. Although pomegranate extract has antioxidant and anti-inflammatory actions in experiments on isolated tissues, it is not known whether ingestion of it can produce the same anti-inflammatory effects in living systems, either because the active compounds are not absorbed from the gut or because the levels of these compounds in the blood are not high enough.

Pomegranate extract, the equivalent of 175mls of pomegranate juice, was given to rabbits orally. The levels of antioxidants were measured in blood samples obtained after drinking the pomegranate extract and compared to blood samples collected before ingestion of pomegranate extract.

Plasma collected from rabbits following ingestion of pomegranate extract contained significantly higher levels of antioxidants than samples collected before ingestion of pomegranate extract; the extract also significantly reduced the activity of proteins that cause inflammation, specifically cyclooxygenase-2. It also reduced the production of pro-inflammatory compounds produced by cells isolated from cartilage.

The results of this study indicate the beneficial effects of pomegranate extract when ingested. According to Haqqi "the use of dietary nutrients or drugs based on them as an adjunct in the treatment of chronic inflammatory conditions may benefit patients". He adds that, "Current treatment with anti-inflammatory drugs can have serious side effects following long-term use. Further research is needed, however, especially on the absorption of orally ingested substances into the blood."

From: ScienceDaily (June 18, 2008)

Chocolate, wine and tea can boost brain power

Eating chocolate and drinking wine and tea can improve your memory, according to a new study.

Researchers discovered that wine has the most pronounced effect in boosting people's memory, followed by chocolate and tea. And those who regularly consume all three in modest amounts were found to perform best when asked to carry out a series of brain tests. However, those hoping to use the findings as justification for gorging on chocolates and enjoying a generous tipple over Christmas will be disappointed.

The study also discovered that the positive effects levelled out after just half a glass of wine and only four squares of chocolate. The researchers from Oxford University examined the effect of the three foodstuffs on cognitive performance among elderly people. Chocolate, wine and tea are thought to improve cognitive ability because they all contain micronutrients called flavonoids, which research has suggested can lower risks of dementia.

Experts from Oxford University's Department of Physiology, Anatomy and Genetics, said their findings appear to support the theory, although they warned that they could not rule out that it could be another aspect of the foods studied which made the difference. Working with colleagues from the Universities of Oslo and Bergen in Norway, the team studied how chocolate, wine, and tea affected 2,031 people aged between 70 and 74.

The participants filled in questionnaires about their diets and then carried out a series of cognitive tests. Those who regularly drank moderate quantities of wine scored better in all six tests than those who abstain.

Chocolate eaters also had "significantly" better results in the tests than non-consumers, while tea drinkers achieved better scores in four of the tests. However, Oxford University Professor David Smith said brain power was only boosted by the three foodstuffs when consumed in small amounts. He said: "What we have shown is that foods rich in flavonoids can improve the function of the brain.

"Depending on how much they had consumed they got better results, although it did plateau with four squares of dark chocolate a day - about 10g. The plateau was about half a glass a day for wine and with tea it went up to about four or five cups. The exciting thing was that people who consumed all three did even better and had least likelihood of being cognitively impaired. These doses could certainly help, that's the implication of this study, but no more than the amounts described."

The researchers warned people not to use the research to binge drink in the hope of improving their memories. They stressed that while moderate alcohol consumption is associated with better cognitive function and reduced risk of Alzheimer's disease and dementia, heavy alcohol intake could be a cause of dementia and other health problems.

http://www.telegraph.co.uk/news/3918685/Chocolate-wine-and-tea-can-boost-brain-power.html

Isoflavone-rich supplement boosts artery health: Study

A dietary supplement rich in isoflavones may improve the function of arteries in stroke patients, according to new research from Hong Kong.

The study is said to be the first randomised controlled trial investigating the effects of isoflavone supplements on improving the blood flow in the arm's main artery in cardiovascular disease patients. A daily 80 mg dose of isoflavones was associated with a one per cent increase in flow-mediated dilation (FMD), the measure of a blood vessel's healthy ability to relax, according to findings published today in the European Heart Journal.

"Although the absolute increase in brachial diameter – one per cent – is small, the relative increase actually amounted to about 50 per cent because the mean average FMD in these stroke patients was about two per cent," explained lead researcher Professor Hung-Fat Tse. "These findings may have important implications for the use of isoflavone for secondary prevention in patients with cardiovascular disease, on top of conventional treatments," wrote the authors in their EHJ paper.

Isoflavones from soy have been shown to provide a number of health benefits, including the promotion of heart health and the maintenance of bone health in post-menopausal women. They have also been studied for their role

in cancer prevention and slowing down the ageing process in peri-menopausal women, and isoflavone-rich supplements have proved to be a popular alternative to HRT for those wishing to control menopause symptoms without resorting to drugs.

Study details

Professor Tse and his co-workers from the University of Hong Kong recruited 102 stroke patients and randomly assigned 50 to receive daily isoflavone supplements (), and 52 to receive placebo, for 12 weeks. “The specific dosage of 80 mg/day was chosen because previous studies have shown that isoflavone at this dosage was well tolerated by both men and women without significant side effects,” explained the researchers.

Ultrasound techniques were used to measure FMD at the start and end of the study. At the start, 80 per cent of the patients had an impaired FMD, defined as relaxation of less than 3.7 per cent. At the end of the 12 weeks, however, the patients receiving the isoflavone supplements experienced an improvement of one per cent, compared with the controls.

Moreover, the prevalence of impaired FMD after 12 weeks was only 58 per cent in the isoflavone group, compared to 79 per cent in the placebo group. "The patients who had a lower initial FMD were found, in general, to respond with a larger absolute increase in FMD after receiving 12 weeks of isoflavone intervention, compared to patients who had a better baseline FMD in the first place," said Prof Tse.

"These findings suggest that isoflavone reverses endothelial dysfunction in this group of patients with cardiovascular disease. This has important clinical implications, as the benefit of the [intervention] is conferred to the group of patients with the highest risks for cardiovascular events, and this effect persists, even at this rather late stage of the cardiovascular continuum."

C-reactive protein

Supplementation with isoflavones was also associated with decreases in the levels of a protein called high-sensitivity C-reactive protein (CRP). This protein is a marker of inflammation and is reported to be an independent predictor of cardiovascular-related events. "These findings suggested that isoflavone[s] alleviated vascular inflammatory stress and was an important component that mediated the reversal of endothelial dysfunction in this group of patients," wrote the authors.

Mechanism

The mechanism by which the soy compounds act is not totally understood, said Professor Tse. However, the anti-inflammatory effects may be related to the weak oestrogenic effect of the isoflavones. The female hormone oestrogen is known to protect against heart disease, said the researchers.

Despite the promising results of this clinical trial, the researchers stressed that it was too early to make any recommendations in this area. "At this juncture, regular isoflavone supplement might not be advocated since the benefits and side effects of long-term supplementation are still unknown,” said Professor Tse. "A balanced diet is still the top priority in promoting health. Diets with higher soy content might be beneficial due to the isoflavone contents. These food products also, in general, have higher contents of polyunsaturated fats, fibre, vitamins and less saturated fat."

From: News Report by Stephen Daniells, 24-Sep-2008 in Nutraingredients.com Europe

Newly Developed Soy-Based Bar Includes Probiotics to Ease Common Intestinal Problems: University of Missouri

Press Release -- December 2, 2008 -- Soy is considered a healthy addition to a diet, but sometimes it is not easy on the stomach. Now, a University of Missouri researcher believes she has the answer: freeze-dried probiotic microcapsules. "Soy foods are recognized as healthy food; however, intestinal bloating, cramping and flatulence can offset the favorable qualities of soy," said Azlin Mustapha, associate professor of food science in the MU College of Agriculture, Food and Natural Resources.

Mustapha believed there was a better way for people in North America to enjoy the benefits of soy as people in

Asian countries have done since ancient times. In her new research she found a holistic, natural solution in probiotics, friendly bacteria that already exist in the human intestinal tract. "We took selected probiotics that were very effective at reducing the undesirable intestinal symptoms, encapsulated the friendly bacteria in a gel to protect the product over time and then freeze-dried the gel," Mustapha said. "We then had a powdery-type ingredient with live bacteria that could be added to food."

The product was added to soy protein energy bars. Taste testers detected no difference in the bars without the probiotic product, bars with the freeze-dried product in microscopic capsules or bars with the freeze-dried product not encapsulated.

"We are now getting a healthy triple whammy," Mustapha said. "Soy is a functional food that is one step higher than the usual healthy foods, and probiotics reduce the negative side effects, provide health benefits and fight potential food-borne infections."

Because it is a dry product, the shelf life is quite high and the bacteria remained active during a moderate period of time. "It is a very important part of food science to create a novel, healthful and beneficial product," Mustapha said. "There are no soy energy bars on the market today that contain probiotics, making this a novel product." Her research was recently presented at the annual meeting of the Institute of Food Technologists.

http://www.soyatech.com/news_story.php?id=11513

Students Eat More Whole Grains When Gradually Added to School Foods: University of Minnesota Study

PR Newswire -- MINNEAPOLIS and ST. PAUL, Minn. -- Nov. 7, 2008 -- Elementary school students will eat more whole grains when healthier bread products are gradually introduced into their school lunches, a new University of Minnesota study shows.

Whole grain breads are strongly recommended as part of a healthy diet, but children and pre-teens won't always eat them. For this study, researchers from the university's department of food science and nutrition monitored how much bread students threw away, and whether that amount increased as the percentage of whole-grain flour in the bread and rolls was gradually increased.

The study included meals fed to kindergartners through sixth-graders at two Hopkins, Minn., elementary schools over the course of a school year. Red and white whole-grain flour was added incrementally to products, but students showed no strong preference for either type of flour. Students didn't throw away more bread products until the percentage of whole-grain flour in the bread and rolls reached about 70 percent.

The research is important because it shows that a gradual approach to improving children's overall diets can be successful both for parents and school food-service workers, said Len Marquart, one of the study's authors and an associate professor at the university.
http://www.soyatech.com/news_story.php?id=11134

Nutrient Supports Bone Health Over Time

Findings from a new study suggest that natural pigments found in plants may help protect against bone loss in older men and women. Researchers funded by the Agricultural Research Service (ARS) reported the findings in a paper published online by The American Journal of Clinical Nutrition. The study was led by epidemiologist

Katherine Tucker with the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, Mass. Tucker directs the HNRCA's Dietary Assessment and Epidemiology Research Program.

Other studies have consistently shown that fruit and vegetable intake is good for bones. Biological antioxidants in fruits and vegetables, such as carotenoids, protect cells and tissues from damage caused by naturally occurring oxygen free radicals in the body. Such plant nutrients may help protect the skeleton by reducing oxidative stress and thereby inhibiting bone breakdown or resorption.

The researchers examined potential effects on bone mineral density of overall and individual intake of several carotenoid compounds, including alpha-carotene, beta-carotene, beta-cryptoxanthin, lycopene and lutein+zeaxanthin.

For the observational study, the researchers tracked changes in bone mineral density at two areas of the hip and lumbar spine of male and female volunteers, aged 75 years on average, participating in the Framingham Osteoporosis Study. Among these volunteers, 213 men and 390 women were measured at the beginning of the study and four years later.

Over the course of the four years of the study, carotenoids were associated with some level of protection against losses in bone mineral density at the hip in men and at the lumbar spine in women. No significant associations were observed at the other bone sites. The results suggest there is a protective effect of carotenoids, particularly of lycopene, against bone loss in older adults. The researchers concluded that carotenoids may explain, in part, the previously observed protective effects of fruit and vegetable consumption on bone mineral density.

To look up the levels of individual carotenoids in selected foods, go to "Reports By Single Nutrients," provided by the ARS Nutrient Data Laboratory at:
http://www.ars.usda.gov/Main/docs.htm?docid=15869

From Report by Rosalie Marion Bliss on January 14, 2009, USDA Agri. Res. Service

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Health & Nutrition News

Herbal medicine is of "proven utility," says WHO

The World Health Organisation has called on governments to integrate traditional herbal medicine into their national health care systems, according to a report in the *China Daily*. The declaration was issued during WHO's first-ever congress on traditional medicine, staged over two days in Beijing last month, said the newspaper.

"Governments should establish systems for the qualification, accreditation or licensing of traditional medicine practitioners," said WHO in the declaration. "Traditional medicine practitioners should upgrade their knowledge and skills based on national requirements."

"For millions of people, often living in rural areas of developing countries, herbal medicines, traditional treatments and traditional practitioners are the main — sometimes the only —source of healthcare," Margaret Chan, WHO's director-general, told the *China Daily*. "The two systems of traditional and Western medicine need not clash. Within the context of primary healthcare, they can blend together in harmony, using the best features of each system."

She added: "Many countries have brought the two systems together. Here in China, herbal therapy of proven utility in many disorders is provided in state hospitals throughout the country, alongside conventional medicine."

From: Functional Ingredients December 2008

Campylobacter jejuni Infection Associated with Unpasteurized Milk and Cheese --- Kansas, 2007

On October 26, 2007, a family health clinic nurse informed the Kansas Department of Health and Environment (KDHE) that *Campylobacter jejuni* had been isolated from two ill persons from different families who were members of a closed community in a rural Kansas county. By October 29, 17 additional members of the community had reported gastrointestinal illness and visited the clinic within a week. All 19 persons reported consuming fresh cheese* on October 20 that was made the same day at a community fair from unpasteurized milk obtained from a local dairy. This report summarizes the findings of an investigation by KDHE and the local health department to determine the source and extent of the outbreak. Eating fresh cheese at the fair was the only exposure associated with illness (relative risk [RR] = 13.9). Of 101 persons who ate the cheese, 67 (66%) became ill. *C. jejuni* isolates from two ill persons had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns, and the isolate from a third ill person was nearly identical to the other two. Although all samples of cheese tested negative for *Campylobacter*, results of the epidemiologic investigation found an association between illness and consumption of fresh cheese made from unpasteurized milk. To minimize the risk for illness associated with milkborne pathogens, unpasteurized milk and milk products should not be consumed.

The outbreak occurred in an insular religious community (population approximately 150) consisting nearly exclusively of agricultural workers who practice small-scale and traditional farming techniques. On October 20, 2007, members held a community fair celebrating their pioneer heritage. During the fair, unpasteurized cheese was made at an activity station by adding rennet extract to unpasteurized milk donated by a local dairy, producing soft cheese in 5--6 hours. Butter also was made, but from pasteurized milk. Adults and children were encouraged to participate in these activities. Hand-washing stations were available at the food preparation stations. The cheese was served at a banquet that evening. Foods made at other activity stations, including buffalo stew and chili, and potluck meals brought from community member homes also were served at the banquet.

As part of the investigation, a self-administered questionnaire was distributed at a community meeting on November 4, 2007, to collect information regarding demographics, illness status and characteristics, food history, and other possible exposures. A case was defined as diarrhea (three or more loose stools in a 24-hour period) in a member of the community, with onset during October 20--30, 2007. Of the 150 community members, 130 (87%) completed the questionnaire, and 68 (52%) persons met the case definition. Among ill persons, 66 (97%) reported watery diarrhea, 18 (27%) reported bloody diarrhea, and 16 (24%) reported vomiting and diarrhea. None of the respondents had diarrhea immediately before the fair; illness onset occurred during October 21--29 (Figure). Two patients were hospitalized for dehydration. One was released the next day; the other, a pregnant woman, remained in the hospital for 5 days. No deaths were reported. Median age of ill persons was 25 years (range: 1--75 years); 41 (60%) were aged ≤15 years, and 37 (54%) were female.

In a cohort analysis, consuming the fresh cheese was significantly associated with illness (RR = 13.9). Factors not significantly associated with illness included making cheese (RR = 1.3), making (RR = 1.2) or consuming butter made from pasteurized milk (RR = 1.4), and drinking well water (RR = 2.1) (Table). Of the 101 persons who reported consuming fresh cheese made from unpasteurized milk, 67 (66%) met the case definition. One apparent case of secondary transmission occurred in a person who did not consume the fresh cheese, but became ill on October 29, 6 days after her child became ill. Stool specimens were collected from three persons who met the case definition and sent to the KDHE laboratory. *C. jejuni* was isolated from all three specimens. Isolates from two of the samples had indistinguishable PFGE patterns (PulseNet pattern number DBRS16.1150) and the third isolate differed by only two bands (PulseNet pattern number DBRS16.0024).

On November 3, KDHE collected six slabs of leftover cheese from the freezer of the community church for laboratory testing and advised community leaders to discard all other cheese remaining from the community fair. On November 6, the Kansas Department of Agriculture inspected the dairy floor, roof, and ceiling; milk tank; equipment; and animal housing for cleanliness and rodent control but did not find any regulatory violations. Milk samples also were examined for bacterial content, antibiotic residue, and presence of added water. Samples of fresh cheese remaining from the event and milk from the dairy were sent for laboratory analysis. *C. jejuni* was not isolated from the samples of leftover fresh cheese or unpasteurized milk.

From: MMWR Weekly January 2, 2009 of CDC

India: Now is the Time to Invest in This Market

Nutraceuticals, dietary supplements, functional foods, fortified foods—and all those products considered "good for you"—have yet to find their true place in India. So far the multi-level marketing companies are the only ones to experience some degree of success.

In markets like India, defining opportunity is heavily dependent on the regulatory framework. Created in 2006, the Food Safety & Standards Act governs the Indian nutraceutical marketplace, but it has yet to find its footing. The act establishes the Food Safety Authority as administrator, headed by a full-time chairperson, who will complete a full year in office as of early 2009. "Members" from academia, industry, allied government ministries and many other entities comprise the Food Safety Authority, and these groups are currently mobilizing to shape the regulatory landscape.

Indian society has always been open to new concepts and quick to adapt. In addition, unlike China, most consumers in the marketplace speak English, particularly the fast-growing middle class.
The shaky financial markets in other parts of the world may have some impact on India in terms of slowing the GDP. But wise investments will most likely emerge unscathed. The good news is that during the past two quarters the Indian market has experienced consistent growth for most consumer durables and consumption of non-essentials.

In fact, India is currently experiencing massive internal consumption, due to a prosperous middle class, which has the money to invest in "nutraceutical" products. This class of consumers is indeed a primary target for many companies. Calcium supplements, cholesterol control, diabetes, heart care, brain health and cosmeceuticals have shown recent success among the largest consumer groups, including Baby Boomers.

Why India?

Everyone is rushing to India because the population of 1.1 billion will plateau at 1.5 billion by 2050, a full 25 years after China has already stabilized. The middle class has doubled and today is the fastest growing portion of the population. In the last 60 years of independence India has met remarkable educational goals and today has moved beyond basic food security issues. India has also evolved from a savings economy to a consumption economy.

Most recently, there has been a series of test marketing initiatives undertaken to take the pulse of the market and determine where it's headed. Companies from the Western world have already experienced some defining moments and know what's next. Just take a successful case study from another market, tweak it for the Indian consumer, and success will come.

Currently this market is experiencing 12% growth, while the rest of the world grapples with financial survival. Strong domestic consumption and a free economy define the emerging India.

Distribution is an important issue to consider, especially with regard to national versus regional brands. Perhaps a company could start regionally and move nationally once the product starts to become more recognized among consumers. Concerted and focused launches to specific market segments and regions—clearly communicating the "bargain" in the "benefit to me"—is a mantra for a successful rollout.

Also called the "Fast Moving Consumer Goods" (FMCG) category, the "mainstream market" for India includes most personal care products, cosmetics and toiletries, but few healthy product options. It's here that one wants to be. According to one estimate, the size of the dietary supplement and functional foods segment equals the prescription drug market—worth $15 billion in 2006 and predicted to grow to $25 billion by 2020. Other market estimations and predictions can be found in Table 1.

Immediate Challenges

For now, the most immediate challenge lies on the regulatory front. The 2006 Food Safety & Standards Act borrows heavily from U.S. and U.K. legislation, and as such, is pretty progressive. It stresses testing as well as regulating advertisements and health claims; current players using health claims are running the narrow stream between the food and drug categories. India needs better state and central coordination for a harmonious rollout throughout the 35 states. Once the new legislation takes effect, the drug department's rules and regulations will no longer apply to this new class of products. Further, the local municipal health departments will sign off to the new authority.

For the past two years, in the context of this new legislation, the market and its players have been in a stage of

flux. But that's what makes the present time so interesting and exciting for the Indian market. Every company has its own strategy for entering this market. For those that wish to be leaders, not followers, the time for entry is now.

The Food Safety Authority will soon form scientific committees to draw up guidelines and an agenda for reform. Allowances and restrictions will be determined from within this group. For the traditional segment in India—Ayurveda and other Indian systems of healthcare—the challenge comes from dealing with this new opportunity and tapping consumer interest. The new act prohibits the approval of any substance previously defined as a drug, under the Drugs & Cosmetics Act of 1940, as a dietary supplement, nutraceutical or functional food. Under the provisions of the ancient text, all botanical ingredients are categorized as drugs. Thus an Ayurvedic herb like Ashwagandha can't be sold as a nutraceutical since it has already been classified as a drug.

For the Future

Wisdom states "food is thy medicine" and this core truth recognizes different uses of an ingredient as a food, drug and supplement. It's the commerce of big pharma that disfigures the core meaning in definition to a convenient regulatory shield. How the traditional industry reacts to this new market opportunity has yet to be seen. Hopefully this chapter will have an equitable outcome, offering tradition a place in the new marketplace.

From: Article by Puranik & Dave in Nutraceuticals World January 2009

EU's subsidy move may hurt Indian dairy industry

New Delhi, Jan 27 The global meltdown is starting to unleash beggar-thy-neighbour policies. The latest instance of this is the re-introduction of export subsidies on dairy products by the European Union (EU).

Doubts over WTO talks

The move, apart from raising fresh doubts over the future of the World Trade Organisations' (WTO) now-stalled Doha Round negotiations, could also adversely impact the Indian dairy industry. Indian companies have in recent times made a successful dent into the world dairy market, with 75,000-odd tonnes of skimmed milk powder (SMP) worth roughly Rs 1,000 crore being exported during the year ended September 2008. Much of this was facilitated by the dismantling of the EU's export subsidy regime.

But, only last week, the European Commission announced the reactivation of export subsidies, which were suspended since June 2007. The EU's executive body has fixed new subsidy rates at up to a maximum of €200 a tonne for SMP, with these being €500 in the case of butter and €580 for butter oil. If that wasn't enough, the Commission has also offered support to dairy producers through intervention purchases at guaranteed prices. The annual limit of such intervention, effective from March 1, is 109,000 tonnes for SMP and 30,000 tonnes for butter.

15% refunds

At €200 or $ 265 a tonne, the refunds offered on SMP exports work out to nearly 15 per cent of the current world price of $1,800 a tonne. The subsidy of €580 eor $766 a tonne on butter oil would amount to over a quarter of the present $3,000 a tonne rate being quoted by Western Europe exporters. Butter oil of New Zealand origin is said to be available even cheaper for around $ 2,000 a tonne.

A major worry now is whether the EU's subsidy resumption policy would prompt a similar response from the US through its Dairy Export Incentive Programme (DEIP). The DEIP allows for subsidising exports of almost 100,000 tonnes of dairy products.

Making it worse

Making matters still worse for the Indian industry is the weakening of the New Zealand dollar. Since April 2008, the New Zealand dollar has depreciated by a third against the US currency, whereas the rupee has correspondingly fallen by slightly over 18 per cent.

"We are currently squeezed between European subsidies and the weakening New Zealand dollar. Our exports have, therefore, been rendered totally uncompetitive", said Mr R.G. Chandramogan, CMD of the Chennai-based Hatsun Agro Product Ltd.

Fear of imports

In fact, forget exports, the domestic industry is now fearing a flood of imports taking place into the country. Last year, on April 29, the Centre had announced a reduction in the basic customs duty on SMP from 15 to 5 per cent (on imports of up to 10,000 tonnes under the tariff rate quota regime, with quantities beyond this continuing to attract 60 per cent) and on butter oil from 40 to 30 per cent. "The Government should immediately restore the duties at the earlier levels, taking into account the latest global developments", noted Mr R.S. Sodhi, Chief General Manager of the Gujarat Cooperative Milk Marketing Federation (GCMMF).

Global rates

World prices of SMP and butter oil scaled their peaks ($5,000 and $6,000 a tonne, respectively) around August-September 2007 before dropping to the current $2,000-3,000 levels. Of the total 12.50 lakh tonne (lt) estimated global trade in SMP last year, the US accounted for four lt, followed by New Zealand (2.60 lt), EU (1.90 lt) and Australia (1.10 lt). The annual trade of 19 lt in whole milk powder is dominated by New Zealand (seven lt), EU (4.3 lt), Argentina and Australia (1-1.10 lt each).

From: Report by Harish Damodaran in Hindu Business Line 28 January 2009