
Current Status of Functional Foods and Beverages in the Context of Key Health Nutrition Challenges

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Introduction

- The fast development in the technology industry
 - Use of pesticides, heavy metals and excessive use of agriculture tools
 - Environmental pollution with increasing civilization
 - life style changes
 - Higher risk for all diseases like cancers, respiratory, diabetes, cardiovascular ,metabolic disorders ,obesity
 - India faces a double burden:
 - Over weight and obesity
 - Under nutrition and poor maternal health
 - Interest in using foods that would improve the health and well being is, therefore fast growing in India.
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Functional Foods

- Consumers judge the food products not only in terms of taste and nutritional needs, but also in terms of their ability to improve the health and well-being.
 - Functional foods exert a beneficial effect health
 - They could have an added health component
 - Reduced harmful component
 - Prevention or risk reduction of chronic diseases, beyond the basic nutritional functions of the food or beverage
 - Functional foods may be whole, fortified, enriched, or enhanced foods.
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Nutritional Challenges



- Infectious diseases
- Chronic diseases
- Poor maternal and child health
- Indian population >1.2 billion
- One in every five people across the country has at least one chronic disease like cardiovascular, respiratory and metabolic disorders
- The epidemic of chronic diseases, especially diabetes has already reached its peak as India is now seen as the diabetic capital of the world.

Nutritional challenges

- Over weight and obesity
 - Coronary Heart disease
 - Diabetes
 - Hypertension
 - Metabolic syndrome
 - Stroke
 - Hypercholesterolemia
 - Hypertriglyceridaemia
 - Lack of physical activity
 - Smoking , tobacco chewing
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Prevalence (%) of Abdominal Obesity in 14-18 y old Asian Indian Adolescents: 5 City Data

<i>Age (y)</i>	<i>New Delhi</i> (<i>n = 4997</i>)	<i>Mumbai</i> (<i>n = 435</i>)	<i>Agra</i> (<i>n = 4415</i>)	<i>Jaipur</i> (<i>n = 2646</i>)	<i>Allahabad</i> (<i>n = 3379</i>)	<i>Overall</i> (<i>n = 15872</i>)
14	26.8	51.9	18.3	15.1	22.9	23.1
15	26.2	35.9	18.5	13.5	23.9	18.9
16	31.6	17.6	5.3	14.0	37.3	20.4
17	34.0	17.2	8.7	14.3	35.8	19.5
Overall	28.8	31.3	13.9	13.7	29.1	20

Incidence of obesity & related disorders

- Young Women (18 – 25 years) = 13.2%
Delhi, DST Trial 2000
- Urban slum (35 years) = 40.2%
European Journal of Clinical Nutrition (2001)
- Urban Slum (30-60) = 28.2% Delhi, 2002 DST Trial
- Post menopausal (52 years) = 62 % Delhi, DBT trial 2006
 - Hypertension >140/90 mm Hg = 43%
 - Hyperlipidaemia Cholesterol > 200 mg = 47%
 - Diabetes Blood sugar >126 mg⁰% = 4 %
 - Osteoporosis (T-score < -2.5) = 22%
- 4,621 (>35 years) overweight urban areas = 64 % DST trial in 6 cities ,2009
 - rural areas = 36 %
 - Hypertension >140/90 mm Hg = 50%
 - Hyperlipidaemia Cholesterol > 200 mg = 25%
 - Diabetes Blood sugar >126 mg⁰% = 3 - 14 %

Nutritional Challenges

- WHO report claims that the largest cause of death in India by 2020 will be due to cardio vascular disease
- 2.6 million Indians are predicted to die due to coronary artery disease and half of these deaths are likely to occur in young and middle aged between 30 – 69 years.

The contributing factors :

- Hypertension, Hyperlipidaemia, diabetes, over weight and obesity, lack of physical activity and tobacco
- Major health gains can be achieved by changing life styles, involving healthy eating practices with increased physical activity and clean environment.

Nutritional Challenges

- UNICEF (2009) data shows infant mortality to be declining steadily, but is still 1726 thousand deaths for children below the age of 5 against 26787 thousand births .
 - 40% of children below the age of 5 are under weight.
 - Despite the country's growing economy and an ambitious rural health initiative
 - Over 100,000 women die from pregnancy-related causes each year – highest in the world
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Nutritional Challenges

Anemia Prevalence

- **WHO : “India is one of the countries in the world that has highest prevalence of anemia”**
 - Indian women 56%
 - Pregnant women 58%
 - Children 79 %
 - Adolescent girls 56 %

National Family Health Survey (NFHS)3

Nutritional Challenges

Prevention and cure for Anemia:

- Increasing the iron content of food through dietary intake
- Increasing the iron content of food through fortification
- Increasing iron intake through supplementation
- Reducing blood loss by treating for parasites
- Reducing blood loss from hemorrhage by improving birthing or abortion practices and post-abortion care

PM's National Council on India's Nutrition Challenges - Iron fortified Iodized Salt to be promoted to battle malnutrition for prevention and cure of Anemia

One cost effective way of increasing the intake of iron, is fortification of salt with iron in addition to iodine

Nutritional Challenges

Prevention and cure for under nutrition in children

- **There are ten proven, high-impact interventions ,that can help in bringing, child under nutrition figures down:**
 1. Timely initiation of breastfeeding within one hour of birth.
 2. Exclusive breastfeeding in the first six months of life
 3. Timely introduction of complementary foods at six months
 4. Age-appropriate foods for children six months to two years
 5. Safe and hygienic complementary feeding practices
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Nutritional Challenges

6. Full immunization and bi-annual vitamin A supplementation with deworming
7. Appropriate feeding for children during and after illness
8. Therapeutic feeding for children with severe acute malnutrition
9. Adequate nutrition and anemia control for adolescent girls
10. Adequate nutrition and anemia control for pregnant and breastfeeding mothers

UNICEF

Way Forward

In light of the above scenario it is important that the **Natural Indian foods** with added health benefits along with the **fortified and other Modified Functional foods** with potential health benefits are promoted.

Natural Functional Foods



Garlic

- Garlic has a compound known by the name of Allicin, which gives the medicinal properties to this wonder herb.
- It strengthens up the natural defense and improves the immune system which helps in the prevention of cancer, heart disease and hypertension . Decreases platelet aggregation

Ginger

- Ginger contains at least 12 anti-aging constituents that inactivate free radicals and reduces inflammation, it is also a good source of dietary fiber



Natural Functional Foods



- **Green tea** contains antioxidant which helps in the prevention of cancers
- **Fenugreek** has very powerful anti-inflammatory and antioxidant properties which help in controlling cardiovascular disease, blood glucose and cholesterol levels.
- **Millets and whole grains** are rich in fibers and are good in the prevention of certain cancers, heart disease and are a body cleanser; **oats** are rich in a cholesterol lowering soluble fiber called beta-glucan



Omega3 fatty acids



- Omega3 fatty acid : **Fish** good for the prevention of coronary artery disease, as it helps in increasing the HDL (good cholesterol) in the blood.
- Decrease triglyceride levels, and slows down the development of atherosclerotic plaque .
- American Heart Association recommends 100 grams of fish at least twice a week .
- Fatty fish like salmon, mackerel, herring, lake trout, sardines and tuna.
- For vegetarians a good source of Omega 3 fatty acid is **flax seeds**



Phytochemicals



- **Fruits and Vegetables** :Rich in polyphenols ,vitamins and fiber
Prevention of cancers, hypertension and heart disease.
- 4-5 servings of fruits and vegetables
- **Broccoli and other Cruciferous** Vegetables are associated with decreased cancer risk.
- **Tomatoes**: good in lycopene ,which is a potent antioxidant.
Lycopene helps in strengthening the immune system and has disease fighting ability.
- Cooking of tomatoes in curries, soups or ketchup liberates this component even more making it more effective.
- **Citrus Fruits.** are protective against a variety of human cancers.
Although oranges, lemons and limes, have important nutrients as vitamin C, folate, and fiber ,limonoids are the phytochemical present



Probiotics & Antioxidants

- Milk, cheese, yogurt are rich in calcium. Addition of **probiotics** is good for the prevention of certain cancers, are anti-inflammatory and help in the prevention of gastrointestinal disorders and boost immunity.
- Good for digestive health
- **Strawberries** are a rich source of phytonutrients and antioxidants ,that give Immunity and have anti-inflammatory properties that fight cancers ,heart disease and are health boosters.



Antioxidants

- **Cocoa** - called the super food.
 - Cocoa is a rich source of antioxidant known as polyphenols and flavonoids
- Are anti ageing and also protects us from heart disease
- Stress buster by increasing serotonin levels in the brain.
 - In moderation, can also lower the blood pressure and improve insulin resistance , thus reducing cardiovascular disease
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MUFA (Mono Unsaturated Fatty Acids)

- Lower LDL (bad) cholesterol levels without negatively affecting the HDL (good) cholesterol.
 - It promotes heart health and might help prevent cancer and a host of other ailments.
 - Help to normalize blood sugar level by a component called Adiponectin which enhances cells' ability to utilize glucose , thus lowering the amount of extra sugar in the blood.
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MUFA (Mono Unsaturated Fatty Acids)

- Canola oil, Olive Oil, Rice bran Oil and Ground nut
- Canola oil is also high in omega-3 fatty acids which can prevent heart disease.
- Olive oil has antioxidants -preventing heart disease and colon cancer.
- Almonds and walnuts are good in antioxidants and MUFA - Reduce oxidation of LDL-cholesterol and prevent heart disease



Polyphenols



- **Red wine** has antioxidant Resveratrol
- Minimizes certain cancers
- Prevents many degenerative disorders especially of the brain.
- Wine in moderation can lower the risk of above disorders and is anti ageing
- Purple grapes contain Polyphenolic compounds that support normal healthy cardiovascular function



Phytoestrogens



- **Soya** is a rich source of phytoestrogens ,proteins and fiber
- Reduces total cholesterol ,LDL cholesterol and triglycerides levels
- Increases HDL cholesterol levels
- Soy has antioxidant properties which protect against LDL oxidation
- Good for heart , diabetes and good for reducing post menopausal symptoms in women
- Good for Bone health



Soy Phytoestrogens

- Intact Soy 70g/day given for one year (Post menopausal women 200 in number)
- Experimental Group (soy group) showed improvement in their symptomatology , blood sugars and lipid profile when reviewed after six months and 1 year
- Initial high prevalence of dyslipidemia and hypertension among experimental group was observed to be lower after 6 months of soy consumption
- Obesity was striking among these patients their BMI and waist hip ratio being high
- There was a definite increase in intake of proteins, MUFA, calcium, iron and fibre in subjects of experimental group after 6 months of soy consumptions .

Organic foods

- Conventional foods with likely lethal pesticides, chemicals, additives and possible allergens, is significantly driving the growth of organic foods .
 - General perception of a healthier lifestyle : is to include organic products , as they can reduce the development of respiratory illnesses , allergies , gastrointestinal disorders, degenerative diseases including some cancers.
 - Organic foods :Cereals , pulses , vegetables , fruits, confectionery, snacks, bakery, non-dairy beverages, meat, baby foods.
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Functional food in the Indian Market

- Presently there are few commercialised functional products in the Indian market.
 - With India's strong tradition of consuming natural healthy foods, the market of functional foods is likely to double in the next five years. The highest growth is likely to be in sub categories such as energy drinks, enhanced shelf stable juices, probiotics, and omega fortified foods and beverages
 - These foods and beverages, personalised to manage certain health conditions are the future of the functional health foods market.
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Indian market

- For the success of the functional foods ,the right strategy would be the partnerships amongst functional food or beverage manufacturers, pharmaceutical companies, nutrition companies, and food additives companies in the formulation of the product
 - Healthy
 - Flavours
 - Palatable
 - Affordable
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Growing demands of the 21st century consumers

- Digestive health
 - Naturally healthy
 - Beauty foods
 - Weight management
 - Mood foods
 - Healthy snacking
 - Kid's nutrition
 - Antioxidants
 - Nutri foods
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Challenges facing Functional Food Industry

- To generate scientific knowledge of foods
 - Provide evidence of physiological effects
 - Implement these in functional food products.
 - Taste , flavor, shelf life , cost , availability
 - Network with government agencies, medical fraternity, manufacturing companies, biotechnology experts, food technology, nutritional science experts and agricultural industry.
 - The success would eventually depend upon the smoothness in execution of the task and innovative brilliance of all players in their respective fields.
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Indian Market

- Products already in the market are foods containing probiotics like yogurt ,Yakult and butter milk.
 - Probiotics are microorganisms that are essential for the proper functioning of the digestive tract, commonly referred to as the "friendly" "beneficial" or "good" bacteria
 - Probiotics produce a favorable environment for nutrient absorption, and promote the health of gastrointestinal tract
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Indian Market

- Fortified Juices/drinks, gluten free products, lactose free products, soy based products, energy bars and fortified milk shakes, cereals with added fiber(Atta Mixes) Sprouted cereals /pulses
 - Vitamins, minerals, and other products containing supplements are booming in the market.
 - India's nutritional supplement market is set to boom over the next few years, with some analysts predicting it will double in value by 2013.
 - Functional foods not only give health benefits, but also profitability to the manufacturers as the retailing is at a much higher cost, as compared to the conventional foods.
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Indian Market

- Young Indian consumers getting higher incomes are spending more on healthy foods and India is expected to become the fifth largest consumer market in the world by 2025 from being the 12th largest currently and statistics shows , that beverages and dairy will drive this growth of functional foods in India.
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MENU FOR A RIPE OLD AGE



Apples: Provide polyphenols

Blackberries: High levels of anthocyanins

Black tea: Theaflavins



Blueberries: High levels of anthocyanins

Broccoli: A range of health-giving polyphenols

Cereal bran: High in fibre and phenolic acids

Cherries: Contain antioxidant anthocyanins

Cherry tomatoes: High levels of quercetin

Coffee: Phenolic acids

Cranberries: Procyanadin, which can prevent infections

Dark chocolate: Cocoa contains epicatechin

Green tea: Polyphenols

Oranges: Contain hesperedin, which aids a healthy heart

Peaches: Contain epicatechin and phenolic acids



Plums: Similar role to peaches



Raspberries: Contain anthocyanins

Red grapes: Anthocyanins and phenolic acids

Red onions: High levels of cancer-fighting quercetin

Spinach: Polyphenols

Strawberries: Contain anthocyanins and ellagic acid

Conclusion

- Eat Healthy – Natural wholesome foods/functional foods with added benefits/customized foods
- Be physically active
- Do not use tobacco
- Alcohol if any - take in moderation (Red wine)
- Manage stress - Yoga/Meditation and Exercise
- Socialize with people , make friends and have hobbies

“ Food is not just eaten - it is eventually worn by an individual - as it shows ”

Good food and Exercise : Health benefit with visible impact

Thank you
