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Life Chakra Mantra for Work Life Balance

Sangeeta Ahuja

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Abstract

The existence of living organisms is the life. The uniqueness of the human being is the power to think. The different facets of life has some specific span through which the human being pass through. Everyone is involved in various activities of life. The different chakras work, money, family, society is to be balanced for getting the balanced life. The enjoyment, satisfaction, contentment are related with the life chakras. The more time we spend on one activity or chakras ignoring the all others also have worst effect. The balancing of all chakras with happiness and satisfaction is very important. Experimentation have been done using the real data sets of female workers with various chakras categories using statistical software packages and the work life balance have been obtained. Results shows that if consistency have been maintained using the threshold values by optimizing the chakras the work life balance is maintained very efficiently. The happiness and satisfaction leads to increase tremendously with high level of contentment.

Keywords: Work Life Balance; Chakras; Happiness; Stress; Consistency; Work; Anxiety; Energy; Satisfaction; Enjoyment; Fear; Body-Mind-Soul; Life Expectancy.

Introduction

Life is very important for all living organisms. Human being is the unique creature of God. Woman is a beautiful gift of the lord who is having the power to reproduce. Every human being has a life cycle consists of various phases. The birth, childhood, adolescence, young age, old age, death completes the cycle. Every human being is having enormous emotions to express with different mental power to retain and pick up the realities of life. Every human being is doing some karma always and it should not confuse with job. Even if the person is not doing any job, he is doing the karma e.g. to breath in/out, to eat food etc. Different people involved in different professions and doing the work for the livelihood. The enjoyment and satisfaction in work varies with different scenario with different people. Except the work, one has to give or spend some time with family and friends. The fun time is needed by each individual. The time of spiritual growth is also needed. The "Me" time is also one of the most common part of one's life. Now fulfulling the needs, requirements, responsibilities, enjoyment, satisfaction, targets, goals one has to maintain a balance in life to synchronize the chakras of life.

We all are so caught up in the work or mental tension that we miss out the various cherishing little things in our personal spheres. Out time, energy and attention is to be used in a balanced and effective manner. One should become master of one's mind. What we experience as life is basically just a creation of our minds. Even though

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it seems that our destiny depends upon externally circumstances, the truth is that the way we perceive those circumstances determines our experiences.

Balance the chakras is basically defined as energy flows freely throughout the body. When the chakras are out of balance, energy can get stuck in areas of the body causing physical, mental or spiritual pain. Chakras get blocked by negative energy that is unable to release from the body. The negative energy, that experience as a response to traumatic life experiences and emotional challenges. When we experience these negative energies they can become blocked into within us if we don't have the ability to release them.

The Chakras are related to anxiety, it is also related to digestive system and the adrenal glands. This chakras regulates our fears, chakras is out of balance we experience fears, eating disorders, anxiety and loss of control. People become anxious because of so many reasons such as generalized anxiety disorder, social anxiety, specific phobias, panic disorder, obsessive compulsive disorder (OCD), post-traumatic stress disorder (PTSD). The only way to bear the body's message and understand what heart really want is to spend a lot of time going onward through body window and trying to rediscover what one needs to hear. Most of the people are horribly ill, they think that they are mentally ill. Their work life balance was so out of whack that they really were physically ill. They were near physical and mental collapse. Their body-mind-soul were ill.

Most of the time, they went for medical leave. When they returned back, they look like a different people altogether. They recounted their experiences with themselves, how they did, what they wanted, took long reflective walks and recharged their spirit. They have to re-learn how to wake time for themselves to simplify their work life and heal their body-mind-soul.[5]

The Wheel of Life[8–10] concept is originally created by Paul. J. Meyer. Founder of success motivation. The wheel of life is a great tool to help you improve life balance. It helps you quickly identify the areas in your life to which area we have to devote more energy. It is "Birds-eye" view of one's lives. Wheel of life is a simple and powerful tool that helps to visualize all the important areas of the life at once.

The purpose of wheel of life exercise is to make sure our wheel the whole of our life is balanced, all aspects or needs fulfilled in the right way. When one aspects of your life becomes the focus and others are neglected, the wheel is out of balance.

Oldest example is one of the many Buddhist wheel of life. The wheel model or symbol is said to have been used by the Buddha as a tool to teach his students his lessons of enlightenment. This one represents Buddha's eight fold path perhaps inspiring Mayer's "Paths". This life wheel is a useful tool when life has gotten out of balance, such as suffering from work alcoholism, getting burned out, or generally being unsatisfied and not sure why.

This is very effective in helping people to become more efficient and satisfied with their life even if they are not burned out or unhappy. The idea is to identify the areas, dimensions or aspects of your life and arrange them as areas or spokes around a wheel.

There are ways to balance it all out such as Assess your life as it is now, make a conscious decision to become balanced, make that decision on a minute to minute schedule, set goals in every areas of your life, be willing to take the risks, make time to reassess yourself on a daily basis.

The wheel of life is the various chakras which we have to balance in life. The various areas or chakras are Profession/Financial, Family, Spiritual/ Religious, Mental/Personal and Social (Friends and others).

Well and happy employees are productive employees. It is really bad practice for companies to allow employees to cash in their vacation time, in lieu of the time off. One should not do this. Take the vacation. Simplify your work life whatever you can and take as much time off as you can. We are the only nation that does not understand the value of time off. When you first take the job, negotiate more time off if you can, even if you have to take a slightly lower salary. Keep your work life balance in check so that you can spend more time for relaxation and reflection to find health and healing for your mind soul.

Clean out your desk and email. It won't take much to clear the clutter in your desk. This is the easiest way to simplify your wok life. Simplify your work life and make an affirmation not to let the pending things control you. If you cannot cope after all your efforts, it is an indication to you that it is time to move on.

When you are happy and in a positive frame of mind, your body also responds positively and brings you health and healing. When all is well in your life and you perceive that you are happy. Your heart rate slows, your breath becomes deeper and more even and your blood pressure goes down. If

you numb yourself to negative emotions, you also destroy the ability to really feel what is good, happy and positive. The strong and negative emotions gives us pain and painful memories. Emotions release is necessary thing for health.[6,7]

Emotions need an outlet. They always come out one way or another. They are part of who you are. Instead of feeling your emotions you deny them. It is your mind that denies the emotions existence. The denial merely buries them deeper into your body and into your soul. Negative, strong emotions, or negative energy however you wish to relabel it will remain inside your body –mind-soul and become body-mind-soul issues if you don't deal with them.

Methodology

SPAR2.0[11] have been used for diagnosis, prognosis of disease and for finding out the possible causes with work life balance. This software consists of many innovative modules based upon advanced statistical and computer methodologies with techniques. This software has been developed using Visual C++. This platform and technology[1-4] is suitable for software development. It utilizes various key features of object oriented technologies such as its ability to programme in an event driven operating system with great ease, write code for events automatically, optimize code capability for native platform, etc. The basic reason behind selection of this technology was its superior abilities for code reusability, inheritability, encapsulation, portability and modular development. The concept of various scripting languages have been used and this expert system is very easy to use and beneficial for everyone who is directly or indirectly related to this field.

Except this software, many other Software tools[12] and engineering techniques have also been used which is mentioned in the next section.

Experimental Analysis

Rigorous experimentation have been done with the real data sets of female workers by using the various elements of the chakras of work life balance. Done the grouping of these chakras by K-means, K-modes, K-median and K-mediod method using SPAR 2.0.[11] Compute the consistency index and if it is less than equal to threshold then work life balance is maintained else work life have to be maintained.

Consistency Index CI

CI = For all Cluster Ci For all tuples Tij <= δ (threshold)

The various areas or chakras are Profession/ Financial, Family, Spiritual/Religious, Mental/ Personal and Social (Friends and others).

The chakra categorization have been pictorially shown as in figure 1 depending upon the real data obtained for the female workers.

The work life chakras of the females are shown as in Figure 2.

Life Expectancy increases after maintaining the

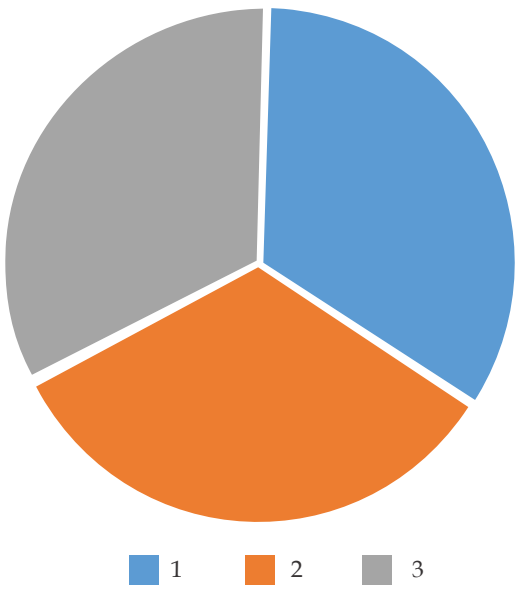

Fig. 1: Chakras Categorization.

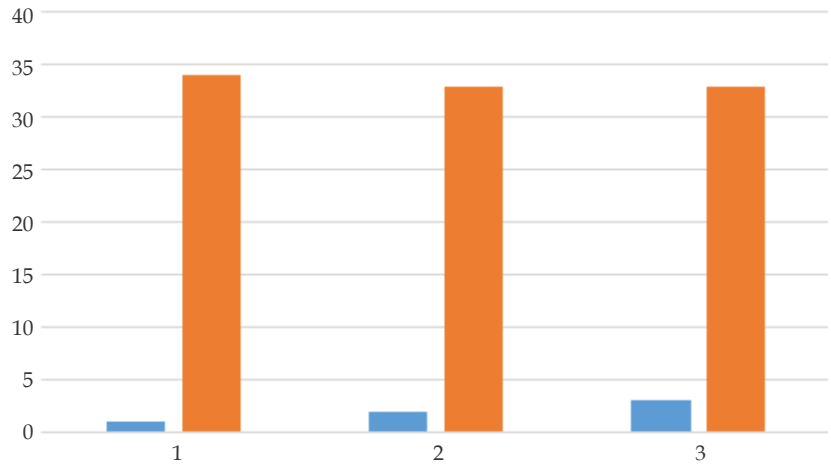

Fig. 2: Work Life Chakras Categorization.

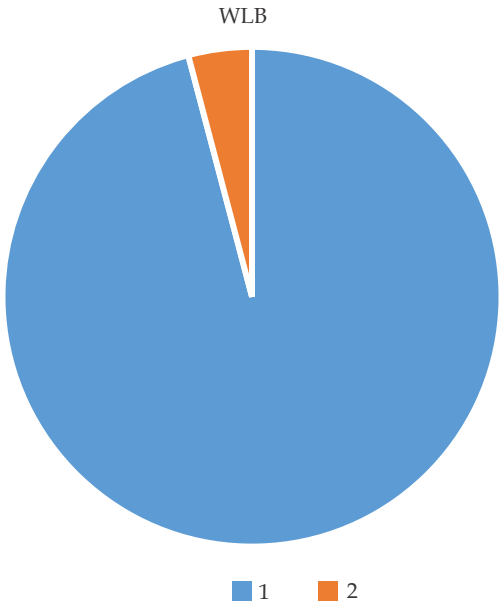

Fig. 3: Life Expectancy after Work Life balance.

work life balance as shown in figure 3.

Learn how to love yourself saying no to others. Ensures good health mental and physical health is pivotal for growth and it is also reflected on the overall health of your family. Striking a balance helps you lead a happy and extended life, it ensures your growth as an individual and secures your mental peace well being.

Conclusion

The happiness, satisfaction, enjoyment with contentment is very much needed for getting the prosperity in life. The work life balance is maintained by balancing the chakras by controlling the activity which is exceeding the threshold. Rigorous experimentation have been done using the real data sets of female workers with various chakras into categories using statistical software packages and the work life balance have been obtained.

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Knowledge, Attitude and Practice of Nutrition: Adolescents Study

E Lakshmi

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Abstract

Nutrition counseling is a process by which beliefs, attitudes, environmental influences and knowledge about food and health are channelized into actual practices. They help improve the nutritional status so that children contribute in the well- being of the nation as they are the future of the nation's prosperity. *Aims:* To assess the Impact of nutrition education on children and Impact of counseling (KAP)imparted to teachers and parents. The study was approved by the Institutional ethics committee of SRM University (1165/IEC/2017). Permission was obtained from school authorities parents and teachers. *Statistical analysis used:* Descriptive statistical measures such as percentage distribution, mean and standard deviation was used for variables, *t*-test was used to compare KAP before and after counseling. *Conclusions:* The improvement in attitude was seen in terms of preference for nutritious foods compared to junk foods, consumption of more vegetables and fruits and i n the choice of suitable recreational activities

Keywords: KAP; Nutrition Counseling; Junk food.

Introduction

Nutrition counselling is a process by which beliefs, attitudes, environmental influences and knowledge about food and health are channelized into actual practices. These practices are sound and consistent with the individual needs, purchasing power, food availability, health and socio cultural background. It is one of the most effective tool of changing the food habits without affecting their sentiments.[1] Nutrition counseling regarding the importance of balanced diet, harmful effects of junk foods will help to curb the junk food addiction and improving their nutritional status.

Knowledge is a set of understandings, It is also one's capacity for imagining, one's way of perceiving. Knowledge of a health behaviour considered to be beneficial, however, does not automatically mean that this behaviour will be followed. The degree of knowledge assessed by the survey helps to locate areas where information and education efforts remain to be exerted Attitude is a way of being, a position. These are leanings or tendencies".[2] This is an intermediate variable between the situation and the response to this situation. Practices helps explain that among the possible practices for a subject submitted to a stimulus, that subject adopts one practice and not another.

An attempt was made to bring about a change in the nutritional profile through nutrition counseling of the adolescents and knowledge, attitudes and practices (KAP) of teachers and mothers to promote

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the consumption of foods like cereals, pulses, green leafy vegetables, roots and tubers, sugar and jaggery, fats and oil, milk and milk products, fruits etc. in the childrens diet. To improve their nutritional status so that children contribute in the well-being of the nation as children are the future of the nation's prosperity.[3]

The practices of children in the form of improved choice for good quality and perfect quantity of foods consumed is important. Inclusion of more vegetables and fruits in the diet, improved physical activity and reduction in television viewing time are also of important and urgent need.

According to Monde (2011) a KAP survey means Knowledge, Attitude and Practices. To properly carry out this type of survey it is important to establish a basic premise and provide definitions for each word.[4]

Materials and Methods

Framing of Schedule for KAP (10 questions on knowledge, attitude and practice of yes/No). Real time questions were framed on nutrition practices. Score card were used to evaluate KAP twice, both pre and post intervention, in order to measure the impact of nutrition education. The validated KAP questionnaire was distributed to all the mothers and teachers, at the beginning of the study and explained about the questions included.

Results

The socio-economic status as depicted in Table 1 revealed that majority (90.79 %) of the adolescents were non vegetarian. A higher percentage (76.96) of adolescents were from nuclear family. It was further observed that a higher percentage (24.88) of fathers were high school educated and about 23.98 per cent had technical qualification.

Table 1: Distribution of adolescents according to demographic profile

Demographic variable	Category	Frequency	Percentage
Age	13–14 yrs	96	44.24
	15–16 yrs	65	29.95
	17–18 yrs	56	25.81
Type of Family	Nuclear Family	167	76.96
	Joint Family	38	17.51
	Extended Family	12	5.53
Dietary Pattern	Vegetarian	20	9.21
	Non Vegetarian	197	90.79
Religion	Hindu	170	78.34
	Muslim	11	05.06
	Christian	33	15.22
	Others	3	01.38
Father's Education	Illiterate	27	12.44
	Primary School Certificate	42	19.35
	Middle School Certificate	42	19.35
	High School Certificate	54	24.88
	Diploma/Technical	52	23.98
Family Income per month	₹2690–5700	24	11.06
	₹5701–8800	44	20.28
	₹8801–10800	54	24.88
	₹10801–15700	73	33.65
	₹>15700	22	10.13
Monthly food expenditure	₹501–780	16	07.37
	₹781–1200	32	14.75
	₹1201–1400	54	24.88
	₹1401–1600	58	26.73
	₹>1600	57	26.27

Family educational level and socioeconomic status have a marked effect on children's lifestyles and dietary habits.[5]

Adolescents

Improvement in knowledge was seen in terms of nutrient content of foods, daily food and nutrient requirements, types of foods needed by the body, quantity of foods consumed, ill effects of junk foods, health and hygiene aspects. The improvement in attitude was seen in terms of preference for nutritious foods compared to junk foods, consumption of more vegetables and fruits and in the choice of suitable recreational activities. The practices of adolescents in the form of improved choice for good quality and perfect quantity of foods consumed, inclusion of more vegetables and fruits in the diet and improved physical activity. Nutrition councelling is an effective tool of changing the food habits without affecting their sentiments.[6]

Table 2: Mean percentage scores KAP obtained by the selected adolescents.

Criteria	Before	After	*t*-value
Knowledge	63.21 ± 18.97	89.76 ± 11.21	51.12 < 0.0001
Attitude	58.46 ± 16.34	71.15 ± 24.12	18.48 < 0.0001
Practices	28.91 ± 14.25	8.31 ± 22.12	79.65 < 0.0001

Teachers

The knowledge of the teachers on the physical growth of children, deficiency symptoms, nutrient requirements, sanitation of the environment and personal hygiene of children showed a marked improvement after counseling.

The attitude of the teachers in deciding to supervise the food habits of adolescents.[7] The practices of talking to students about good food habits, stressing on the habit of eating vegetables and fruits among the adolescents, monitoring their height and weight, deficiencies, if any and enhancing their sanitary practices in the form of proper sanitary training and hand washing showed marked improvement which was found to be statistically significant

Table 3: Mean percentage scores KAP obtained by the Teachers

Criteria	Before	After	*t* value
Knowledge	46.32 ± 16.31	81.65 ± 18.13	22.91 < 0.0001
Attitude	39.13 ± 13.97	86.71 ± 13.12	39.25 < 0.0001
Practices	38.12 ± 12.54	87.11 ± 11.12	46.21 < 0.0001

Mothers

Improvement in knowledge was found to be significant at one per cent level. Improvements in knowledge regarding food groups, nutrients required for the children, food allergies, food restrictions and food fads and fallacies improved. effective tool of changing the food habits without affecting their sentiments.[8]

Table 4: Mean percentage scores KAP obtained by the mothers

Criteria	Before	After	*t* value
Knowledge	33.34 ± 16.32	79.13 ± 16.14	31.5 < 0.0001
Attitude	28.31 ± 15.92	76.91 ± 23.11	27.4 < 0.0001
Practices	18.43 ± 14.86	79.41 ± 21.34	37.1 < 0.0001

Conclusion

Significant improvements in attitude of parents in providing breakfast for their children, inclusion of more vegetables and fruits, restricting junk foods and the importance of physical activity were observed. Parents showed a change in practices to target better health for their children by restricting usage of saturated fats, fried snacks and including more sprouted grams, salads and nuts. Better methods of cooking and reduced frequency of consumption of outside food by the families were also noticed.

Key Messages: The practices of children in the form of improved choice for good quality and perfect quantity of foods consumed is important. Inclusion of more vegetables and fruits in the diet, improved physical activity and reduction in television viewing time are also of important and urgent need.

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Original Article

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Trans: Fat in Modern Diet

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Abstract

Trans fatty acids are unsaturated fatty acids with minimal of one non-conjugated double bond in the trans-configuration. Industrially produced trans-fatty acids (TFA) and ruminant TFAs are the major sources in modern junk foods. Evidence from experimental studies, dietary trials, and prospective observational studies in which TFAs are measured by biomarkers or dietary records consistently shows that intake of TFAs can increase low-density lipoprotein levels and decrease high-density lipoprotein cholesterol levels which is an associative factor in coronary heart disease. Denmark by banning the sale of food items with TFA has brought down the number of deaths due to coronary heart disease by nearly 50% over a period of 20 years. Creating Public awareness about the adverse effects of TFA on human health will be extremely important in this modern world. Nutrition education and awareness towards food labeling and sale of low TFA food items would help the reinforcement of traditional diets to the younger population over processed foods.

Keywords: Trans fatty acids; Coronary heart disease; Low density lipoproteins; Processed foods.

Introduction

Replacement of traditional diets with pre-packed, processed and ready-to-eat energy dense foods with low nutritional quality reflects the increase in consumption of sugar and hydrogenated fats. Trans fatty acids are produced either by hydrogenation of unsaturated oils or by bio-hydrogenation in the stomach of ruminant animals. Industrially produced TFAs and ruminant TFAs are the major sources of trans fats (T-fat) in foods. TFAs are commonly thought to be of industrially produced trans-fats. However, TFAs are found naturally in foods as well. These are commonly known as ruminant trans-fats.[1] Daily food ingredients such as vanaspati and margarine have high contents of TFA. These foods are usually prepared in partially hydrogenated vegetables oils that are the predominant sources of trans- fat in diets globally. The invention of fat hydrogenation leading to trans fat was considered as a major technical breakthrough. Food industry enthusiastically accepted the mass production of a convenient form of artificially modified fat which has a long shelf-life. As vegetable oil is prone to oxygen-induced rancidity, hydrogenated fat in the form of margarine was promoted because the solid fat is easier to store for a prolonged period. Because, margarines did not contain cholesterol, over the decades, enormous amounts of hydrogenated fat were fed to the world populations, claiming one side of the health benefit. People were led to believe that margarine is healthier than butter. But, critical research, documented the health risk of hydrogenated fat and now it has become the need

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of the hour to save thousands of lives at risk of developing non-communicable diseases.

Global Scenario

Excessive TFA intake is a health threat in high-income countries as well as in middle and low income countries. In developed countries like United States and Canada the dietary intakes of TFAs were more than twice the WHO-recommended limit of 1% of energy intake per day. In India, the recent survey data from National Sample Survey Organization and National Nutrition Monitoring Bureau indicates an increase in fat intakes from Partially Hydrogenated Vegetables Oils for fat intake reported as 47.9 g per capita per day in urban areas in the year 2009–10 as compared to 42.0 g in the year 1993–94 on national average. The Global Burden of Diseases Nutrition and Chronic Diseases Expert Group and application of the Pareto principle on the available data, states that 15 countries account for approximately 80% of the total number of Coronary heart disease deaths attributable to high intake of TFAs globally.[2] (Fig .1)

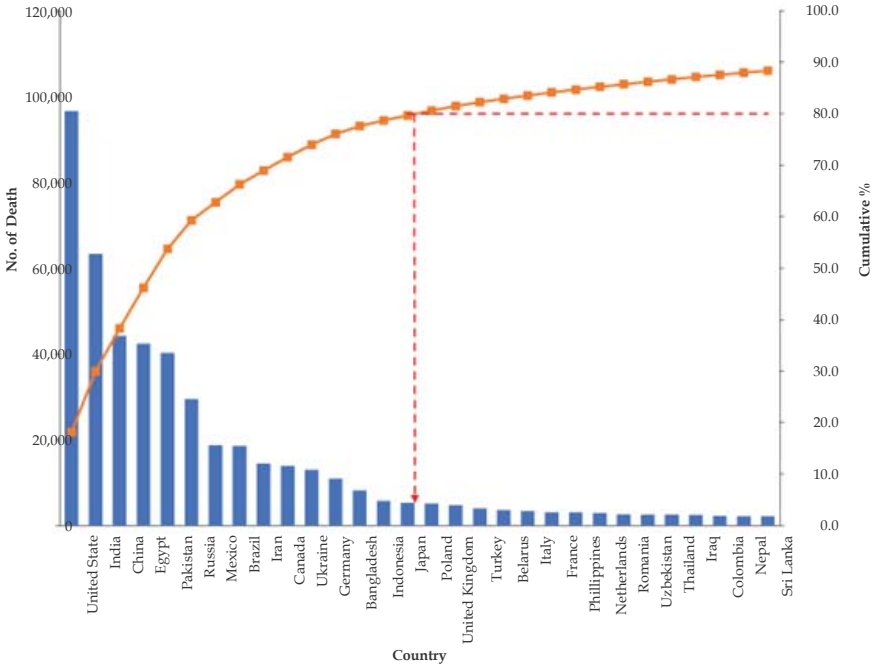

Fig. 1: Global Scenario

Fats and Trans-Fats

Reducing the amount of total fat intake to less than 30% of total energy intake helps to prevent unhealthy weight gain in adult population.[3] Also, the risk of developing Non Communicable Diseases is lowered by:

- reducing saturated fats to less than 10% of total energy intake in a day;
- reducing *trans*-fats to less than 1% of total energy intake in a day ; and
- replacing both saturated fats and *trans*-fats with unsaturated fats – in particular, polyunsaturated fats

Trans-fats and processed foods

A major change in nutritional understanding of fat came when the health risk of T-fat is made known. In 2015, the US-Food and Drug Administration finalized its decision that T-fat is not safe and set a three-yeartime limit for complete removal of T-fat from all processed foods. It initiated steps in US towards mandatory food labelling which declares a statement on T-fat that-' product contains no trans-fat'. Additionally, removing T-fat in products like pie crust, brownies, peanut butter and microwave popcorn also adds health benefits. The ban on T-fat has to mean absolutely *zero trans-fat*. Margarine, vanaspati ghee, bakery and frying fats and vegetable shortenings are obtained through industrial hydrogenation which contains significant amounts of TFA. In USA it is estimatedto be 2–3 energy percent, while in Middle East and South Asia, it could be as high as 7 energy percent.In South Asian countries, vanaspati is the major source of TFA. In India, vanaspati usually contains as high as 40–50% TFA.[4]

Dietary approach to reduce trans-fat intake

The consumption of trans-fat could be reduced to a minimum level by:

1. Substitution of vanaspathi, butter, lard and ghee with natural plant oils oils rich in polyunsaturated fats, such as soybean, canola (rapeseed), corn, safflower and sunflower oils.
2. Edible oil should contain minimal amount of TFA to at least WHO recommended levels (<4%).
3. Frying has been found to result into theformation of TFA. Therefore deep-fried fooditems are likely to contain high contents of TFA. And hence forth, the adoption of gentle-frying, steaming or boiling of food will reduce TFA formation in food items. This would be an effective process of preparing healthy foods in our homes.
4. Repeated use of cooking oil leads to increased TFA contents in the oil. As the hydrogenated vegetable oils are high in TFA and these would further increase the TFA content in the used oil after repeated frying. Therefore, repeated use of heated oil should be avoided to reduce the ill effects.
5. Limit the consumption of fried, baked foods, pre-packaged snacks and foods like doughnuts, cakes, pies, cookies, biscuits and wafers which contains industrially-produced *trans*-fats.[5]
6. Recent research has indicated that high intake ofdairy saturated fat is associated with decreased risk of CVD. Therefore the use of saturated fat from dairy sources instead of TFA containing oils is an healthy option.[6]
7. Consumers' awareness and education about the adverse effects of TFA is the most important initiative to avoid TFA rich food items.

WHO in elimination of Trans-fats

The World Health Organization project for elimination of industrially produced trans-fatty acids from the global food supply by 2023 through launching the REPLACE (review, promote, legislate, assess, create, enforce) on May 2018. Its action is to provide a strategic guidance for all countries to take action toward the goal of elimination of industrially produced trans-fats by 2023. The Health Assembly approved the 13th General Programme of Work, which will guide the work of WHO in 2019–2023.[7] It has the goal of reduction of salt/sodium intake and elimination of industrially-produced trans-fats from the food supply.

Conclusion

Food industry has to adapt the dramatic change in removing T-fat from their production lines. Scientific evidence is firmly stating the best interest of public health by removing the T-fat from the processed foods. Studies also show that reducing the intake of TFA from 6 gm to 1 gm per day helps to decrease the number of deaths due to coronary diseases. Awareness about the ill effects of T-fat will create public alert in terms of bringing back the traditional foods in modern diet.

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Climate Change and Childhood Malnutrition

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Abstract

Malnutrition is the single biggest contributor of morbidity and mortality among children throughout the world. In the recent times the problem of child malnutrition has been further exacerbated by climate change. Therefore an attempt has been made to study the possible effects of climate change on child malnutrition. The study has been carried out by collecting secondary data from different books, journals and internet. The present study revealed a clear and alarming link between climate change and child malnutrition especially undernutrition.

Keywords: Climate change; Malnutrition; Children; Morbidity; Mortality.

Introduction

Malnutrition is a challenge to the health and productivity of populations, particularly in low- and middle-income countries. Over one third of the global annual 6.9 million deaths of children under age 5 years were attributable to undernutrition, either directly or via their increased susceptibility to succumb to other diseases (Horton et al., 2010; FAO, 2009). Although the proportion of malnourished children has decreased globally, particularly in China and other middle income countries, progress has been uneven and slow in sub- Saharan Africa and India. Moreover, there is evidence that climate change will slow this secular decrease, and it is projected that a world with a medium-high climate change will have an additional 25.2 million malnourished children than would the counterfactual world without climate change (SUN, 2010). According to the World Health Organization (WHO) (Black et al., 2008) and the fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2014), malnutrition is viewed as one of the five largest adverse health impacts of climate change (Nabarro, 2010; Bloem et al., 2010).

Malnutrition refers to both undernutrition (underweight, wasting, and stunting) and overnutrition (overweight and obesity) as well as to micronutrient deficiencies that may occur in both groups.

Our particular concern is stunting (height-for-age being 2 or more SD below the international median value in well-nourished children). In 2011, an estimated 165 million children under age 5 years were stunted worldwide. In Africa more than 36% of the children under 5 years of age are stunted (Easterling, 2007) with a relative increases in severe stunting of 31–55% in West sub Saharan Africa and 61% in South Asia, making it an impending epidemic (Tirado et al., 2013). Undernutrition is a primary cause of ill health and premature mortality among children in developing countries. In 2018,

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wasting continued to threaten the lives of an estimated 7.3 percent or 49 million children under 5 globally (UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates, 2019).

Undernutrition remains one of the world's most serious but least addressed socioeconomic and health problems (Horton et al., 2010; FAO, 2009; SUN, 201), hitting the poorest the hardest, especially women and children. The number of people suffering from hunger stood at 925 million in 2010, and maternal and child undernutrition persists (FAO, 2009; SUN, 2010; Black et al., 2008). In developing countries, nearly one-third of children are underweight or stunted, and undernutrition is the cause of more than one-third of deaths among children under 5 years of age (Horton et al., 2010; SUN, 2010; Black et al., 2008). Undernutrition, including micronutrient deficiencies, also referred to as "hidden hunger," is caused by inadequate dietary intake and disease, which in turn stem from food insecurity, poor maternal and child care practices, and inadequate access to clean drinking water and safe food, sanitation, and quality health services. The human and socioeconomic costs of undernutrition are enormous, falling hardest on the poorest, especially on women and children (Horton et al., 2010; FAO, 2009). Undernutrition interacts with infectious disease, causing an estimated 3.5 million preventable maternal and child deaths annually (SUN, 2010; Black et al., 2008). The millions of people who have experienced undernutrition early in life tend to face many challenges as they grow up (FAO, 2009). They encounter increased risks of illness, experience difficulties at school, and are often not able to make a full contribution to the social and economic development of their households, communities, and nations when they become adults (Nabarro, 2010). Undernutrition during the critical stages of fetal development and early childhood is very often the beginning of a vicious cycle of negative feedbacks, leading very often to social and economic vulnerabilities later in life, particularly in women, which then perpetuate undernutrition in the next generation. The resulting impacts in terms of lost national productivity and economic growth are huge. Recent food and economic crises and economic downturn have magnified the problems (Horton et al., 2010; SUN, 2010; Bloem, 2010). International and national nutrition stakeholders are now stepping up to address this urgent challenge, including through building up a global movement for Scaling Up Nutrition (SUN) actions at the country level (SUN, 2010). It is important to note here that the largest burden of current undernutrition is attributed to calorie insufficiency caused by lack of food intake.

Table 1: Number (in millions) of undernourished children under age 5 yrs in 2000 and 2050 using the National Center for Atmospheric Research climate model and the A2 scenario.

Region*	No. of undernourished children under age 5 yrs, in millions			Additional no. of children under nourished because of climate change, 2000–2050
	2000, base climate	2050		
		Without climate change	With climate change	
Sub-Saharan Africa	32.7	41.7	52.2	10.5
South Asia	75.6	52.3	59.1	6.8
East Asia/Pacific	23.8	10.1	14.5	4.4
Latin America & Caribbean	7.7	5.0	6.4	1.4
Middle East/North Africa	3.5	1.1	2.1	1.0
Europe and Central Asia	4.1	2.7	3.7	1.0
Total	147.9	113.3	138.5	25.2

Source: Phalkey et al.,(2015)

*Developing countries only.

Climate change amplifies threats to livelihoods and food security through its direct impacts on food availability, access, quality and utilization. Global crop production is expected to decline due to the projected decrease of staple food yield6, leading to negative impacts on availability of food, and farmers' incomes. Consequently, the structural rise and volatility of staple food prices will highly constrain food access for the poorest. Every year climate change is responsible for 4,00,000 annual

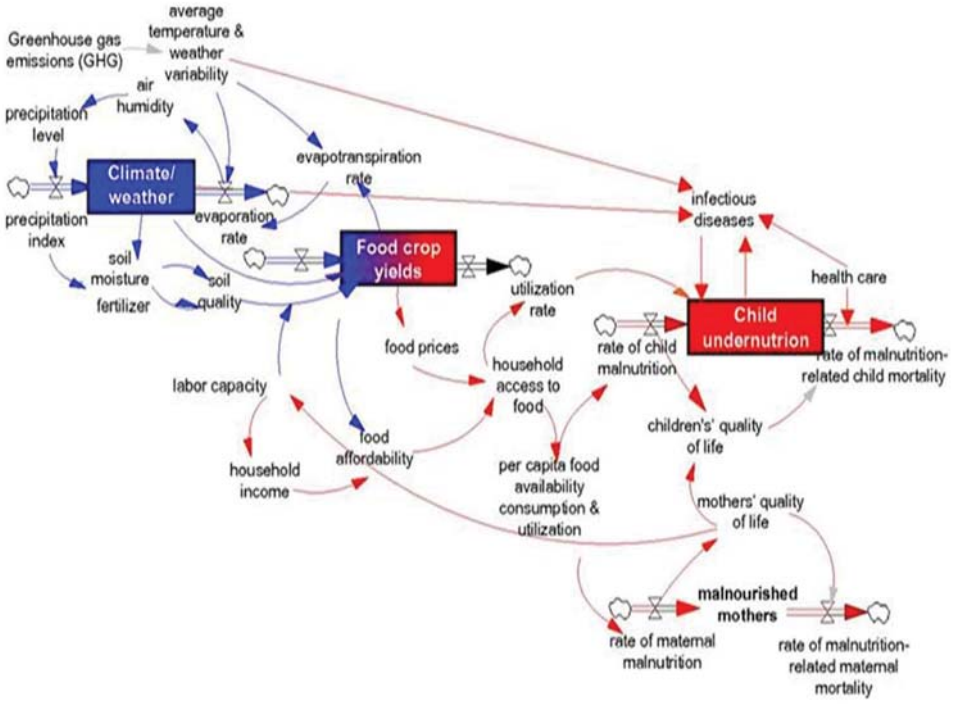

Fig. 1: Complex pathways from climate/weather variability to undernutrition in subsistence farming households (Phalkey et al., 2015).

deaths, mostly due to hunger that affect above all children in developing countries (DARA, 2012). Climate change increases the overall risk of hunger and undernutrition (Easterling 2007; WFP, 2009), and challenges the realization of the human rights to health and adequate food (UN, 2013; Caesens, 2009). Climate change is already affecting nutrition security through different causal pathways that impact food security, livelihoods, household food access, maternal and child care, health, water and sanitation, and many socioeconomic factors that determine nutrition security. Crop-yield variation induced by climate change has been suggested as one of the potential mechanisms leading to malnutrition (USNCN, 2010). This is particularly worrying, since children are especially vulnerable to environmental adversities because of their greater exposure, greater sensitivity to certain exposures and dependence on care givers (Shekhar, 2006; FAO, 2001). For this reason, increased weather variability predicted by climatic models is expected to lead to a rise in the health risks of this age group, associated with more frequent extremes such as droughts and floods (Shekhar, 2006; FAO, 2009). Climate change also reduces the nutritional value of staple crops thereby increasing the prevalence and spread of diseases. This is closely related to malnutrition in poor communities. Because of high rainfall, the fertility for the corn is not good, and it means that the plants get unhealthy to the point where they die. If the corn dies, it also means that the people will have a difficult economic situation. Livestock are also affected by the changing climate (both by gradual change and by the sudden impact of natural disasters) (UNICEF, 2013). Mongolia is highly dependent on pastoralism for sustaining livelihoods. The pastoral livestock sector engages more than half the population and provides food (meat and milk) and fibre to the majority of the population. Livestock rearing and crop production, as well as the grasslands and water resources on which they depend, areparticularly vulnerable to droughts and dzud (extreme snow) events. Because of climatechange areas unfavourable to grazing are expected to increase to 65–70 percent by 2050 and to 70–90 percent by 2080 (UNICEF, 2011). Some plant species are growing one to two months later as a result of declining precipitation, while others are growing with fewer leaves or at a reduced size. High-nutrient plants have also declined by 1.5–2.3 times since 1940 (UN, 2012). A study by UNDP after the 2010 dzud found that of 32,500 small subsistence-level herders (owning fewer than 250 animals) in the 14 worst-affected regions, 17 percent reported experiencing a shortage of food for daily consumption due to a lack of cash to buy food, resulting in hunger. The large number of livestock deaths (8.5 million) prevented families from selling

milk, meat and cashmere fur for income. Families reported using cash for children's school supplies on food for the household. The implication is that even a small risk of increased droughts and effects to livestock as a result of climate change and the knock-on effects related to poor nutrition (UNICEF, 2013).

Alderman et al. (2010) noted that exposure to drought in the first 5 y of life may contribute to a decline in mean height of 1% of the median reference in Tanzania. Woldehanna et al. (2010) also found that prenatal exposure to drought had a significant and negative effect on stunting, particularly in rural areas (−0.200, $p < 0.01$) in Ethiopia, indicating regional variations in the effect. Children in flooded households in India were most likely to be stunted and underweight but not wasted (FAO, 2009). Early exposure also was rated as a higher risk. In contrast, Stewart et al. (2008) did not observe a significant difference in the anthropometric measurements of children from inside or outside the embankment for the degree of flood damage in Bangladesh, even in the postharvest season. They report that other factors such as landlessness and maternal education were significantly associated with anthropometry. However, Wright et al. (2001) did not observe seasonality as a determinant of underweight children in Zimbabwe. They instead noted geographic factors, diarrhea, poor household food access, and increased workload for women during the weeding and harvest seasons as the main contributors. Changes in weather averages, climate variability, and extreme weather events (particularly floods and droughts) determine the quantity, quality, and stability of crop yields (Porter et al., 2005). The steady rise in the world population, food wastage, and increasing diversion of cereal crops to feed livestock will put an additional strain on food systems. Climate change is likely to reduce agricultural production and affect more than 30% of the farmers in developing countries that already are food insecure (Lobell et al., 2008). Both Asia and Africa are projected to experience continuing decreases in per capita food availability from these negative productivity impacts (Neison et al., 2010; Knok et al., 2012). Although economic growth may help offset some of these pressures, declining per capita harvested area affects per capita food production and therefore creates a deficit in per capita calorie availability (hence leading to undernutrition). The impacts are borne disproportionately by smallholder subsistence farming households, as already noted in parts of Africa (Brown et al., 2008; Bernstein et al., 2011).

Skoufias et al. (2012) assessed the growing degree days (GDD) for crops instead of the ambient

temperature and observed that positive GDD (8°C to 32°C) during previous wet season or in the 2 year before the survey had insignificant impacts on children's nutrition status. Mueller et al. (1999) reported that in Papua New Guinea none of the environmental or agricultural factors were significant predictors of underweight children, and the socioeconomic status was the most important factor determining children's growth (1990). In contrast, no association was noted between household variables and children's weight in Swaziland (1994).

Recent data (Climate Change Vulnerability Index 2013) showed that the poorest people already suffering from the highest rates of undernutrition will be the most vulnerable to climate change. Vulnerability will increase with climate change: exposure to climate change-related effects and dependence on climate-sensitive resources will rise, as adaptive capacity (Parry et al., 2007) decreases. They rely on small-scale rain-fed farming systems and agricultural labour as their main source of food and income, making them highly dependent on climate-sensitive natural resources. Climate change is increasingly and simultaneously eroding their livelihoods assets and access to natural resources and services, while at the same time eroding their capacity to cope with climate-related crises, and adopt sustainable solutions to climate change. The hungry poor, especially women and children, are already the main victims of the changing climate. They live in areas that are prone to weather- and climate-related disasters. Indeed, when facing a disaster, people have no choice but to resort to negative coping strategies (reduction of food intake, sale of productive assets etc. (Reaching Out to Women When Disaster Strikes, 2008) that hinder their resilience, increase their vulnerability to climate threats, and exacerbate their food and nutritional security. Under nutrition undermines the ability and capacity of vulnerable populations to implement resilient climate coping strategies. Food insecure people are the hardest hit by climate change: they require increased attention.

Effects of climate change have already irreversibly affected many populations and their livelihoods. This is why the international community needs to dramatically invest resources in creating adaptive strategies for the poorest, specifically to guarantee sustainable access to sufficient and nutritious food, drinking water, and natural resources in order to thrive. (ACF-International, 2012).

Summary and Conclusion

Assessing the pathways through which climate change impacts undernutrition is, without doubt, a complex and daunting challenge but is one that must be addressed. The impact of climate/

weather variability on crop yields has been documented and widely acknowledged, as have the direct impacts of crop yields on childhood undernutrition, especially acute undernutrition. Current evidence, although limited, does suggest a strong link between weather variables and childhood stunting. Understanding and quantifying associations between climate variability, crop yields, and childhood undernutrition, ideally at both the macro and the micro levels, is necessary. Documenting these associations systematically over the next years, even "with associated uncertainties," may help generate more realistic estimates for the future and therefore should be done (Phalkey et al., 2015).

Also, there is an urgent and immediate need to apply resources to fight against undernutrition and help the most vulnerable build their resilience to the changing environment. Increased funding for nutrition-specific and nutrition-sensitive programs is more urgent than ever. Climate change mitigation should remain a high priority. We cannot yet figure out what the consequences of a +4°C world would be. Even if major mitigation efforts are made, the most at-risk populations will suffer from the climate change impacts and will have no choice but adapting. But adaptation to climate change is costly. Governments and donors should urgently increase their financial and technical support toward adaptation in least developed countries, as currently, financial contributions remain insufficient to meet adaptation needs. The further the delay, the higher the price will be: economically, environmentally, and socially. Immediate additional public funding is required in order to support the adaptative strategies of the world's poorest to climate change (AICF International, 2012).

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Review Article

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Nutrimental and Ethnomedicinal Potential Plants of the Qur'an: An Overview - IV

TP Mall

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Abstract

Our ancient literatures of Hindus', Muslims as well as of Cristian's are full of plants described about their nutrimental and medicinal potential. A significant number of plants described in their texts are still unidentified because of least or no interest in plant taxonomy among neither grate scientists in well-developed different organisations nor respected teachers of Universities or Colleges of repute. We can say with confidence that there are no teachers who can teach Plant Taxonomy in significant numbers of academic institutions. A man of Biotechnology can do nothing if he/she cannot identify the plant on which the work has to be worked out. As a result, due to non-identification of plants we cannot use our wealth of knowledge which has been provided by our ancestors present in form of scripts. We were presented a book written by Dr. M.I.H. Farooqi entitled "Quruani Poudhe-Vagayanic Dhristi Se" while in Seminar organised by UP Biodiversity Board, Lucknow. We found that there are seventy-one plants being reported in Holy Qur'an and Bible. We have consulted the literatures available as well as the tribal of Bahraich about the uses of the plants available. The perusal of the alphabetical list of plants of Holy Qur'an reveals that there are 71 plant species representing 48 genera of 30 families. Brassicaceae, Cucurbitaceae and Moraceae family were found to be the biggest family represented by 6 plant species each whereas Caesalpiniaceae, Papilionoideae and Poaceae with 5 plant species each; Rosaceae and Rhamnaceae with 4 plant apecies; Mimosaceae, Liliaceae, Pinaceae, Euphorbiaceae, Oleaceae, Lytharaceae, Lamiaceae and Arecaceae with 2 plant species and rest fourteen species viz., Malvaceae, Asclepidiaceae, Lauraceae, Bixaceae, Dipterocarpaceae, Juglandaceae, Cuprassaceae, Lecnoraceae, Loranthaceae, Anacardiaceae, Sterculiaceae, Ericaceae, Salvadoraceae, and Vitaceae is being represented by single plant species each.

Keywords: Ethnobotanical; Ethnomedicinal; Potential; Plants; Qur'an.

Introduction

Herbal Medicine is the oldest form of medicine known to mankind. It was the mainstay of many early civilizations and still the most widely practiced form of medicine in the world today,

Ethnobotany is one of the most interesting themes of economic botany which might have first of all came into the existence probably when earliest man of "stone age" observed the animals mostly the apes and monkeys eating certain plants or plant parts ex. Fruits, leaves and even inflorescences to satisfy their hunger. Therefore, on the basis of plants usage first of all by animals and later on by the human beings the concepts of Ethnobotany and Ethnozoology were evolved, which merged into a common term known as Ethnobiology. However, the term Ethnobotany was first of all used in the last of 19th century by J. W. Harsh Berger (1895) to indicate the interrelationship of plants with aboriginal people or tribal societies

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[Trivedi and Sharma, 2011]. In many parts of the world, wild plants are obtained from forests or wild areas designated for extractive resources and managed by local communities [Jadhav et al., 2011]. Wild edible plants provide food quantity as well as medicines [Patale et al., 2015].

India is one of the twelve mega-biodiversity countries of the World having rich vegetation with a wide variety of plants. As per the 2001 census, the tribal population of India is 8.43 crore, constituting 8.2% of total population of the country [Annual Report, 2005–2006]. With enormously diversified ethnic groups and rich biological resources, India represents one of the great emporia of ethnobotanical wealth [Pal, 2000]. Even today, trial's and certain local communities in India still collecting and preserving locally available wild and cultivated plant species for their day today life [Mahishi et al., 2005 and Ayyanar et al., 2010].

We were presented a book written by Dr. M.I.H. Farooqientitled "QuruaniPoudhe-VagayanicDhristi Se" while in Seminar organised by UP Biodiversity Board, Lucknow. We found that there are seventy-one plants being reported in Holy Qur'an and Bible. We have consulted the literatures available as well as the tribal of Bahraich about the uses of the plants available. The perusal of the alphabetical list of plants of Holy Qur'an reveals that there are 71 plant species representing 48 genera of 30 families. Brassicaceae, Cucurbitaceae and Moraceae family were found to be the biggest family represented by 6 plant species each whereas Caesalpiniaceae, Papilionoideae and Poaceae with 5 plant species each; Rosaceae and Rhamnaceae with 4 plant apecies; Mimosaceae, Liliaceae, Pinaceae, Euphorbiaceae, Oleaceae, Lytharaceae, Lamiaceae and Arecaceae with 2 plant species and rest fourteen species viz., Malvaceae, Asclepidiaceae, Lauraceae, Bixaceae, Dipterocarpaceae, Juglandaceae, Cuprassaceae, Lecnoraceae, Loranthaceae, Anacardiaceae, Sterculiaceae, Ericaceae, Salvadoraceae, and Vitaceae is being represented by single plant species each. We have enumerated five plants viz., *Acacia nilotica, Acacia senegal, Acacia seyal, Alhgimaurorum* and *Allium cepa* in detail in first part and eight plants *viz., Allium sativum, Astragaluhadscendens, Bombax ceiba, Brassica arabica, Brassica juncea, Brassica nigra, Brassica rapa* and *Brassica schimperi* in second part of the manuscript. and in third part of the manuscript we have enumerated seven plants *viz., Butea monosperma, Calotropis gigantean, Cedruslibani, Cedrusdeodara, Ceratonia siliqua, Cinnamomumcamphora* and *Citrullus colocunthis.* In the present fourth part we are enumerating eight plants viz., *Cochlospermum religiosum, Cucumis melo, Cucumis utilisimus, Cucurbita pepo, Cydonia vulgaris, Dryobalamops aromaticum, Euphorbia resinifera* and *Ficus benghalensis.* The present review is an attempt to compile most of the information available regarding the distribution, cultivation, phytochemical characteristics, Ayurvedic properties, ethno-pharmacological, medicinal and non-medicinal uses of the plants.

Eneumerations

Cochlospermum religiosum (Linn.) Alston Butter cup tree, silk-cotton tree (Bixaceae):

Commmon names

Buttercup tree, Yellow silk cotton tree, Golden silk cotton tree, Karita • Hindi: Galgal • Marathi: Ganeri • Tamil: Kattupparutti • Konkani: Kondagogu • Bengali: Sonali simul • Kannada: Arasinaburuga • Malayalam: Cempanni • Telugu: Konda gogu

Synonyms

Bombax gossypium, Cochlospermum gossypium, Maximilianea gossypium

Buttercup tree is native to India, Burma and Thailand. It is a small tree growing upto 7.5 m. The bark is smooth and pale grey. It is sparsely clothed with leaves and sheds them at the height of the flowering season. The leaves appear at the tips of the branches and are palmately lobed. The flowers of the Buttercup tree are the most conspicuous part of the tree. They are large, growing upto about 10 cm, buttercup shaped and bright yellow. The stamens are orange. The flowering season is between February and April, particularly after the leaves are shed. The fruits are brown and oval shaped. They come in the form of a capsule made up of five segments. The capsule splits open to release the seeds which are embedded in the silky cotton contained within. This silky cotton is said to induce sleep when stuffed into pillows. The botanical name has the following meaning - *Cochlospermum* because the seed resembles a snail. *religiosum* because the flowers are used as temple offerings.

It is also known as silk-cotton tree because the capsules containing the seeds have a fluffy cotton-like substance similar to kapok [USDA]. Another common name is buttercup tree because its yellow and bright flowers look like large-sized buttercups[Flowers of India].

In Theravada Buddhism, this plant is said to have used as the tree for achieved enlightenment, or Bodhi by nineteenth Lord Buddha called "Siddhaththa". The plant is known as Kinihiriyaa in Sinhala, and Kanikaara in Sanskrit.

The habitat is Cultivated ground [Flora Malesiana Series 1]. Dry forests, especially on stony hills[Chopra et al., 1986]. The plant succeeds well in a well-drained but moisture-retentive soil and a sunny position [Huxley, 1992]. Plants can flower and fruit all year round [Flora Malesiana Series 1].

Ethnobotanical Potential

The oil cakes from the pressed seed can be eaten [Flora Malesiana Series 1].

The insoluble gum obtained from the plant can be used as a substitute for tragacanthin when making ice cream [Facciola, 1998].

An oil is obtained from the seed [Flora Malesiana Series 1; Dodge, 1897].

The source of an insoluble gum that can be used as a substitute for gum tragacanthin [Uphof, 195946].

It occurs in irregular, rounded, translucent clumps of a pale bluff colour [Uphof, 1959].

Gum tragacanthin, obtained from several *Astragalus* spp, has a wide range of uses including in cosmetics, calico printing, confectionary, medicinally as a suspending medium for insoluble medicines etc [Uphof, 1959].

The seeds possess a short but very soft and elastic floss [Dodge, 1897]. This floss is much too short to be of any service as a textile but, along with the flosses of *Bombax malabaricum*, *Eriodendronan fractuosum* and *Calotropis gigantea*, it has been classed as a 'silk cotton'. In some parts of India, the floss of this tree is collected and used for stuffing pillows, for which purpose it would seem better suited than the floss from *Bombax malabaricum*, since it is not so liable to get matted [Dodge, 1897]. The floss is said to induce sleep when stuffed into pillows [Flowers of India]. It might also be found serviceable as a gun cotton [Dodge, 1897].

The wood is extremely soft[Flora Malesiana Series 1].

Ethnomedicinal Potential

The gum obtained from this plant is sweetish, cooling and sedative [Chopra et al., 1986].

It is used in the treatment of coughs and gonorrhoea [Chopra et al., 1986].

The dried leaves and flowers are stimulant [Chopra et al., 1986].

Cucumismelo Linn. Kharbuza, Melon, Muskmelon (Cucurbitaceae):

Common names

Melon, Muskmelon, Cantaloupe, Honeydew, Sweet melon, Dudaim melon, Queen Anne's melon, Armenian cucumber, Snake cucumber, Wild melon, Orange melon, Pickling melon, Serpent melon, Snap melon, Round melon, Casaba, Winter melon, Melão (Portuguese), Kharbuz/Kharbuza (Pakistan), Tian gua (Pinyin, China) [Reznicek et al., 2011;Tropicos.org, 2013; USDA, NRCS. 2013; Plants for A Future, 1996-2012].

Cucumis melo is an annual trailing vine with pubescent striated stems, lacking stipules, bearing unbranched tendrils at the base of the 4–12 cm long petioles. The leaves are simple and alternate, nearly round, basally cordate, and may have 3–7 shallow palmate lobes. The blades are 6–15 cm both broad and long (occasionally up to 20 cm), undulate-dentate, with pointed hairs on both sides, and palmate venation [de Melo et al., 2000]. Melons use their tendrils to climb over structures or other vegetation (Lu and Jeffrey, 2011)

The melon fruit is a fleshy berry that is round to ellipsoid, hairy during its early development, and smooth to reticulate at maturity. Melons are highly variable in colour, showing shades of yellow, green, orange, white, and often mottled or striped; the flesh is also variable and usually yellow, orange, pink, white, or green. Melons weigh 0.4–2.2 kg, bear many seeds and can taste and smell sweet, or not [Reznicek et al., 2011; Grubben, 2004; Lu and Jeffrey, 2011].

The smooth seeds are elliptic and flattened, 0.5–1.2 cm long × 0.2–0.7 cm broad; they germinate epigealy. The seeds are rich in lipids, protein, and contain 24 fatty acids (Grubben, 2004; de Melo et al., 2000).

The fruits are consumed by animals, such as birds, that spread the seeds; the seeds also can be transported by water. Due to the agricultural importance of melons, much of the dispersal is attributed to escapes [Sebastian et al., 2010; Schaefer et al., 2009].

Ethnobotanical Potential

The fruit is widely consumed for its juice and flesh,

and can be dried and made into a powder for cooking and future use [Chittendon, 1951; Hedrick, 1972; Uphof., 1959; Tanaka and Nakao, 1976].

Edible oil can be extracted from the seeds.

Very watery but with a delicate flavour, it is very refreshing. Rich in vitamins B and C [Allardice,1993].

The flesh of the fruit can be dried, ground into a powder and used with cereals when making bread, biscuits etc [Moerman, 1998].

The size of the fruit varies widely between cultivars but is up to 10 cm long and 7 cm wide [Huxley, 1992].

Seed consumed raw [Schery, 1954; Organ,1963; Tanaka and Nakao,1976].

Rich in oil with a nutty flavour but very fiddly to use because the seed is small and covered with a fibrous coat [Fern, 2014].

The seed contains between 12.5 - 39.1% oil [Duke and Ayensu, 1985].

An edible oil is obtained from the seed [Tanaka and Nakao, 1976; Facciola, 1990].

Agroforestry Uses

Grows well with corn and sunflowers but dislikes potatoes [Riotte, 1978;Allardice, 1993].

The weeds fat hen and sow thistle improve the growth and cropping of melons [Allardice, 1993].

Other Uses

The seed oil is used as a humectant and skin conditioner in commercial cosmetic preparations [Cos Ing Publications].

Ethnomedicinal Potential:

The flowers are expectorant and induce vomiting.

The fruits are used medicinally to promote skin hydration, to treat light burns and scrapes, and as a stomach tonic.

The seeds are cough suppressant, fever reducer, and a digestive aid.

A seed powder is mixed with water and used as a vermifuge.

The roots are diuretic and induce vomiting. *Cucumis melo* seedlings are toxic [Plants for A Future, 1996-2012].

An extract from melon has anti-inflammatory and antioxidant properties [Vouldoukis et al., 2004].

The fruits can be used as a cooling light cleanser or moisturiser for the skin [Allardice,1993].

They are also used as a first aid treatment for burns and abrasions [Allardice,1993].

The flowers are expectorant and emetic[Duke and Ayensu, 1985].

The fruit is stomachic [Dukeand Ayensu, 1985].

The seed is antitussive, digestive, febrifuge and vermifuge [Dukeand Ayensu, 1985].

When used as a vermifuge, the whole seed complete with the seed coat is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purge in order to expel the tapeworms or other parasites from the body [Chiej, 1984].

The root is diuretic and emetic [Duke and Ayensu,1985].

The leaves are used to treat scrotal hernias [De Filipps et al., 2004].

Cucumis utilissimus Roxb. Karkati., Kȧnkur, Beng, Kakri (Cucurbitaceae):

Fl. Ind. (ed. Carey) 3: 720. 1832.

Cucumis utilissimus Roxb. Sans is a synonym of *Cucumis melo* Linn. It is also as *Cucumis melo* L. var. *utilissimus* (Roxb.) Duthie & Fuller.

The seeds of this useful species of *Cucumis* are described as cooling, edible, nutritive and diuretic, and are used in painful micturition and suppression of urine. Two drachms of the seeds rubbed into a pulp with water, are given alone or in combination with salt and kȧnjika.

The seeds of *Cucumis sativa*, (Sans. Trapusha, Trapusha. Vern. Khira, Hind.) and of *Benincasa cerifera* (Sans. Kushmȧnda.) are also used as diuretics like those of *Cucumis utilissimus*.

Cucurbita pepo Linn. Pumpkin, Field pumpkin, Courgette (Cucurbitaceae):

Common Names:

Pumpkin, Field pumpkin • Hindi: Safed kaddu, Kumrha • Manipuri: Mairen • Marathi: Kohala, Bhopli • Tamil: Parangi • Malayalam: Kumpalam, Kumpalanna • Telugu: Budadegummadi, Budidegummadi, • Kannada: Bude-kumbala-kayi, Bileegumbala, Boodugumbala • Bengali: Safed kaddu, Lanka • Sanskrit: Karkaru, Kkurkaru, Kurlaru, Kkushmanda • Oriya: Kakharu

Synonyms:

Citrullus variegatus M. Roem., *Cucumis pepo* (L.) Dumort., *Cucumis zapallo* Steud., *Cucurbita aurantia* Willd., *Cucurbita ceratoceras* Haberle ex Mart., *Cucurbita clodiensis* Nocca, *Cucurbita courgero* Ser., *Cucurbita elongata* Bean ex Schrad., *Cucurbita esculenta* Gray *Cucurbita fastuosa* Salisb., *Cucurbita grisea* M. Roem., *Cucurbita hybrida* Bertol. ex Naudin, *Cucurbita lignosa* Mill., *Cucurbita mammeata* Molina, *Cucurbita mammosa* Gmel., *Cucurbita marsupiiformis* Haberle ex Roem., *Cucurbita melopepo* Linn., *Cucurbita oblonga* Link., *Cucurbita polymorpha* Duchesne, *Cucurbita pomiformis* Roem., *Cucurbita pyridaris* Duchesne ex Poir., *Cucurbita pyxidaris* DC., *Cucurbita subverrucosa* Willd., *Cucurbita succado* Nägeli ex Naudin, *Cucurbita succedo* Arn., *Cucurbita tuberculosa* Schrad., *Cucurbita urnigera* Schrad., *Cucurbita variegata* Steud., *Cucurbita venosa* Descourt., *Cucurbita verrucosa* Linn., *Pepo citrullus* Sageret, *Pepo potiron* Sageret, *Pepo vulgaris* Moench.

Pumpkin is a creeping plant which is creeping or semi-shrubby, annual, velvet-hairy. Broadly ovate-heartshaped to triangular-heartshaped leaves, 20–30 cm long, 20–35 cm broad, are often with three to five deep lobes, and with toothed margins. Tendrils have two to six branchlets, or are simple and little developed tendrils in the semi-shrubby types. The plant has solitary, flowers borne in leaf axils. The male flowers have stalks 7–20 cm long, a bell-shaped sepal cup of 9–12 mm, linear sepals 1.2–2.5 cm long. Flowers are tubular/bell-shaped, 5–10 cm long, which are divided into five petals for up to one-third or more of its length. Flowers have three stamens. The female flowers have sturdy stalks, 2–5 cm long. the ovary is round, ovoid, cylindrical, smooth, and the sepal cup is very small. The fruit is very variable in size and shape. It is smooth to heavily ribbed, with a rigid skin varying in colour from light to dark green, plain to minutely speckled with cream or green contrasting with yellow, orange or two-coloured. The flesh is cream to yellowish or pale orange. It ranges from soft and not bitter to fibrous and bitter, has numerous seeds which are narrowly or broadly elliptical or rarely circular, slightly flattened and 3–20 × 4–12 mm.

The plant is widely cultivated in temperate and tropical zones, mainly for its edible fruit but also for its leaves, seed, oil and medicinal uses. In the tropics, it tends to grow better at elevations of 500 mor more [Tindall, 1983]. The sprouting seeds produces a toxic substance in its embryo[Frohne and Pfänder, 1984].

Ethnobotanical Potential

Fruit are cooked and consumed [Hedrick, 1972; Vilmorin-Andrieux, 1985;Uphof, 1959;Tanaka and Nakao, 1976].

Used as a vegetable, it has a very mild flavour and is very watery [Fern, 2014].

It is often harvested when still very young when it is called courgettes. The fruit has very little flavour of its own and so is often used as a base for making savoury dishes, the seeds being scooped out of the fruit and a filling being put in its place - this can then be baked [Fern, 2014].

A nutritional analysis is available [Duke and Ayensu, 1985].

Seed consumed raw or cooked [Shrey, 1954; Organ, 1963; Facciola, 1990].

The seed can also be ground into a powder and mixed with cereals for making bread etc[Facciola, 1990].

Rich in oil with a pleasant nutty flavour but very fiddly to use because the seed is small and covered with a fibrous coat [Fern, 2014].

The seeds can also be sprouted and used in salads etc[Facciola, 1990].

An edible oil is obtained from the seed [Uphof, 1959; Tanaka and Nakao, 1976; Facciola, 1990].

Leaves and young stems cooked as a potherb [The Plantsman, 1986; Facciola, 1990].

Flowers and flower buds cooked or dried for later use [The Plantsman, 1986; Facciola, 1990].

Root are cooked and consumed [Reid, 1977] but Fern, 2014 had reported some doubts on this report [Fern, 2014].

The seed contains 34–54% of a semi-drying oil. It can be used for lighting [Uphof, 1959; Protabase].

Ethnomedicinal Potential

The pumpkin has been much used as a medicine in Central and North America. It is a gentle and safe remedy for a number of complaints, especially as an effective tapeworm remover for children and pregnant women for whom stronger acting and toxic remedies are unsuitable [Chevallier, 1996].

The seeds are mildly diuretic and vermifuge [Chiej, 1984; RHS. 1987; Chevallier, 1996].

The complete seed, together with the husk, is used to remove tapeworms. The seed is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purgative

afterwards in order to expel the tapeworms or other parasites from the body [Chiej, 1984]. As a remedy for internal parasites, the seeds are less potent than the root of *Dryopteris felix-mas*, but they are safer for pregnant women, debilitated patients and children [Bown, 1995]. The seed is used to treat hypertrophy of the prostate [Duke and Ayensu, 1985]. The seed is high in zinc and has been used successfully in the early stages of prostate problems [Chevallier, 1996]. The diuretic action has been used in the treatment of nephritis and other problems of the urinary system [Chevallier, 1996].

The leaves are applied externally to burns [Chopraet al., 1986]. The sap of the plant and the pulp of the fruit can also be used [Chevallier, 1996].

The fruit pulp is used as a decoction to relieve intestinal inflammation [Chevallier, 1996].

Cydonia vulgaris Pers. Amritphal, Bihi (Rosaceae):

Common Names

Sanskrit Amritphala; Hindi Bihi; Tamil Shimaimathala; Telugu Simadanimma; Kannada Simedalimbe; Kashmir Bamsutu, Bam-tsuntu

Cydonia vulgaris Pers. and *Pyrus cydonia* Linn. are a synonym of *Cydonia oblonga* Mill.

Cydonia vulgaris Pers. is the cultivated and economically important species of genus *Cydonia*. *Cydonia vulgaris* Pers. (*Cydonia oblonga* Miller) is a small shrub belonging to the family Rosaceae and is a native to Southwest Europe and Minor Asia. The plant is commonly called Quince. There are three varieties of the tree namely *Cydonia vulgaris* Pyriformis, *Cydonia vulgaris* Maliformis and *Cydonia vulgaris* Lusitanica.

It is a small tree with bright golden yellow pome fruits, when mature. The bark is smooth and brown approaching to black. The leaves are roundish or ovate, dusky green above and whitish underneath. The fruit of *C. vulgaris* Pers., known as Quince, resembles an apple, but differs in having manyseeds in each carpel. The fruits are globular, oblong or pear-shaped form of rich yellow or orangecoloured when ripe of an austere taste and emitting a peculiar and pleasant smell [Browne, 1804; Wallis, 2005]. The seedscalled bihidana, are in great use medicinally, and highly valued as demulcent tonic. It mainlygrows in Europe, Persia, Afghanistan, in India it grows in Kashmir in Himalayan valley [Browne, 1804; Kapoor, 2002].

The quince prefers a moist but free soil near water and a situation rather opened but sheltered. In dry soils neither the tree nor the fruits attain the large size, and in situation exposed to high wind the fruit is liable to fall before mature. The finest specimen of quince-trees in Britain are said to be found in old orchards adjoining ponds; it being customary formerly to plant a quince-tree in every apple orchard.

The quince may be as readily propagated from seeds as the apple and pear, but the quickest mode of raising plants is by layers. It will also grow by cuttings, planted in autumn in moist sandy soil.

The trees when planted as standards should be situated about ten feet apart and once set out, require but little attention, beyond that of removing suckers from the roots and side shoots from the main stems. To have the fruit of large size the head of the tree should be kept open by thinning out the shoots; and the fruit ought also to be thinned out, leaving no more on the treethan it can well mature. The tree is of moderately rapid growth, when young, acquiring in four or five years, a height of six or eight feet, and in ten or twelve years it attains an elevation of fifteen feet after which it continues to increase chiefly in the width of its head [Browne, 1804].

Quince seeds are ovoid and flattened, about 5 to 10 mm long, 2 to 5 mm. wide and 2 mm thick. The two larger flattened surfaces meet in a straight acute edge on one side and are united by a strongly arched rounded surface on the other side. They frequently adhere to one another in small irregular masses, being usually arranged in two more or less regular rows, and cemented together by dry mucilage, which is visible in the form of whitish flakes on the surface of the seeds. This mucilage is derived from the cells of the epidermis of the seed-coat. The seeds are pointed at one end, where the hilum appears as a minute paler spot, and are obtuse at the distal or chalazal end; the raphe is evident as a paler line extending from the hilum along the acute ridge to the chalaza. Within the mahogany-brown testa is a very narrow endosperm surrounding a straight embryo composed of two piano-convex whitish cotyledons and a small radical. The kernel possesses a taste resembling that of bitter almonds but much fainter. The seed-coats, when chewed are mucilaginous constituents. The seeds contain about 15% of fixed oil in the cotyledons together with proteins and probably a small amount of amygdaline and emulsion, which yield the odour and taste resembling that of bitter almond when they are crushed with water [Wallis, 2005].

The *Cydonia vulgaris* is commonly medicinally used as demulcent, in treatment of asthma. Other usages of the plant are as a source of flavour in marmalade, liqueur, candies, brandy, jelly and preserves [Patel et al., 2011].

Chemical Constituents

The powerful and characteristic odour of Quince fruit has attracted considerable attention as asource of flavour in recent years, particularly appreciated in marmalades, candies, fruits, sweets and brandy.

Two ionone glycosides, *β*-D gentiobioside and *β*-D glucopyranoside of (3R), 3-hydroxy-βionone along with 2,7-dimethyl-8 hydroxy-4(E), 6(E)-octadienoic acid and its diol have beenisolated from the fruit. The aglycone, 3-hydroxy- *β* ionone yields a number of volatile C13 norisoterpenoid degradation products, including (E) – 3, 4-dihydro- *β* ionone and 1, 1, 6 – trimethyl– 1, 2 – dihydronaphthalene. The presence of C15 – carotenoid metabolites, (S) – abscisic alcohol, trans abscisic alcohol – *β* – D-glucopyranoside and (4R, 1'E, 3'E)- 4 (5'- hydroxy-3'methyl -1',3' – pentadienyl) 3, 5, 5 – trimethyl – 2- cyclohexen – 1 – one – *β* – D glucopyranoside together with trace amount of C12 – terpenoids, viz. quince oxepine and quince oxepines' (Cisand Trans) is also reported in fruits. Besides, mamelon oxide having a strong, characteristic quince dour is reported in fruits [Guldner and Winterhalter, 1991; Lutz, 1992, 1993; Escher and Niclass, 1991].

The nor-isoprenoids contribute to overall flavour impression of the fruit. The juice from ripefruits contains C13 nor-isoprenoids, viz. 3-hydroxy – and 4- hydroxy – *β*- ionols, 3 – hydroxy–7,8 – dihydro – *β* ionol, 3 – oxo – α – ionol, 4 – oxo – *β* – ionol, 3 – hydroxy – 4 – hydroxy – and 5 -6 – dihydroxy – *β* ionones, vomifoliol, dehydrovomifoliol and 7, 8 – dihydro vomifoliol together with (2S, 5S)- (-) and (2S, 5R) – (+) – theaspirones. The presence of 4 – hydroxy – 7, 8– dihydro – *β* ionol, a natural precursor of theaspirins which are widely used in flavourindustry, is also reported in quince fruit juice. Theaspirins are not present in original volatiles but are formed at natural pH of the fruit pulp i.e. in acidic conditions (pH 3.5 – 3.8) from a labileprecursor. The industrially quince quince fruit constituents are found to be vitispiranes, bicycle [4.3.0] nonane derivatives, 3, 4 didehydro – *β* – ionol, metastigma – 4, 6, 8 – trine – 3 – ones andtheaspirones. [Winterhalter and Schreier, 1988; Herion et al., 1993].

A number of ionone – related compounds have been reported in quince essential oil. They arenot original volatiles of fruit but are formed during technological processes such as heating degradation of acid labile and non-volatile precursor compounds. The major important C13 –norisoterpenoids formed on the heat treatment at normal pH (pH 3.5) of the quince juice are; 2,2, 6, 7 – tetramethyl bicycle [4.3.0] nona – 4,7, 9 (1) – triene, 3, 4 – didehydro – *β* – ionol and 2,2, 6, 7 – tetramethyl bicycle [4.3.0] nona – 4, 9 (1) – dien – 8 – ol. The natural precursor of thesecompounds has been characterised as 3 – hydroxy – *β* – ionol – *β* – D – gentiobioside. [Winterhalter et al., 1991]

The fruit juice (pH 3.0) from Japan contained glucose, 1.98; fructose, 454; sucrose, 0.91; malicacid, 1.29; polyphenol, 0.59%; besides vitamin C, 29; calcium, 350.0; pectin, 175.8 ppm. A juicesample from Poland was similar to citrus juice in the level of monosaccharides (1.90% vs. 1.82%), total sugars (2.06% vs. 1.96%), protein (0.56% vs. 0.47%), pectin (0.32% vs. 0.32%) and thiamine (0.035% vs. 0.044%). It has a higher content of ascorbic acid, *β*- carotene, and phenoliccompounds but lower percentage of citric acid. However, as compared to pomegranate and grapefruit juices, it contains higher percentage of citric acid, pectin, ascorbic acid, phenols and mineralelements. The fruit paste can be used as a partial substituent for sugars in pastries. Vinegar with good flavour can be prepared from the fruit juice. The fruit pectin (yield 0.53% fresh weight) issimilar to that of apple. It has high galacturonic acid content (6.78%) [Anonymous, 1990].

In Greece, a tea prepared by boiling dry seeds in water is given in cystitis. The kernel oil is usedfor massage. The major water-soluble polysaccharide in mucilage of seeds has been identified asa partially O – acetylated (4 – O – methyl – D – glucorono) – D – xylan having a proportion of glucoronic acid residues [Malamas and Murselos, 1992; Lindburg et al., 1990]

Quince seeds contains 3*β*-(18-hydroxylinoleoyl) -28 hydroxyurs -12-ene, 3*β*-linoleoylurs- 12-en28-oicacid, 3*β*-oleoyl-24-hydroxy-24 ethylcholesta-5, 28 (29)-diene, tiglic acid 1-O- *β*-Dglucopyranoside and 6, 9- dihydroxymegastigmasta-5, 7-dien-3-one 9-O-b-D-gentiobioside. [Alesianiet al., 2010] (2E, 4E)-2, 7-Dimethyloctadiene-1, 8-diol, (2E, 4E, 7Z)-2, 7 dimethyldecatriene-l, lO-diol and (4E, 6E)- 2, 7-dimethyl 8 hydroxyoctadienoic acid, three acyclic precursors of the marmelooxides, of the marmelolactones and of quince oxepine respectively, as well as three acyclic Cl0 compounds ((3E)-2, 7 dimethyloctene-1, X-diol, (2E, 4E)-2, 7. Dimethyl 8 hydroxyoctadienoicacid and (2E, 4E)-2, 7- dimethyloctadienedioic acid) were isolated

from the glycosidic fraction of quince fruit (*Cydonia oblonga* Miller). Quince brandy contains a number of mixed acetals ofaliphatic and aromatic aldehydes, C13 nor-isoterpenoids, substituted C12 hydro oxipenes andmarmelo oxide derivatives. [Regula and Velluz, 1991]

The isolation of four new flavanol glycosides and nine new R-ionolderived glycosides togetherwith the known 3-oxo-α-ionol 9-O-*β*-D-apiofuranosyl-(1→6)-*β*-Dglucopyranoside, vomifoliol 9-O-*β*-D-glucopyranoside (roseoside), and vomifoliol 9-O-*β*-Dapiofuranosyl- (1→6)-*β*-Dglucopyranoside from the MeOH extract of the aerial parts of *C. vulgaris* Pers. [Tommasi et al., 1996a].

The CHCl3-MeOH extract of *Cydonia vulgaris* Pers. was shown to contain four new sisterterpene esters, namely 24, 25-O-diacetylvulgaroside, 25-O-acetylvulgaroside, 24-O-acetyl 25-O-cinnamoylvulgaroside, and 25-O-cinnamoylvulgaroside [Tommasi et al., 1996b].

Quince leaves presented a common organic acid profile, composed of six constituents: oxalic, citric, malic, quinic, shikimic and fumaric acids. [Oliverire et al., 2008]

Ethnobotanical Potential

Quince fruit is recognized as a good, cheap and important dietary source of health-promoting compounds, due to its biologically active constituents which are characterized by their antioxidant, antimicrobial and anti-ulcerative properties [Garcia-Alonso, 2004; Hamauzuet al., 2005, 2006; Silva et al., 2004; Wang et al., 2006; Yildirim, 2006; Fattouch et al., 2007 and Olivera et al., 2010]. It has protective effect against oxidative haemolysis of human erythrocytes [Magalhaes et al., 2009]

Pomes of Quince, known in Italy as 'cotogna' apple, have hard flesh of high flavour, but very acid, and these are largely used for marmalade, liqueur, jelly and preserves [Wallis, 2005].

Ethnomedicinal Potential

It has been reported that the leaves and fruits of Quince have some positive effects in the medical treatment of various conditions, including cardiovascular diseases, haemorrhoids, bronchial asthma, and cough.

Quince seed mucilage has a wound healing activity [Hemmati et al., 2010].

Cydonia oblonga Miller leaves have been used, after decoction or infusion, in folk medicine for their sedative, antipyretic, anti-diarrheic and antitussive properties and for the treatment of various skin diseases [Magalhaeset al., 2009].

Dryobalanops aromatica Gaertn. Sumatran camphor, Malay camphor (Dipterocarpaceae):

Synonyms:

Dipterocarpus dryobalanops Steud., *Dipterocarpus teres* Steud., *Dryobalanops camphora* Colebr., *Dryobalanops junghuhnii* Becc., *Dryobalanops sumatrensis* (Gmel.) Kosterm., *Dryobalanops vriesii* Becc, *Pterigium teres* Corrêa, *Shoreac amphorifera* Roxb.

Dryobalanops aromatica, commonly known as Borneo camphor, camphor tree, Malay camphor, or Sumatran camphor, [Sumatra Camphor, 2009] is a species of plant in the Dipterocarpaceae family. The species name aromatica is derived from Latin (aromaticus = spice-like) and refers to the smell of the dammar (resin). This species was one of the main sources of camphor and attracted early Arab traders to Borneo, at that time being worth more than gold, and used for incense and perfumes [Ashton, 2004]

It is found in Sumatra, Peninsular Malaysia and Borneo.

It is a large emergent tree, up to 65 m [Ashton, 2004] or even 75 m [Carder, 2005] tall, found in mixed dipterocarp forests on deep humid yellow sandy soils. It is a heavy hardwood sold under the trade names of Kapur. It is recorded from at least two protected areas (Lambir and Gunung Mulu National Parks).

The tree is classified as critically endangered in the IUCN Red List of Threatened Species(2009), with only small subpopulations of the species having been found in forest reserves [IUCN Red List of Threatened Species Publication].

Bergenin, malaysianol A, laevifonol, ampelopsin E, α-viniferin, ε-viniferin and diptoindonesin A can be isolated from the stem bark of *D. aromatica* [Wibowo et al., 2011].

Dryobalanops aromatica is one of several tree species known to exhibit a behaviour called crown shyness.

Habitat

Undisturbed mixed dipterocarp forests at elevations up to 300 m [Trees of Sungai Wain]. Usually found growing on hillsides and ridges with sandy soils

[Trees of Sungai Wain]. In secondary forests it is usually present as a pre-disturbance remnant tree [Trees of Sungai Wain].

The plant is propagated through seeds.

Ethnobotanical Potential

Young trees produce a clear yellow, aromatic liquid, known as 'oil of camphor' [Bown, 1995].

This sometimes crystallises in cavities in the trunks of older specimens to form true camphor [Bown, 1995].

An essential oil is obtained from the camphor. It is used in perfumes with a camphoraceous note [Bown, 1995].

The heartwood is reddish brown to pinkish brown; it is clearly demarcated from the 4–8 cm wide band of whitish to yellowish brown sapwood. The texture is medium; the grain straight or interlocked; there is a strong camphor-like smell when freshly cut. The wood is moderately heavy; soft to moderately hard; moderately durable, being resistant to fungi and dry wood borers, and moderately resistant to termites. It seasons slowly with only a slight risk of checking or distortion; once dry it is stable in service. The wood has a fairly high blunting effect, satellite-tipped and tungsten carbide tools are recommended; it splits easily; nailing and screwing are good, but require pre-boring; gluing is correct, though resin exudation can cause problems. It is used for a wide range of applications including house construction, bridges, boards, heavy carpentry, joinery, panelling, turnery, tool handles, boxes and crates [Uphof, 1959; Chudnoff, 1984; Tropix-7, 2017]**.**

Ethnomedicinal Potential

Borneo camphor has a long history of medicinal use, both the aromatic liquid known as 'oil of camphor' and the crystallised exudate, or true camphor, being employed. A bitter, pungent, stimulant herb, it is analgesic, antibacterial, anti-inflammatory, anti-spasmodic and febrifuge [Bown, 1995].

It is used internally to treat conditions such as fainting; convulsions associated with high fever; cholera and pneumonia [Bown, 1995].

It is used externally to treat a range of skin conditions, including ulcers, mouth ulcers, abscesses, boils, cold sores and ringworm [Bown, 1995].

It is also used to treat rheumatism, sore throats, chest infections and conjunctivitis [Bown, 1995].

In aromatherapy, it is used both internally and externally as an antiseptic, sedative and tonic for the heart and adrenal cortex [Bown, 1995].

It is particularly valued for skin problems, rheumatism, infectious diseases, depression and convalescence[Bown, 1995].

Euphorbia resinifera Berger Resin spurge (Euphorbiaceae):

Accepted name in llifle Database: *Euphorbia resinifera* f. monstruosa hort. [Llifle-Encyclopediaof Succulents].

Common names

Resin Spurge, Moroccan Mound, Moroccan Mound Spurge, Moroccan Ground Spurge, Officinal Spurge, Spurge, Poisonous Gum-Thistle, Farbiyun, Euphorbium, Euphorbe, Euforbium, African Spurge, Gum euphorbia

Synonym

Euphorbia resinifera Berg in Berg & Schmidt, *Euphorbia officinarum, Tithymalus resiniferus* (Berg) Karst., *Euphorbia resinifera* var. *chlorosoma* Croizat, *Euphorbia resinifera f. compacta* hort., *Euphorbia resinifera* var. *typica* Croizat, *Euphorbia sansalvador* Hort. ex Jacobsen

This is probably the oldest known succulent plant of all, having been discovered by an eastern king about 25BC, and may have been the plant which was originally named Euphorbia[Llifle-Encyclopedia of Succulents].

Euphorbia resinifera, the resin spurge, is a species of spurge native to Morocco, where it occurs on the slopes of the Atlas Mountains. The dried latex of the plant was used in ancient medicine. It contains resiniferatoxin, a capsaicin analog tested as an analgesic since 1997.

It is a shrub growing to 61cm tall, forming multi-stemmed cushion-shaped clumps up to 2 m wide andevergreen, stiff, mounding, interesting, dry. The stems are erect, succulent, superficially like a cactus, four-angled, with short but sharp pairs of 6mm spines on the angles, spaced about 1 cm apart up the stem[Huxley, 1992]. Xeric textural accent sub-shrub often used as a specimen, containers.

A dense, slow growing succulent shrub growing to 2 to 2.5 feet tall, forming multi-stemmed cushion-shaped clumps up to 5 feet wide.

Generally leafless, stems photosynthetic, dull

green to glaucous, four-sided, stem ridges armed with short white spines; medium coarse texture.

Flowers & fruits: The flowers are small, simple, and bright yellow, and the fruit a small capsule with one seed in each cell. Flowering is rare out of its native rang

Euphorbia resinifera is a species of spurge native to Morocco, where it occurs on the slopes of the Atlas Mountains [Huxley, 1992]. It is similar to its relative *Euphorbia echinus*, which occurs on the Moroccan coast and the Canary Islands. Due to its origin it is also called the African spurge.

Stem cuttings (resin spurge branches profusely and stem segments are readily available). Allow stem segments (propagules) to dry for a week before planting so the wound can seal. Unsealed cuttings, planted too soon, will easily rot before they can grow roots. Before drying, washing the stem segment to remove the latex is highly recommended.

Chemical constituents

Euphorbia resinifera contains a milky fluid or latex, which in its dried form is called Euphorbium. It has high concentration of resiniferatoxin, an analog of capsaicin, the primary vanilloid compound found in hot peppers. It can interact with a vanilloid receptor on primary sensory neurons mediating pain (nociception) and neurogenic inflammation. The pain sensing cation channel is TRPV1 [Appendino and Szallasi, 1997]. Resiniferatoxin has been used as a starting point in the development of a novel class of analgesics. Desensitization to topical resiniferatoxin has been tested in clinical trials to evaluate its potential to relieve neuropathic pain, as in diabetic polyneuropathy and postherpetic neuralgia [Appendino and Szallasi, 1997] resiniferatoxin injected subcutaneously into a rat hind paw several minutes before a surgical incision reduced postsurgical pain for 10 days in a NIH study published March 2018 [Stephen et al., 2018]. It has been tested to treat pain with advanced cancer [NIDCR, 2008].

Resiniferatoxin was isolated in 1975 [Appendino and Szallasi, 1997]. Euphorbium has been used since at least its first written record from the time of Roman Emperor Augustus[Appendino and Szallasi, 1997]

Ethnomedicinal Potential

Euphorbia resinifera is widely used by the local population of Berber community to treat cysts. Moreover, it was also used in Moroccan traditional medicines to treat various diseases. It might possess laxative, anti-inflammatory, hypoglycemic as well as anti-tumour activity [Lahlou et al., 2014].

This plant has poison characteristics.

All parts of the plant are poisonous.

Poison Delivery Mode is through Dermatitis.

Symptoms: Nausea, vomiting, diarrhoea when ingested; redness, swelling, blisters after some delay following contact with skin.

Toxic Principle: Diterpene esters in milky latex Severity causes only low toxicity ifeaten. The skin irritation is minor orlasting only for a few minutes.

Found in: Houseplant or interiors cape[NC state University].

The chemical is so hot that it destroys nerve endingsin a Good Way [https://www.wired.com/story/resiniferatoxin/].

Ficus benghalensis Linn., Banyan, Bargad (Maraceae):

Synonyms

Ficus benghalensis var. *krishnae* (CDC)Corner, *Ficus chauvieri* G. Nicholson, *Ficus cotoneifolia* Vahl, *Ficus cotonifolia* Stokes, *Ficus crassinervia* Kunth & Bouché, *Ficus karet* Baill., *Ficus lancifolia* Moench, *Ficus lasiophylla* Link, *Ficus procera* Salisb., *Ficus pubescens* Heyne ex Roth., *Ficus umbrosa* Salisb., *Perula benghalensis* Raf., *Urostigma benghalense* (L.) Gasp., *Urostigma crassirameum* Miq., *Urostigma procerum* Miq., *Urostigma pseudorubrum* Miq., *Urostigma rubescens* Miq., *Urostigma sundaicum* Miq., *Urostigma tjiela* Miq. [The Plant List, Ficus benghalensis].

Banyan is a type of strangling fig native to India and Pakistan. Known in Hindu mythology as 'the wish-fulfilling tree', banyans represent eternal life.

Native to India and Pakistan, banyan is a type of strangling fig. The plant begins life growing on other trees and eventually envelops them completely. Aerial roots hang down from the branches and these eventually become trunks. This circle of trunks deriving from one original tree can reach an enormous size - 200 m in diameter and 30m in height.

Their welcome shade has made them important gathering places. Known in Hindu mythology as

'the wish-fulfilling tree', banyans represent eternal life.

Tree, often very large, up to 30 m tall, with many aerial roots which can develop into new trunks so that the tree goes on spreading laterally indefinitely; a single tree can thus cover a very wide area.

The leaves are leathery, entire, ovate or elliptic, 20–40 cm long with prominent lateral veins.

Fruits of the figs are 1 to 2 cm in diameter, without stalks, in pairs in leaf axils, and when ripe are bright red.

Ficus benghalensis, commonly known as the banyan, banyan fig and Indian banyan, [GRIN, 2016] is a tree native to the Indian Subcontinent. Specimens in India are among the largest trees in the world by canopy coverage.

Ficus benghalensis is the national tree of India [National Tree, 2019]. The tree is considered sacred in India [Simoons, 1998] and temples are often built beneath. Due to the large size of the tree's canopy it provides useful shade in hot climates.

In Theravada Buddhism, this tree is said to have been used as the tree for achieved enlightenment, or Bodhi by the twenty fourth Buddha called "Kassapa". The sacred plant is known as "Nuga" or "Mahanuga" in Sri Lanka [Bali, 2019].

The giant banyans of India are the largest trees in the world by area of canopy coverage. Multiple individual trees have achieved notoriety: Thimmamma Marrimanu; Kabirvad; The Great Banyan

The largest, known specimen of tree in the world in terms of the two-dimensional area covered by its canopy is Thimmamma Marrimanu in Andhra Pradesh, India, which covers 19,107 square metres. This tree is also the largest, known specimen of tree in the world in terms of the length of its perimeter, which measures 846 metres [Bar-Ness, 2010].

Nearchus, an admiral of Alexander the Great, described a large specimen on the banks of the Narmada River in contemporary Bharuch, Gujarat, India; he may have described the specimen presently named "Kabirvad". The canopy of the specimen which Niarchos described was so extensive that it sheltered 7,000 men. James Forbes later described it in his Oriental Memoirs (1813–5) as almost 610 m in circumference and having more than 3,000 trunks [Wikisource, 1911]. Currently the area of its canopy is 17,520 square metres with a perimeter of 641 metres [Bar-Ness, 2010].

Other notable Indian specimens include The Great Banyan in the Jagadish Chandra Bose Botanic Garden in Shibpur, Howrah, which has a canopy area of 18,918 square metres and is about 250 years old, and Dodda Aladha Mara in Kettohalli, Karnataka, which has a canopy area of 12,000 square metres and is about 400 years old.

Monsoon and rain forests [New Crops Fact Sheet]. Evergreen to deciduous lowland forest [PROSEA].

Ethnobotanical Potential

Banyan fruits can be eaten fresh or dried, and the young leaves and shoots are also eaten as famine food.

Fibre from the bark is used for making paper and ropes.

The tree is sacred to Hindus and Buddhists in India and is frequently planted around temples. Being a majestic ornamental tree, it is also planted in parks and along streets in the tropics. In temperate climates it is grown as a houseplant.

Ripe fruit consumed raw [Manandhar, 2002]. A sweetish flavour [Hedrick, 1972]. Relished by children [Manandhar, 2002]. Generally, only eaten when better foods are not available [Hedrick, 1972; Mansfield Database]

This species can be a very noxious weed in the forest, occupying a large amount of space to the exclusion of more useful species [Ecocarp]. Further, it is very destructive to any walls or buildings it grows near to and is extremely difficult to eradicate [Ecocarp].

The aerial roots are used for temporary binding materials [Manandhar, 2002].

The bark and leaves contain tannins [Mansfield Database].

The latex obtained from all parts of the plant can be used to produce an inferior quality rubber[Whistler and Arthur, 2000].

The wood is light in weight, water-resistant[Manandhar, 2002; Howard, 1934]. A low-quality wood, it is not suitable for general use, but it might be employed for secondary cabinet work, such as the linings of drawers and cabinets [Howard, 1934]. It is used locally for poles, cart yokes, furniture and to line wells [Manandhar, 2002].

Production of shellac

Banyan is used in the production of shellac, an important ingredient of French polish. Shellac

is derived from a resinous secretion called lac, produced by various insects living on the tree, the most commercially important of which is the lac insect (*Laccifer lacca*). Shellac has many industrial uses, and is an ingredient of hair lacquer. Lac dye is used in skin cosmetics.

Banyan wood is hard, and durable in water. Although considered to be of little value, it is used for furniture and house building. The wood from aerial roots is stronger and is used as poles and for cart yokes.

Ethnomedicinal Potential

Banyan has many uses in traditional medicine, for example, the milky sap is applied externally for treating pains and bruises, and is a remedy for toothache. Despite this, scientists are only now beginning to investigate the plant, for example leucocyanides, which may have potential for treating diabetes, have been isolated from the tree.

The leaves are used to remedy dysentery and diarrhoea [PROSA]. They are used in a decoction with toasted rice as a diaphoretic[Mansfield Database].

The young leaves are heated and used as a poultice [Manandhar, 2002]. They are applied to abscesses as a poultice to promote suppurations and discharge of pus [PROSA].

The concentrated latex, combined with the fruit, is aphrodisiac and is used to treat spermatorrhoea and gonorrhoea [PROSA]. Mixed with sugar, it is used as a treatment for dysentery in children [Manandhar, 2002].

The milky latex in the plant is applied topically to treat toothache, bruises, painful areas, rheumatic joints and lumbago [Manandhar, 2002; PROSA]. It is dripped into wounds in order to kill or expel germs, and is applied to treat bleeding and swelling of the gums [Manandhar, 2002].

The bark is tonic and diuretic. An infusion is antidiabetic and a decoction are used as an astringent in the treatment of leucorrhoea [PROSA].

A decoction of the root fibres is useful as a treatment against gonorrhoea, whereas the tender ends of the aerial roots are used for obstinate vomiting [PROSA].

An infusion of the twigs is a useful remedy for haemoptysis [PROSA].

The milky latex is used against pains and fever, rheumatism and lumbago, toothache, and applied to cracked and inflamed soles [PROSA].

The fruit is tonic and has a cooling effect [PROSA].

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Need of Milk Fortification and Indian Scenario

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Abstract

There is a very heavy burden of vitamins deficiency in all age groups of population particularly in urban areas because of their lifestyle as they spent more time indoors so they get less exposed to sunlight and therefore become more prone to vitamin D deficiency. The need of fortification of milk feels as an alternative of the supplementary vitamin capsules. As a component of daily diet milk is the best way to supplement with additional vitamins to overcome the effect of deficiencies. Not only vitamins milk can also be supplemented with micronutrients like Fe, Zn and folic acid. As a developing country India has a higher proportion of anaemic population and people rely on milk for their nutrients but milk is deficient in iron and cannot compensate with daily iron requirements. Therefore, government is focusing on fortification as this is cost effective and do not require complex technologies for the addition of vitamins, it just require a premix of the vitamins and added before homogenisation and pasteurisation.

Keywords: Milk; Fortification; Vitamin A; Vitamin D, Deficiency; Life style.

Introduction

Fortified milk is that milk that contains extra vitamins and minerals that are not naturally found in milk in sufficient amount (FSSAI, 2019). Mainly Vitamin A and Vitamin D fortified milk is sold in the United States. Other nutrients like Zn, Fe, and folic acid can also be added to the milk. What kinds of nutrients are used for fortification of milk that depends on the country where you live? To fortify milk with Vitamin A palmitate and Vitamin D_3 are added because these are the most active and absorbable forms of these nutrients. Because of their tolerance to pasteurisation temperature, these compounds can be added to milk before pasteurisation and homogenisation. For the fortification of milk with Vitamin A and Vitamin D fat is necessary because these are fat soluble vitamins. Iron deficiency anaemia is a common problem especially in developing countries. Therefore, milk fortified with iron helps to fight iron deficiency anaemia. In these regions, milk is often fortified with iron and other nutrients, such zinc and B vitamins. Studied conducted in Pakistan showed that folic acid fortified milk helped improve the iron status of toddlers, compared with unfortified milk. Fortification was 1st developed to prevent nutrient deficiency diseases like rickets, a weakening of bones due to Vitamin D deficiency.

Earliest attempt for food fortification was made in 4000 BC by Persian physicians, Melampus, he added iron filings to the sweet wine to strengthen

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the sailors' resistance to spears and arrows. Vitamin A was added in margarine in 1920s in Denmark. In 1924 iodine was first added to the salt on a voluntary basis in an attempt to address the prevalent health problem of goitre in United States. This initial fortification effort was followed in 1933 by the fortification of milk with Vitamin D based on recommendations of American Public Health Association, the Council on Foods and Nutrition of the American Medical Association (AMA), and the Committee on Food and Nutrition of the National Academy of Sciences. The addition of Vitamin D to milk was originally accomplished by irradiating milk or by feeding the cows irradiated yeast. This technique was replaced in 1940s by the simpler and more effective method of adding Vitamin D concentrate to milk, as is currently practiced today (Rajakumar et al., 2007)

Need of milk fortification

For over past half a century, the intake of dietary calcium, milk, milk products and cereals has declined drastically in the background of upward revision of RDA/RDI in modern India. This is attributed to changing life style, inadequate milk consumption across various socio-economic strata and shift in dietary intake from cereals to rice and wheat. The total population of India 960.5 million in 1995 went up to 1.35 billion in 2018. Due to industrialisation and introduction of machinery in the agriculture sector, agriculture became less intensive due to which there is a reduction in day-to-day energy expenditure. Due to modernization there is a sharp change in the lifestyle with long indoor working hours and changes in diet of erstwhile rural people with consumption of fast foods. Indians come under the skin class category V (dark skin) Mechanization of agriculture reduces the time spent under the sun. Due to modernization in culture, change in clothing habits, use of sunscreens of high SPF and prolonged indoor working hours leads to development of lifestyle disease i.e. hypovitaminosis D in India.

The dietary calcium deficiency (with declining dietary calcium intake in India) can lead to secondary hyperparathyroidism. This secondary hyperparathyroidism leads to increased conversion of 25(OH) D to 1, 25-dihydroxyvitamin D, thereby reducing the serum 25 OHD concentrations. The phosphaturia action of secondary hyperparathyroidism leads to low serum phosphorus and inadequate calcium phosphate ratio, resulting rickets in children and osteocalcin in adults. So, to combat this lifestyle diseases fortification of milk can be the best option. Fortified milk can also be a good alternative of the supplementary tablets of Vitamin D, calcium, iron and zinc. Also, these capsules and tablets can become toxic if consumed in large amounts. Unlike supplements milk fortification is a simple, preventive and low-cost approach to curb micronutrient deficiencies. This problem can also be overcome by the supply of fortified milk to children as a part of Integrated Child Development Scheme and mid-day meal scheme.

Indian scenario of milk fortification

But except for mandatory iodine fortification of salt, India lags in adopting milk fortification as a scalable public health intervention. This is a mis opportunity as a glass of fortified milk (320g) can provide approximately 34% of the RDA of Vitamin A and 47% of Vitamin D. In 2016, the Food Safety and Standard Authority of India released standards for the fortification of five staple food items: rice, wheat, salt, oil and milk. Further to that, regulations are now in place to fortify milk variants such as low fat, skimmed and whole milk with Vitamin A and D. Despite of its benefit effects milk fortification is not yet a common practice across the Indian Milk Industry. To cover this gap NDDB partnered with South Asia Food and Nutrition Security Initiative (SAFANSI), the World Bank and India Nutrition Initiative, Tata Trust to explore the possibilities of large-scale milk fortification in India.

The state of Jharkhand is one of the worst affected in India with acute Vitamin A and D deficiencies. Now the government of Jharkhand is pioneer in taking milk fortification. Himachal government launched fortified milk brand "Him Gauri" (with vitamin A and D) under state-run cooperative Milk fed in collaboration with TINI-Tata Trusts and NDDB. (FSSAI, 2019). Currently, 72 lakh litre per day (LLPD) of milk is being fortified by co-operative dairies and 15 LLPD by private companies in the country (FSSAI, 2018). Milk production in India, the world's largest producer 176 million tonnes (DHAD, 2017–18). Out of which, mere 22% of the milk from the organised sector is available for fortification. FSSAI has already set standards for fortification of milk and even a logo '+F' has also been launched for the same.

Fortification of milk with aloe vera

Lactobacillus bulgaricus and *Streptococcus thermophilus* are used for the preparation of yoghurt from buffalo and cow milk, with or without any additional food ingredients and permitted additives. The supernatant of fermented aloe vera with probiotic *Lactobacillus plantarum* HM218749 shows a very strong antioxidant property. The aloe fermentation supernatant can be used as functional beverage or cosmetic ingredients to guard human intestinal health, delaying aging and prevent chronic diseases (Jiang et al., 2106). There is no significant change in the pH and acidity of cultured buttermilk, prepared by fortification of aloe vera juice (5–20%). Aloe vera juice increase viscosity and reduced phase separation of the aloe vera fortified butter milk. Butter milk prepared with fortification of 10%aloe vera juice give highest sensory acceptability (Mudgil et al., 2016). Aloe vera fortified probiotic yoghurt on storage gives a reduced pH and count for Lactobacillus acidophilus and Bifidobacterium bifidum with an increased synergies effect with storage time. However, it shows good viability for the above probiotic culture (Panesar and Shinde, 2012).

Iron fortified milk

Iron deficiency anaemia affects up to two thirds of infant, children and women of a child bearing age in developing countries and up to one fifth in developed countries (Mc Lean et al., 2009). Iron fortification of commonly consumed foods may be the most effective supplementation method (Lynch, 2005). Due to widespread consumption iron enriched milk and dairy products have been proposed to be a good vehicle for iron fortification (Gaucheron, 2000). Iron fortified milk (Sazawal et al., 2010), cheese (Pizzaro et al., 2013) and yoghurt (Le porte et al., 2017) have been reported to effectively enhance iron absorption. Co-fortifying cow milk and dairy products with iron and ascorbic acid has been repeatedly reported to enhance iron absorption (Olivares, 1997). The bioavailability of iron within milk also varies significantly between species. Iron bioavailability has been reported to be higher in human milk compared to cow milk (Etcheverry et al., 2004). Goat casein micelles contain a higher proportion of β casein, the digestion products of which have been associated with augmented mucosal transport (Alferz and Lopez-Aliaga, 2006) and reduced iron mediated oxidation of milk (Smailowaska et al., 2017). Therefore, goat milk is strong candidate for iron enrichment.

The addition of ascorbic acid to either cow or goat milk significantly enhanced the iron dialysability and bioavailability compared to the ascorbic acid free milk treatment of either species. Ascorbic acid competes with iron chelators for soluble unbound iron but cannot displace iron once bound to high affinity chelators (Abbaspour et al., 2014).

Fortification of milk with phytosterols

Phytosterol lowers the cholesterol level when they are supplemented in diet. Phytosterols are a group of lipophilic steroid alcohols found in plants, have a molecular structure similar to cholesterol. The most frequently found phytosterols in nature are β-sitosterol, campesterol and stigmasterol (Langyel et al., 2012). These molecules are able to displace cholesterol during micelle formation in intestine due to their hydrophobicity, thus reducing cholesterol absorption (Calpe-Berdiel et al., 2009). Phytosterols are added in milk in oil-in-water emulsion. Phytosterols are made into a water-soluble form by emulsification can be applied in a wide range of food products. Some clinical trial results indicate that sterol-enriched milk and milk products are effective at reducing concentrations of serum cholesterol (Noakes et al., 2005; Goncalves et al., 2007; Garcia-Llatas et al., 2015). The oxidative stability of phytosterol in phytosterol- enriched dairy products was analysed by Soupas et al., (2006). They evaluated level of phytosterol oxidation products in phytosterol enriched milk powder (7% phytosterol) and heat-treated skim milk (0.4% free phytosterol, 0.5% phytosterol esters, 0.5% Phyto stanol esters) during processing and long-term storage. Phytosterol is reported to be a valuable nutraceutical substance. Since its level in the diet is low and milk is a food that is regularly used in the diet, fortification of milk with phytosterol could be used to increase dietary phytosterols. Phytosterol being a high melting substance with a poor solubility in milk, its addition is achieved through an o/w emulsion. The fortified milk can be kept for up to 7 days at refrigerator temperature without any adverse impact on the milk quality. Two servings of the fortified milk can provide almost entire daily requirement of phytosterols.

Conclusion

A quick glance is made over the need of milk fortification by keeping in view the vitamin deficiencies that have occurred due change in lifestyle. Indians need a regular supplement of fortified milk to overcome the effect of deficiencies. Indian government is also active in this field as fortification is cost effective. Keeping in mind milk is fortified with different kind of premix like with aloe vera, iron, phytosterols.

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