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A review paper on fruit nutrition and health benefits

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Abstract

The present study aimed at studying nutritional facts of fruits and its impact on betterment of health. Food packets come with labels on it stating its nutritional facts. If fruits had labels on them their nutritional facts would leave us surprised. Over last few decade people have become conscious about their health and diet. In such time, importance of fruits in nutrition and their health benefits can't be left unrecognized. Fruits are rich in vitamins, minerals and are rich source of energy. Mango and papaya are rich source of Vitamin A. Aonla, guava and citrus fruits are rich in vitamin C, while richest source for vitamin C was Barbados cherry. Walnut is the richest source of fat (64.5 per cent) and produces highest calories per unit of edible portion. Cashew nut is the richest source of protein 21.2% and thiamine 630mg/100g. Litchi is richest source of calcium and cashew nut is found rich in Vitamin-B1 (Thiamine). Dry karonda is the richest source of iron (39.1 per cent) followed by date palm (10.6 per cent).

Keywords: Blood pressure, fruits, health benefits, nutrition, vitamin

Introduction

The nutrition value of fruits places them on the crest of our edibles. Fruits contain vitamins and minerals in large quantities. Fruits are the oldest food of mankind. Taking fruits everyday strengthens our vitality. Nutrition scientists advise us to take at least 120 grams of fruit every day for balanced diet (ICMR). Fruits like papaya, mango, guava, jackfruit, pineapple, lemon, etc. abound with vitamins A, B and C. Moreover, they have calcium, magnesium, iron, and potassium. Phosphorus and amino acid abound in adequate amount in wood apple, litchi, almond etc. Rice and wheat are staple food in India. In many countries, people eat fruits as their staple food. For example: People in the South American Countries eat banana as the main course of their meal. Banana, Jackfruit, Guava, Pineapple, etc. can reduce our food deficit to a great extent.

Fruits are nature's marvelous gift to humankind; indeed, they are life-enhancing medicines packed with vitamins, minerals, antioxidants, and many phytonutrients (Plant-derived micronutrients). They are an absolute feast to our sight, not just because of their color and flavor but of their unique nutrient profile that helps the human body be fit, rejuvenate, and free of diseases. An intake of fruit every day keeps us hale and hearty (Rahman, 1998) [12]. Citrus fruits are rich in Vitamin C, while the richest source for Vitamin C was Barbados cherry. Walnut is the richest source of fat (64.5 per cent) and produces highest calories per unit of edible portion. Cashew nut is the richest source of protein 21.2 per cent and thiamine 630mg/100g. Dry Apricot is the richest source of calcium, phosphorus and niacin. Dry karonda is the richest source of iron (39.1 per cent) followed by date palm (10.6 per cent). Litchi was found rich in calcium content. Bael is the richest source of riboflavin. (Salaria, 2008) [14]. Proper nutrition promotes the optimal growth and development of children. Healthy eating helps prevent high cholesterol and high blood pressure and helps reduce the risk of developing chronic diseases such as cardiovascular disease, cancer, and diabetes. Healthy eating helps reduce one's risk for developing obesity, osteoporosis, iron deficiency, and dental caries (cavities).

A poor diet can lead to energy imbalance (e.g., eating more calories than one expends through physical activity) and can increase one's risk for overweight and obesity. (Dietary guidelines, 2010) [5]. Citrus fruits are rich in Vitamin C, while the richest source for Vitamin C was Barbados cherry. Walnut is the richest source of fat (64.5 per cent) and produces highest calories per unit of edible portion. Cashew nut is the richest source of protein 21.2 per cent and thiamine 630mg/100g. Dry Apricot is the richest source of calcium, phosphorus and niacin. Dry karonda is the richest source of iron (39.1 per cent) followed by date palm (10.6 per cent). Litchi was found rich in calcium content. Bael is the richest source of riboflavin.

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calories than one expends through physical activity) and can increase one's risk for overweight and obesity. (Dietary guidelines, 2010) [5].

A poor diet can increase the risk for lung, esophageal, stomach, colorectal, and prostate cancers (Kushi, 2006) [10]. A wide variety of nutritious food is available in the United States. However, many Americans do not eat the array of foods that will provide all needed nutrients while staying within calorie needs. In the United States, intakes of vegetables, fruits, whole grains, milk and milk products, and oils are lower than recommended. As a result, dietary intakes of several nutrients—potassium, dietary fiber, calcium, and vitamin-D are low enough to be of public health concern for both adults and children. (Byres, 2012) [3]. Fruits compose of many antioxidants such as polyphenolic flavonoids, vitamin-C, and anthocyanins. These compounds, firstly help the human body protected from oxidant stress, diseases, and cancers, and secondly; assist the body in developing the capacity to fight against these ailments by boosting our immunity level. Many fruits, when compared to vegetables and cereals, have very high anti-oxidant values, which measured regarding their "Oxygen Radical Absorbent Capacity" or (ORAC).

Nutritional Facts of Different fruits

Nutritional facts for various fruits are summarized in the table below.

Table 1: Nutritional status per 100 g edible fruits

Food Substance = 100 g.	Energy kJ/Kcal	Water %	Fibre g	Fat g	Protein g	Sugar g	Vit.A mg	Vit.C mg	Vit.B1 mg	Vit.B2 mg	Vit.B6 mg	Vit.E mg
Apple	207/49	84	2.3	0	0.4	11.8	2	15	0.02	0.01	0.05	0.5
Apricot	153/36	87	2.1	0	1.0	8.0	420	5	0.06	0.05	0.06	0.5
Avocado	523/126	81	0.2	10	2.0	7.0	20	17	0.06	0.12	0.36	3.2
Blueberry	204/48	80	8.4	0	1.0	11.0	0	10	0.02	0.03	0.05	1.9
Blackberry	170/40	85	8.7	0	2.0	8.0	30	150	0.08	0.04	0.07	1.0
Banana	375/88	76	2.7	0	1.2	20.4	3	10	0.04	0.03	0.36	0.3
Cranberry	68 /16	89	4.2	0	0.0	4.0	0	15	0.00	0.01	0.07	0
Cherry	221/52	86	1.2	0	0.0	13.0	40	10	0.02	0.02	0.04	0.1
Date	1275/300	20	7.5	0	2.0	73.0	0	0	0.05	0.10	0.10	0.7
Fig	340/80	80	2.0	0	1.0	19.0	10	3	0.06	0.05	0.11	-
Grapefruit, Red	128/30	90	1.4	0	0.9	6.6	0	40	0.07	0.02	0.03	0.5
Grapes	274/64	83	2.2	0	0.6	15.5	0	3	0.03	0.01	0.08	0.6
Guava	306/72	81	5.3	0	1.0	17.0	30	218	0.04	0.04	0.14	-
Gooseberry	170/40	88	3.2	0	1.0	9.0	0	30	0.02	0.01	0.08	0.4
Kiwi Fruit	168/40	84	2.1	0	1.1	8.8	5	70	0.01	0.02	0.12	1.9
Lemon	51/12	96	1.8	0	0.0	3.0	0	40	0.06	0.02	0.04	0.8
Lime	156/37	91	0.3	0	0.0	7.0	0	40	0.03	0.02	0.08	-
Lychee	323/76	82	1.5	0	1.0	18.0	0	39	0.05	0.05	-	-
Mandarin / Tangerine	177/42	88	1.9	0	0.9	9.5	12	30	0.08	0.03	0.084	0.4
Mango	255/60	84	1.0	0	0.0	15.0	210	53	0.05	0.06	0.13	1.0
Olive	586/142	75	4.4	14	1.0	3.0	50	0	0.03	0.08	0.00	2.0
Orange	198/47	87	1.8	0	1.0	10.6	2	49	0.07	0.03	0.06	0.1
Papaya	136/32	91	0.6	0	0.0	8.0	40	46	0.03	0.04	0.04	-
Passion Fruit	158/37	88	3.3	0.4	2.6	5.8	125	23	0.03	0.12	-	0.5
Peach	151/36	89	1.4	0	1.0	7.9	15	7	0.01	0.02	0.02	0.0
Pear	201/47	86	2.1	0	0.3	11.5	0.0	4	0.01	0.01	0.02	0.1
Persimmon	325/76	81	0.5	0	0.5	18.6	260	16	0.02	0.03	-	-
Pineapple	211/50	84	1.2	0	0.4	12.0	20	25	0.07	0.02	0.09	0.1
Pomegranate	343/81	82	3.4	0	1.0	17.0	10	7	0.05	0.02	0.31	-
Plum	177/42	84	2.2	0	0.8	9.6	18	5	0.02	0.03	0.10	0.7
Strawberry	99/23	91	2.2	0	0.7	5.1	10	60	0.02	0.03	0.06	0.4

Source: Nevo table 1996, Nevo Foundation Netherlands Nutrition Centre

Work Carried on nutritional values and health benefits

Health Benefits of Fruits

Fruits are universally promoted as healthy. The Dietary Guidelines for Americans 2010^[5] recommend you make one-half of your plate fruits and vegetables. Myplate.gov also supports that one-half the plate should be fruits and vegetables. Fruits include a diverse group of plant foods that vary greatly in content of energy and nutrients. Additionally, fruits supply dietary fibre, and fibre intake is linked to lower incidence of cardiovascular disease and obesity. Fruits also supply vitamins and minerals to the diet and are sources of phytochemicals that function as antioxidants, phytoestrogens, and anti-inflammatory agents and through other protective mechanisms (Slavin, 2012)^[17].

Fruit Consumption and disease cure

It was recognized that a high consumption of fruits and vegetables can help to prevent several non-communicable diseases such as cardiovascular diseases, the diabetes type 2 and some cancer (Ganry, 2006)^[7].

Pomegranate

Reported that special blend of pomegranate juice, seed, and peel that, according to published results, potently and reproducibly kills prostate and breast cancer cells in culture. In addition to Biblical references, the Romans mention the tree's unique healing powers, and several Middle Eastern, Asian, and South American peoples continue to chew small bits of its bark, petals, and peel to treat ailments ranging from dysentery to diseases of the mouth and gums. By supplementing diets with pomegranate juice, which is high in antioxidants, seemed to improve some key indicators of cardiovascular health. In addition to the high levels of antioxidant-rich tannins and flavonoids in the juice and peel, researchers crush and dry the seeds to produce unique oil, about 80% of which is a very rare 18-carbon fatty acid, or punicic acid. Also present in the oil is the isoflavone genistein, the phytoestrogen coumestrol, and the sex steroid estrone. In fact, the pomegranate is one of the only plants in nature known to contain estrone (Robert, 2003)^[13].

Date Palm Fruits

Egyptian Date Palm (*Phoenix dactylifera* L.) Fruits contain a variety of B-complex vitamins B1, B2, Nicotinic acid and vitamin A. The date palm extracts contains 13.80% moisture and 86.50% total solid. Ash and Crude fibres contents were 2.13 and 5.20, respectively. Protein, carbohydrates and lipids contents were 3.00%, 73.00% and 2.90% respectively. The low level of lipids content 2.90% compared with its content of sugars means that, the date palm is safe to heart and blood patients because its containing a very low level of fatty acids and cholesterol. HPLC analysis of sugars content showed that, the carbohydrate content consists of a large amount of glucose, fructose and sucrose, The protein pattern on SDS-PAGE showed that, most of proteins in the date palm are a high molecular weight proteins between 80 and 135 KD and contained a minimum levels of the LMW proteins less than 55 KD (El-Sohaimy, 2010)^[6].

Star fruit (carambola)

Star fruit is one of the very low calorie exotic fruits. 100 g fruit just provides 31 calories, which is much lower than for any other popular tropical fruits. Nonetheless, it has an impressive list of essential nutrients, antioxidants, and

vitamins required for well-being. Star fruit contains good quantities of vitamin-C. Vitamin C is a powerful natural antioxidant. 100 g of fresh fruit provides 34.7 mg or 57% of daily-required levels of vitamin C. In general, consumption of fruits rich in vitamin C helps the human body develop resistance against infectious agents and scavenge harmful, pro-inflammatory free radicals from the body. Star fruit and its juice is often recommended in many folk medicine in Brazil as a diuretic (to increase urine output), expectorant, and to suppress cough. (www.Nutritionandyou.com, 2014)^[2]

Aonla or Indian Gooseberry

The main nutrient in Aonla is vitamin C (720 mg/100 g fruit). While storing dry or in other forms vitamin c may get destroyed if exposed to heat but its tannins which protect them from being destroyed. It also has ample of chemical constituents which render it with a very high antioxidant value. Amalaki (*Emblicofficinalis*) i.e. Aonla and its preparations can be used in any type of ill health. It is commonly used in piles, fracture, constipation, vomiting, nausea, diseases related to vision and eye, hiccups, fever, jaundice, liver disease, skin disease, diabetes (Kavita, 2013)^[8].

Banana

It is a dessert fruit of millions apart from staple food owing to its rich and easily digestible carbohydrates with a calorific value of 67-137mg/100 g fruit. Being a rich source of Vitamin C and minerals, it makes healthy and salt free diet (Chaddha, 2007)^[4].

Avocado

Avocado or butter fruit (*Persea Americana*) is reputed as a nourishing food of high dietic value. Its nutritional values are comparable to ripe olives with an average of 2.1 per cent protein, 1.32% minerals and 24-26% fat. Since the fruit contains not more than 1% sugar, it is recommended as high energy food for diabetics (Chaddha, 2007)^[4].

Almond

According to the U.S. Department of Agriculture, Americans' demand for almonds has increased over 400 percent since 1980. In 2016, Americans ate an average of 1.8 lbs. (816 grams) of almonds each. There's good reason for the love affair. "Almonds have been studied extensively for their benefits on heart health, diabetes, and weight management," said Jenny Heap, a registered dietitian with the Almond Board of California. "The unique nutrient combination of almonds - plant-based protein, fiber and monounsaturated fats, plus key nutrients like vitamin E and magnesium help make them a heart-healthy snack."

A 2017 study published in Nutrition Journal found that Americans, especially children, who replaced snack foods with almonds or other tree nuts saw a major increase in consumption of nutrients. In the study of more than 17,000 children and adults, participants swapped all their snacks with almonds and. Researchers found that participants consumed fewer empty calories, solid fats, sodium, saturated fats, carbohydrates and added sugars. Good oils and fats increased significantly, as did magnesium, fiber and protein by a small margin.

Apricot

Dried or fresh, a handful of apricot is loaded with vitamins A,

C, potassium, calcium, phosphorus and fibre. It helps those who have dull and life less skin and the iron regulates hemoglobin. Apricots also have beta carotene that improves immunity and helps fight skin allergies, rashes and other skin problems. Smearing fresh apricot juice on skin will soothe sun burns (Anand, 2009) [1].

Apple

Apple is a reach source of fibre which keeps bowels clean, ensuring skin that is free of acne and boils. It is also loaded with phytochemicals that have properties similar to antioxidants. Studies have also shown that eating apples regularly reduce wrinkles and fine lines. Mix grated apple with honey and apply on skin for five minutes for a hydrated and stress free skin (Anand, 2009) [1]. Apples are alkaline and can effectively cleanse the liver (Tahseen, 2015) [18].

Watermelon

Consisting of 90 per cent water, watermelon hydrates and rejuvenates our skin. It contains lycopene that helps flush out toxins and combats free radicals with its antioxidant properties- an inexpensive and a quick detox therapy (Anand,

2009) [1].

Papaya

Papaya is a good source of Vitamin A and papain. Vitamin A acts as an anti-oxidant, while the papain breaks down inactive proteins and removes dead cells. The best feature of the fruit is its low-sodium quality. Since the salt content is less, the water retention is also little. The result- an overall hydrated skin. Rubbing mashed papaya on cracked heels removes dead cells and makes feet softer (Anand, 2009) [1].

Global Intake of Fruits and Vegetables

According to World Health Organisation STEP-wise approach to surveillance surveys on chronic disease risk factors conducted in several African countries including Mauritius and in line with existing Food and Agriculture Organisation data, fruit and vegetable intake (FVI) levels were found to be below the recommended daily intake of 400g/person (Profav, 2011) [11]. A large gap still exists between the recommended and actual intake and many worldwide are not receiving the quantity or variety of F&V that they should have (Serdula *et al.*, 2004; Krebs, 2011) [16, 9].

Table 2: Mean Fruits and Vegetables Intake (FVI) in selected countries

Country (Developed)	Year of updated data	Mean Fruit intake (g/d)	Mean Vegetable intake (g/d)
Hong Kong	2010	146.81	176.96
Denmark*	2013	151.70	162.08
Germany*	2013	171.36	118.02
UK*	2013	130.02	97.86
France*	2013	136.56	145.15
US**	2015	189.30	255.00
Netherlands*	2013	102.36	127.79
Italy*	2013	90.83	150.81
(Developing countries) Malaysia	2012	179.00	133.00
India**	2015	158.20	105.70
PR China**	2015	222.10	262.80
Ghana**	2015	149.80	36.10
Ethiopia**	2015	114.70	51.20
Uganda**	2015	464.10	24.40

Fruits and vegetable consumption in adults in selected countries

Hazelnut

Hazelnut is a rich source of nutrients that have cardio protective benefits. These nutrients include arginine, an amino acid which relaxes blood vessels, folate and heart healthy B Vitamins (Setalvad, 2009) [15]

Pineapple

Pineapple juice has bromelain enzyme which prevents coughs and colds (Tahseen, 2015) [18] and is well recognised as a digestive enzyme. It is a good source of Vitamin A and B; it is fairly rich in Vitamin C, calcium, magnesium, potassium and iron (Chaddha, 2007) [4].

Conclusion

In conclusion, it can be stated that fruits are rich sources of vitamins, minerals, calories and other needful nutrients. Including fruits in daily diet will have multiple health benefits and will also help in disease cure. Poor diet can be said an invitation to multiple diseases. Citrus fruits and Aonla are rich in Vitamin C, while the richest source for Vitamin C was Barbados cherry. Walnut is the richest source of fat (64.5 per cent) and produces highest calories per unit of edible portion. Cashew nut is the richest source of protein 21.2 per cent and thiamine 630mg/100g. Dry Apricot is the richest source of

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