

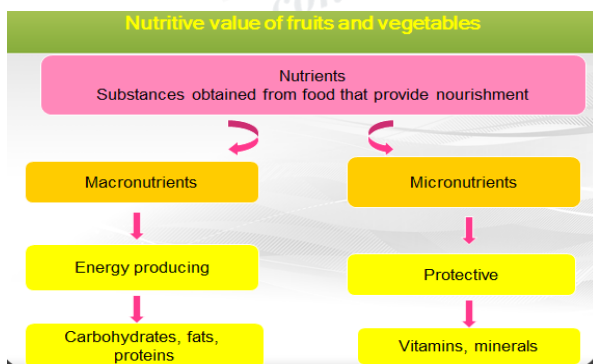
# Maximizing the Nutritional Value of Fruits & Vegetables

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**Abstract :-** Fruits give us plenty of fiber, vitamins, minerals, including folate, potassium and vitamins A and C. and phytochemicals (which give the color). Fruits contain fiber, phytochemicals and a variety of minerals and vitamins, particularly vitamins A, C, E and K. Many fruits are also packed with minerals such as calcium, magnesium, phosphorous and zinc. Vegetables are low in calories and fats but contain good amounts of vitamins and minerals. All the Green-Yellow-Orange vegetables are rich sources of calcium, magnesium, potassium, iron, beta-carotene, vitamin B-complex, vitamin-C, vitamin-A, and vitamin K. A healthy intake of fruit and vegetables helps to protect against major illnesses, such as heart disease and cancer

## I. INTRODUCTION

An essential nutrient is a nutrient that the body cannot synthesize on its own or not to an adequate amount and must be provided by the diet. These nutrients are necessary for the body to function properly. The definitions of “fruit” and “vegetable” vary from country to country. While fruit definitions are more homogeneous, vegetable definitions vary considerably and raise particular issues in terms of the inclusion/exclusion of starchy roots and tubers and legumes



**Table 1.1 Nutritive value of fruits and vegetable**

Although standardized methodologies, including definitions, are required for cross-country comparisons of fruit and vegetable intake, further discussions are required to determine how best to achieve this comparability<sup>[1]</sup>. The six essential nutrients include carbohydrates, protein, fat, vitamins,

minerals and water. As molecular biology, biochemistry and genetics advance, nutrition has become more focused on the steps of biochemical sequences through which substances inside us and other living organisms are transformed from one form to another - metabolism and metabolic pathways. Nutrition also focuses on how diseases, conditions and problems can be prevented or lessened with a healthy diet. In addition, nutrition involves identifying how certain diseases, conditions or problems may be caused by dietary factors, such as poor diet (malnutrition), food allergies, metabolic diseases, etc. Dietetics is the interpretation and communication of the science of nutrition so that people can make informed and practical choices about food and lifestyle, in both health and disease<sup>[2]</sup>.

Part of a dietician's course includes both hospital and community settings. The majority of dietitians work in health care, education and research, while a much smaller proportion also work in the food industry<sup>[3]</sup>.

Vitamins		
Fat soluble vitamins: Vitamin A, D, E, K		
Water soluble vitamins: Vitamin B complex, C		
Vitamin	Functions	Deficiency
Vitamin A	Essential for proper vision, healthy skin, alimentary and urinary tracts Reduces susceptibility to infections foods rich in beta-carotene may reduce the risk of lung cancer and certain oral cancers	Night blindness and keratomalacia
Vitamin D	Essential for healthy bones Helps in calcium absorption in body	Rickets (in children) and osteomalacia (in adults)-degeneration of bones
Vitamin E	Possesses antioxidant property Reduces risk of degenerative diseases Prevents oxidation of lipids and maintains cell integrity	Enhanced fragility of red blood cells and increased urinary excretion of creatine indicating muscle damage

**Table 1.2 Vitamins A,D,E**

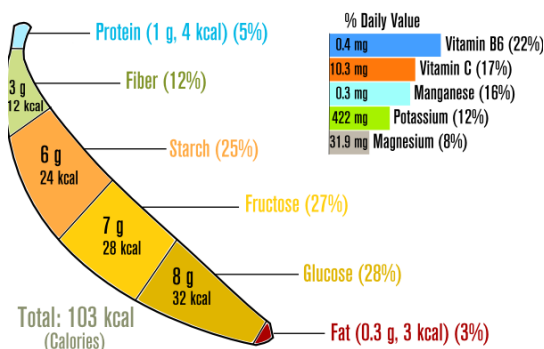
Nutrition is the study of nutrients in food, how the body uses nutrients, and the relationship between diet, health and disease. Major food manufacturers employ nutritionists and food scientists. Nutritionists may also work in journalism, education and research<sup>[4]</sup>. Many at its effects on people, while a dietician looks at the human, and then how that human's health is influenced by food there is a lot of overlap between what nutritionists and dietitians do and studied.

Vitamin	Functions	Deficiency
Vitamin K	It is an antihemorrhagic vitamin. It is necessary for the clotting of blood, Necessary for liver functioning	Prolonged blood clotting time which may lead to internal hemorrhage and uncontrolled bleeding
Vitamin B complex	Includes thiamine, riboflavin, nicotinic acid, pantothenic acid, pyridoxine, folic acid, biotin, choline, inositol Act as co-enzymes and therefore essential for the metabolism and proper utilization of energy, carbohydrates and fats	Deficiency diseases involving these vitamins are multiple in nature
Vitamin C	Required for collagen synthesis, bone and teeth calcification Helps in absorption of dietary iron Builds resistance to infection Aids in the prevention and treatment of the common cold Gives strength to blood vessels One of the major antioxidant nutrients	Scurvy: soft and bleeding gums

**Table 1.2 Vitamins K,B,C**

Some nutritionists work in health care, some dietitians work in the food industry, but a higher percentage of nutritionists work in the food industry and food science and technology, and a higher percentage of dietitians work in health care.

### What Is A Banana Made Of?



**Diagram 1.1 Nutrients in banana**

## II. COMPARISON OF PROCESSED FRUITS & VEGETABLES FRUITS VS FRESH

**1.1 Processed Fruits and Vegetables** Many fruits and vegetables only grow in specific regions of the world, in a particular type of soil, under certain temperature and humidity environments, and at limited times of year, and in many countries refrigeration is not available. Processing allows fruits and vegetables produced in remote regions of the world, such as coconuts, durian, mango, and papaya, to be stabilized and transported to distant locations for consumption. In many instances, fruits and vegetables such as pumpkin, clingstone peaches, and some leafy greens and squashes may be too tough or bitter to consume. Processing, however, changes the colour, texture, flavour, and nutritional quality of many fresh fruits and vegetables<sup>[7]</sup>. Surprisingly few published studies compare the nutritional quality of fresh, frozen, and canned fruits and vegetables. Freezing is typically preceded by blanching (a short-time heating step) to inactivate enzymes, and this pre-treatment may result in some relatively limited loss of quality components. Frozen products should not be stored for long periods in “frost-free” home freezers, because these go through warming cycles to defrost coils and inherently warm products stored in them. Storage in warehouses where temperature is well maintained may be for up to one year.

**1.2 Fresh Fruits and Vegetables:** Fruits and vegetables are a major source of macronutrients such as ashier and micronutrients such as minerals and vitamins. Fresh, frozen, and canned fruits and vegetables in the United States (ERS, 2004). Fruits and vegetables are often the most attractive and health promoting when harvested at their peak maturity, but most Americans do not have home gardens capable of growing them. Fresh fruits and vegetables may spend 1–3 days on display prior to being purchased by the consumer, who may store them for up to 7 days prior to consumption. This means that fresh fruits and vegetables may not be consumed for a significant length of time following harvest, during which time nutrient degradation may occur. Most fruits and vegetables are composed of 70–90% water and once separated from their source of nutrients (tree, plant, or vine) undergo higher rates of respiration, resulting in moisture loss, quality and nutrient degradation, and potential microbial spoilage. In some instances, fruits and vegetables may be harvested immature to reduce mechanical damage during harvesting and transportation<sup>[6]</sup>.

Commodity	Amount (lb)		
	Fresh	Frozen	Canned
Asparagus	1.0	0.07	0.2
Beans, snap	1.9	1.9	3.7
Carrots	8.9	1.6	1.2
Corn	9.6	9.1	8.2
Green peas	-	1.9	1.2
Mushrooms	2.6	-	1.6
Peaches and nectarines	5.1	0.55	3.6
Pineapple	4.4	-	4.8
Spinach	2.1	0.93 <sup>a</sup>	
Tomatoes	19.3	-	70.4

Table 1.3 2. Cumulative losses in vitamin C due to fresh storage or processing and storage, followed by home cooking in all cases. Adapted from Rickman et al. (2007a).

Because intact fruits and vegetables are still alive and respiring, temperature and relative humidity must be carefully controlled to maintain low rates of respiration, prevent moisture loss, and maintain eating quality.

### III. PREVENTION OF DISEASES BY FRUIT AND VEGETABLES

#### 3.1 Fruit and Vegetable Consumption And Cancer Prevention:

Of all dietary factors in cancer prevention, the most abundant evidence is for the protective effect of fruit and vegetable consumption. The European Prospective Investigation into Cancer and diet (EPIC) is a multinational study across 10 European countries investigating the relationship between diet, lifestyle and environmental factors and cancer incidence.

- Fruit has a protective effect against lung cancer, while vegetables do not.
- In women, fruit has a protective effect against colorectal cancer (not dose-response).
- In men, vegetables have a protective effect against colorectal cancer (dose-response).
- Fruit and vegetables do not have a protective effect against prostate cancer.
- A meta-analysis by Riboli and Norat concluded the following (refrer):Fruit has:
- A protective effect against the risk of cancers of the lung and bladder (both case-control and cohort studies);
- A protective effect against the risk of cancers of the mouth and pharynx, larynx and oesophagus (case-control only, no cohort study data);

- A protective effect against the risk of cancers of the stomach and colorectum (case-control only, cohort study data not significant);
- No significant protective effect against the risk of breast cancer
- Vegetables have
- A protective effect against the risk of cancers of the oesophagus, breast, lung, stomach, and colorectal (case-control only, cohort study data not available or not significant);
- No significant protective effect against the risk of cancers of the mouth and pharynx, larynx or bladder (case-control data not significant, cohort data not available or not significant).

#### 3.2 Framework For A Fruit And Vegetable Promotion:

The overall goal of the fruit and vegetable promotion initiative is to strengthen, promote and protect health in the context of an overall healthy diet by guiding the development of sustainable actions at community, national and global levels that, when taken together, will lead to reduced risk of NCD through increased fruit and vegetable consumption. For the purposes of this framework, the term NCD refers to those chronic, non-communicable diseases for which adequate fruit and vegetable consumption can play a role in prevention, such as heart disease, cancer, diabetes and obesity. The fruit and vegetable promotion initiative has four specific objectives<sup>[9]</sup>.

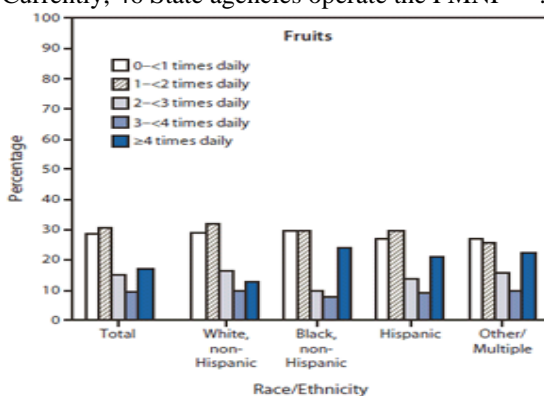
- To increase the overall awareness and understanding of the role of fruit and vegetables in preventing NCD;
- To increase fruit and vegetable consumption through essential public health and agricultural action, particularly emphasizing environmental and policy change;
- To encourage and support the development and implementation of national fruit and vegetable promotion programmes which are sustainable, comprehensive, and which actively engage all sectors, including civil society and the private sector ;
- To support research in a broad spectrum of areas relevant to the promotion of fruit and vegetable production and consumption and develop the human resources required to design and implement fruit and vegetable promotion programmes.very person has the right to safe and nutritious food. To this end, every person should be informed of the health benefits of fruit and vegetable consumption, and effective legislative, executive, administrative and/or other measures should be considered at the appropriate government level to ensure the

availability and accessibility of adequate amounts of a variety of fruit and vegetables.

- Effective partnerships are necessary to develop and support, at national, regional and international levels, comprehensive multispectral measures and coordinated responses.
- Partners should include, but not be limited to, researchers and policy-makers across the continuum of fruit and vegetable production, distribution, storage, marketing and consumption.
- There is a need to employ both environmental and policy-change strategies to address the supply of fruit and vegetables as well as the demand.
- Fruit and vegetable promotion programmes should be based upon the best available scientific evidence, and the fruit and vegetable research agenda should be promoted in order to consolidate the evidence base.
- The predominant stage of the nutrition transition should be considered in the development of national fruit and vegetable promotion programmes.
- Fruit and vegetable promotion programmes should be incorporated into current nutrition policies and frameworks.
- Priority should be given to activities that have a positive impact on the poorest populations and communities as NCD are emerging at an accelerated rate in poorer countries and in the poorer population groups in richer country.

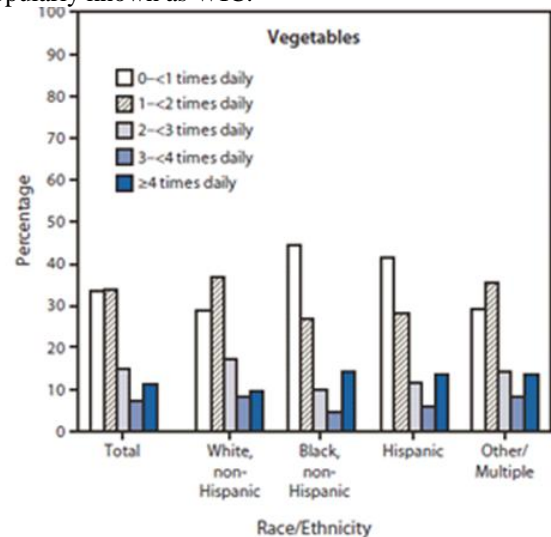
#### IV. RESEARCH PROGRAMME

**4.1 WIC Farmers' Market Nutrition Program (FMNP)** provides fresh, unprepared, locally grown fruits and vegetables to WIC participants, and expands awareness, use of, and sales at farmers' markets. Currently, 46 State agencies operate the FMNP<sup>[10]</sup>.



*Graph 4.1 Fruit race vs percentage*

The WIC Farmers' Market Nutrition Program (FMNP) is associated with the Special Supplemental Nutrition Program for Women, Infants and Children, popularly known as WIC.



*Graph 4.1 Vegetables race vs percentage*

The WIC Program provides supplemental foods, health care referrals and nutrition education at no cost to low-income pregnant, breastfeeding and non-breastfeeding post-partum women, and to infants and children up to 5 years of age, who are found to be at nutritional risk



*Diagram 4,1 WIC Programme*

the WIC FMNP was established by Congress in 1992, to provide fresh, unprepared, locally grown fruits and vegetables to WIC participants, and to expand the awareness, use of, and sales at farmers' markets.<sup>[11]</sup> Women, infants (over 4 months old) and children that have been certified to receive WIC program benefits or who are on a waiting list for WIC certification are eligible to participate in the WIC FMNP. State agencies may serve some or all of these categories. A variety of fresh, nutritious, unprepared, locally grown fruits, vegetables and herbs may be purchased with FMNP coupons. State agencies can limit sales to specific foods grown within State borders

to encourage FMNP recipients to support the farmers in their own States.

#### 4.2 Child Nutrition Programs (CNP)

The Food and Nutrition Service administers several programs that provide healthy food to children including the National School Lunch Program, School Breakfast Program, Child and Adult Care Food Program, Summer Food Service Program, Fresh Fruit and Vegetable Program, and Special Milk Program<sup>[12]</sup>.

Administered by state agencies, each of these programs helps fight hunger and obesity by reimbursing organizations such as schools, child care centres, and after-school programs for providing healthy meals to children. Fresh Fruit and Vegetable Program (FFVP) provides free, fresh fruits and vegetables and dried fruits to children in selected schools participating in the National School Lunch Program.

### V. CONCLUSION

A good diet should include a variety of fruits and vegetables, whether they are fresh, frozen, canned, dried, or otherwise preserved. The Nutrition Facts label on processed products accurately reflects the nutritional content and should be consulted by consumers interested in healthy diets. Loss of nutrients during fresh storage may be more substantial than consumers realize, so consumers should be educated about proper storage. Fruits and vegetables should be consumed soon after harvest, or postharvest handling conditions must be controlled such that nutrient degradation does not occur.

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