

## Encouraging Healthy Diet By Categorizing Food In Different Colour Zones.

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Perhaps you've noticed that the days of the four basic food groups — dairy, meat, vegetables and fruit — are long gone. Today, a healthy diet encompasses a far wider range of options: whole grains, legumes, seeds and nuts, fish, and even plant oils, such as olive oil. Add in ethnic, religious, cultural and personal preferences, and you have more options than ever before when planning healthy meals and snacks.

A healthy eating plan can be illustrated in many ways, but it's often found in the shape of a pyramid. The triangular shape of the pyramid shows you where to focus when selecting foods. Foods to eat the most of create the base of the pyramid, and foods to eat in smaller amounts or less frequently are shown farther up the pyramid. Food pyramids place foods in categories — such as dairy products or meat and beans — to help guide your food choices. No single food provides all of the nutrients that your body needs, so eating a variety of foods within each group ensures that you get the necessary nutrients and other substances that promote good health.

With the variety of food pyramids available, you may wonder which one to follow. It may help to know that the basic principles of food pyramids are largely the same. A pyramid familiar to most Americans is the Food Guide Pyramid, established by the United States Department of Agriculture (USDA) and the Department of Health and Human Services in 1992. The Food Guide Pyramid has since been replaced with My Pyramid, a new symbol and interactive food guidance system. 'MY Pyramid' has tried to create awareness of healthy eating; however while the food pyramid is easy to explain and understand, it does not address the issue of cooking portions. Cereal based foods which form the base of the pyramid, are considered healthy options as are fish and vegetables; but the way in which the cooking and processing affects these foods are not discussed. However there is yet another pyramid- 'Healthy eating Pyramid' prepared by the nutrition experts, it also uses colour codes. This pyramid recommends sparing use of red meat and butter put in one red compartment at the narrowest portion of pyramid along with a pale yellow compartment for white rice, white bread, potatoes, pasta and sugars. There are many other pyramids too, these include the Asian, Latin American and Mediterranean diet pyramids, and the Vegetarian Diet Pyramid, just to name a few. However, other than the food pyramids there are a few other methods also for a healthy diet. The UCLA center for human nutrition's colour code system recommends aiming for one food item from each colour group per day from the table given below.

### Fruits and vegetable colour codes

Colours	Fruits & Vegetables
Red	Tomatoes, Tomato products (ketchup, tomato soup), pink grape fruit, watermelon
Red/Purple	Grapes, grape product (red wine, grape juice), prunes, crane berries, blueberries, strawberries, red pepper, plums, cherries, red beets, raisins, red apples, red pears
Orange	Carrots, mangoes, apricots, pumpkins, acorn squash, winter squash, sweet potatoes
Orange/Yellow	Orange juice, oranges tangerines, yellow grape fruit, lemon, lime, peaches, papaya, pineapple nectarines
Yellow /Green	Spinach, collard, mustard green, turnip green, corn, avocado, green peas, green beans, cucumber, kiwi, romaine lettuce, Zucchini, honey dew, melon, musk melon
Green	Broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, kale
White/ Green	Garlic, onions, leeks, celery, asparagus, artichoke, mushrooms

Colours have always played a vital role in each of us lives as the first thing a child learns is to identify different colours and so colours can be used as an important tool for creating a better health awareness. Based on one of such concepts, a signal system was introduced at "Your Diabetes World Exhibitions" for mass media communication with lay people. This system has been reported by Kavita Kapur and Anil Kapur. Since 1999, this system has been used as a food display. This system makes a person aware enough to make a distinction by looking at the way the food is cooked. This system is based on the traffic light concept of 'Red' for 'Stop' that also denotes danger; 'Yellow' for 'go slow or cautious', and 'Green' for 'go or safer road'. It uses universally understood symbols and focuses attention on processing and cooking, lays stress on glycemic Index (GI), fiber content of food, the amount and type of fat used and the mode of cooking. The healthiest choice fall in the green zone, the less healthy option in the yellow zone and the least healthy in the red zone. Furthermore, by informing people about alternative methods of cooking, negative advice to avoid certain food is replaced by an empowering range of options. In order to explain the signal system, a break down by food groups of the classifications is employed in the signal system.

### Cereals

Wheat is known to be very high in insoluble fiber and is really the king when it comes to digestive health, thus bread made from whole-wheat flour (roti) is classified in the green zone as the whole wheat contains the bran layer rich in fibre, minerals, oil, phytonutrients, protein and vitamins. In refined grains, processors strip the bran and so reduce the fiber and vitamin content of the grain pushing it in the yellow zone. When shortening – hydrogenated fat, butter or oil is added in the preparation of biscuits, cakes and breads, it moves to the red zone. Similarly, steamed hand pounded brown rice in the green zone; polished steamed white rice appears in the yellow zone; and biryani fried rice in the red zone. Grains like oats and barley fall in the green zone, as they are known for their high beta-glucan content which has led to oats and barley share a common health claim. On Dec 23, 2005, the FDA announced that, as with foods containing oats, the label for foods containing at least 0.75 grams per serving of soluble fiber from barley can carry a heart-health benefit when consumed as part of a diet low in saturated fat and cholesterol.

### Pulses

Boiled or steamed peas, whole or split lentils and kidney beans garnished with a little oil are in the green zone, while the dal that has been prepared with butter or ghee garnish is in the red zone.

### Vegetables & Fruits

Packed with vitamins, minerals and other beneficial compounds, fruits contribute significantly to good nutrition. Commonly available bananas, grapes, guavas and strawberries contain potassium. Most fruits especially citrus and berries contain vitamin C. Other than this fruits are also a rich source vitamin B, niacin, and riboflavin. Figs, dates, apples and pomegranates are high in fibre. Beta-carotene rich fruits are orange mango and apricot. Other vitamins and minerals found in fruits are vitamin A (persimmons, papayas, mangoes and cherries) vitamin B (strawberries, figs and peaches), niacin (gooseberries, guavas, bananas and raspberries), riboflavin (bananas and raspberries) and phosphorus (gooseberries and nectarines). One kiwi provides more than daily requirement of vitamin C, a grapefruit or orange yields almost double the requirement whereas half a mango (140 g) provides 40% of daily value of vitamin A.

Thus fruits are included in green zone, which is the most nutritious zone, but unsweetened fruit juices lack fibre and therefore fall in the yellow zone, and sweetened fruit juice in the red zone.

Most vegetables are in the green zone. But if cooking involves deep frying or the use of rich sauces, the vegetable move to the red zone, example spinach which is included in salad or cooked with a little of oil is in green zone while the same ingredient when added with paneer and made into Palak Paneer moves to the red zone.

### Meat

Steamed, grilled or roasted fish and the chicken and white of eggs are in the green, However butter chicken and fried fish move to the red zone along with fatty red meat, sausages, ham and egg yolk- due to their high saturated fat content. Many studies have shown that high intakes of saturated fats can raise the levels of low-density lipoprotein (LDL) cholesterol in blood and increase the risk of coronary heart disease. A reduction of 1% calories from saturated fats decreases LDL cholesterol by about 1-2%.

### Milk or milk products

Dairy provides fatty acid such as linoleic acid (CLA) that is a fatty acid naturally present in cow's milk and certain animal meat, particularly beef and lamb. Compared to all other foods, dairy products are the natural sources of CLA. It was suggested that milk derived CLA might hold anti cancer properties and positively impact cardio vascular health.

Low fat milk, skimmed milk and products made form these are in the green zone, but whole milk and full fat milk products are classified in the red zone.

### Fat

Earlier guidelines recommended that diets low in total fat decreases the risk of heart disease, but the more recent research recommends consuming a moderate amount of dietary fat for overall good health, including heart health. However most fats should come from sources of polyunsaturated and monosaturated fats such as fish, nuts and vegetable oils. Consuming less than 20% of calories from fats may decrease the desirable high-density lipoprotein (HDL) cholesterol. Low intake levels also lead to inadequate intake of vitamin E and essential fatty acids. Consuming more than 35% generally increases saturated fat intake and may also lead to consumption of excess calories. Dietary fat is mostly consumed through butter, margarine, vegetable fat on meat and poultry, whole milk, egg yolk, nuts and bakery products. Nuts and seeds don't have cholesterol and are good sources of protein. They tend to be very high in fat and calories, but most of the fat is polyunsaturated or monounsaturated (e.g., walnuts, almonds, pecans). Some varieties, such as macadamia nuts, are also high in saturated fat, so check the label and put them in the red zone.

Vegetable oils are hydrogenated for use in margarines or shortenings. Hydrogenation adds trans fat, which may partly offset some of the benefits of using polyunsaturated or monounsaturated vegetable oils, thus butter and hydrogenated fat, such as margarine, fall in the red zone. Olive Oil and others such as rapeseed oil, canola oil, mustard oil and sesame oil represent the healthier options and are in the green zone. Corn, safflower, soybean and sunflower oils are low in saturated fat, they are in yellow zone. They're good to use in limited amounts for cooking or dressings.

### Signal system- Application in daily life

The rationale for separating the different zones depends upon one or more of the following.

**Table - 1 Food Zones:**

Principles	Green	Yellow	Red
Refined cereals and Sugars	Low	Moderate to high	High
Saturated fat	Low	Low	High
Total Fat	Low fat	Moderate fat	High Fat
Glycemic index	Low GI	High GI	High GI
Fibre	High fibre	Low fibre	Low fibre
<b>How much to eat</b>	<b>Eat as permitted</b>	<b>Eat in moderation</b>	<b>Very restricted</b>

To explain further, let us look at it food group wise how a healthy food moves from green zone to Red zone depending on the processing and cooking method.

**Table -1 Cereal and Pulses**

Foodstuff	Green	Yellow	Red
<i>Rice</i>	Steamed	Pulao	Biryani
<b>Wheat</b>	Tandoori Roti	Naan	Butter Naan
	Chappati	Maida Roti	Paratha/ Puri
<b>Bread</b>	Multi grain	White bread	Croissants
<b>Biscuit</b>	Whole wheat crackers	Marie	Cream biscuits
<b>Breakfast Cereals</b>	Oats	Cornflakes	Cornflakes with sugar
<b>Snacks</b>	Roasted fat free whole jowar/ bajra /corn etc	Aloo Poha /avial /murmura	Samosa / Kachori / Mixture/ chewra
<b>Bengal gram (chana dal)</b>	Bengal gram whole cooked as Dal	Dal Tadka	Dal makhini
	Dhokla /Khandvi	Bean Patty (chila)	Bhajiya

**Table -2 Vegetables and Fruits**

Foodstuff	Green	Yellow	Red
<b>Green leafy</b>	Tossed salad with lettuce and other greens		Palak Paneer
<b>Other vegetables</b>	Bottle gourd (Lauki) curry		Malai kofta curry
	Brinjal sabzi		Baghare baigan
	Ladies finger (Bhindi sabzi)		Bhindi do pyaza / Bhindi fry
	Mixed vegetable curry		Vegetable Korma (with coconut)
<b>Roots and Tubers</b>	Carrot sabzi/ carrot salad	Aloo chaat	Aloo dum
<b>Fruit</b>	Apple/ orange/ peach/ guava etc	Unsweetened fruit juice	Sweetened fruit juice

**Table -3 Meat, fish and Chicken**

Foodstuff	Green	Yellow	Red
<b>Egg</b>	Egg white	Boiled egg whole	Omelette with cheese, bacon
<b>Fish</b>	Poached /steamed	Fish tawa, fish curry (without coconut)	Fish fry, fish curry (with coconut)
<b>Poultry</b>	Chicken Roast / Grilled chicken / Tandoori chicken	Chicken tawa /kabab	Butter chicken / murg makhini / Fried chicken
<b>Mutton</b>			Mutton curry /Rogan Josh

Red meat, sausage, bacon, ham, liver, kidney, egg yolk are not healthy choices as they are rich in fat especially saturated fats and cholesterol. Fish, chicken, white of eggs are healthier choices.

**Table -4 Milk and Milk products**

Foodstuff	Green	Yellow	Red
<b>Milk</b>	Double toned /skimmed milk	Toned /cow milk	Buffalo/ full fat milk
<b>Milk products</b>	Curd (from double toned or skimmed milk)	Low fat cheese / channa from low fat milk	Processed cheese / Khoa

**Table -5 Fats and Oils**

Food-stuff	Green	Yellow	Red
<b>Oils and fats</b>	Olive/rapeseed/ sesame/ groundnut	Sunflower/ safflower/ corn oil	Ghee / butter/ Vanaspati

**Table - 6 How a simple main meal can move from green zone to red zone depending on the food we eat?**

Food groups	Green zone	Yellow zone	Red zone
Cooking methods	Steamed, boiled, roasted, grilled, tandoor, dry	Cooked with moderate amount of fat	Deep fried, extra butter/ghee added, rich sauces/dressing, rich in sugars

	heat		
Processing	Rich in fiber/parboiled /hand pounded	Low in fiber /refined milled	Low in fiber, ready to eat
Rice	Steamed rice	Pulao	Biryani
Wheat	Chappati, tandoori roti	Naan	Butter Naan / Puri
Dal	Whole chana /sambhar	Dal tadka	Dal makhini
Vegetables	Steamed vegetables, Fresh green salad	Aloo sabzi /aloo chaat	Malai Kofta curry, Salad with Mayonnaise
Fish	Steamed Fish	Fish curry (home-style)	Fried fish
Chicken	Grilled chicken	Chicken Tawa	Butter chicken (Murg Makhini)
Fruit	Apple, Pear, orange (fresh, whole)	Apple / Orange juice unsweetened	Sweetened fruit juice
Dessert	Fresh cut fruit		Gulab jamun, ice cream, laddoo, mithai, jalebi

This system has been applied in the development of educational programmes for health-care providers. Using the signal system as a framework, displays are mounted and talks offered about food choices – both healthy and not so healthy as described in the earlier paras. Health care providers are asked to flag the lunch buffet or to arrange a large number of cooked items routinely available in the area and place them on red, green, and yellow coloured cloth, on long tables after a brief five-minutes introduction to the system. It is encouraging that 75%-80% of the displayed food is flagged appropriately. Although like the food pyramid, even the signal system does not teach proportion size, it can be understood easily and easily applicable in everyday life. If you develop the skills to make healthy choices now, your body will thank you later.

**Reference:**

1. Diabetes Voice-June 2005 Vol: 50-The Signal System: An Empowering Tool For Healthy Food Choices. By Kavita Kapur and Anil Kapur
2. <http://www.exrx.net/Nutrition/ColorCodes.html>
3. Krause's Food, Nutrition & Diet Therapy-9<sup>th</sup> Edition

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