Common Caribbean Foods and Your Health – Part 2

June Holdip[a]

In the previous issue of **CAJANUS**, some commonly used Caribbean staple foods, fruits and vegetables as well as legumes and nuts were presented. The remaining two of the six Caribbean Food Groups, namely Foods from Animals, and Fats and Oils are the focus of this issue that highlights many attractive and healthy choices.

Foods from animals have always been featured prominently whether in community markets, supermarkets or dining tables. Although they are noted for absorbing a large proportion of the food budget, they are still a "must have" for many persons while others consider them as optional. Foods from animals offer a range of nutrients but the presence of saturated fat can also contribute to the development of many diseases, especially cardiovascular disease. Greater care should therefore be exercised regarding selection and even preparation of foods from animals.

Plant-based foods, such as avocado, coconut and ackee, with a notable high fat content have also been conversational as well as debatable topics especially among persons who are or should be concerned about dietary fat intake. It is heartening to note that it is well established that the quality of fat in these items is different to that which is present in foods from animals and thus can be viewed as "heart healthy". However, moderation should still be the overriding guideline.

In the Caribbean, many appetites are not satisfied without the inclusion of a sweet-tasting item some of which may include sugar or honey. Both of these items are entangled in the culinary fare, our national psyches as well as our agriculture. Although sugar has lost its position on the world market to the extent that much of the industry no longer exists in many countries, it still remains a widely used item and contributes a significant amount of calories to the daily diet of many persons although honey is fast becoming an acceptable substitute. However, it should always be remembered that honey is not

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recommended to be used substitute. However, it should always be remembered that honey is not recommended to be used for infants.

As with the previous issue of **Cajanus**, each article here presents a brief historical perspective and then elaborates the health contribution and some dietary uses. Both volumes comprise a wealth of nutrition information and show the health riches of our Caribbean foods.

CAJANAQUOTE

Someone Told Me I am What I Eat...

I am what I Eat!
Now isn't that neat!
But can it be that meat is me?
Are beans my legs; my kneecaps eggs?
Is my plasma made of milk?
My skin from something soft as silk?
Potatoes cannot make an ear
Or any part of me, I fear.
Can someone solve this mystery
Of how my food turns into me?

Regina (Saskatchewan) City
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Common Caribbean Foods and Your Health...

MEATS

Foods from animal sources constitute one of the Caribbean Food Groups. This group can be divided into many subcategories.

They include:

- Meats (including the edible portion of flesh of cow, goat, pig, sheep)
- Poultry (including the edible flesh of birds such as chicken, turkey, duck)
- Offal (the edible internal organs of all animals)
- Dairy products
- Eggs

NUTRIENT CONTENT

Foods from the 'Foods from Animals' group are generally rich in the nutrients: protein, fat, vitamin A, B_1, B_2, B_{12}, D, niacin, and the minerals: calcium, iron and zinc. They do not contain fibre, and they do not have any significant carbohydrate content.

Another significant component of this food group is cholesterol. All foods in this group contain saturated fat which often raises the bad cholesterol. Though not considered a nutrient, cholesterol affects our health, and much attention should be paid to its content in our foods.

For years, meat and other foods from animals, such as milk and cheese were regarded as vital components in our diets. Because of the cholesterol content of these foods there is concern that they may be contributing to the

escalation of nutrition-related chronic non-communicable disorders. These disorders include heart disease, diabetes, hypertension, and some cancers. In addition, some illnesses and deaths have resulted from the consumption of meats that have been handled or prepared unsafely, inadequately cooked, or have carried harmful microbes.

For vegetarians and vegans (people who for religious, humanitarian and/or other reasons choose to exclude foods from animals sources from their diet to varying degrees) this question of meat is not a major issue, but some people choose to exclude red meats only.

When a comparison of fat and cholesterol is done of selected subcategories in this food group, several interesting factors arise. Table 1 summarizes the comparison. Goat, followed by turkey, had the lowest value of saturated fat when all the areas were considered. On the whole, meats were higher in total and saturated fats than poultry. However, all meats had comparable or less cholesterol content than chicken and the other poultry items. The cholesterol content of egg was significantly higher than the others considered. Whole milk was relatively low in total and saturated fats and lowest in cholesterol content for the portion considered. Even if doubled to one cup, it would still be much lower in cholesterol than the others. Mutton from sheep or lamb sources, not the local goat, had the highest total and saturated fat content. All fats increase the calorie content of the diet which may lead to undesirable weight gain.

Table 1:
Comparison of the Lipid Content of Selected Categories of Foods From Animals

Food and Description (100g)	Total Fat (g)	Saturated Fat (g)	Cholesterol (mg)	Calories
MEAT				
Beef	24.0	9.8	74	291
Pork	22.6	8.2	72	275
Mutton (sheep/lamb)	70.6	32.2	90	267
Goat	2.3	0.7	57	109
POULTRY				
Chicken	14.8	4.2	90	213
Turkey	4.3	1.2	92	133
Duck	39.3	13.2	76	404
DAIRY				
Milk (whole) ½ cup	4.1	2.6	18	76
EGGS (1 large)	5.0	1.5	212	75

Meats and Poultry values for 100g (approximately 3½ oz) of the raw, whole carcass

MEATS VERSUS OTHER FOODS FROM ANIMALS

How do meats measure up nutritionally when compared with other foods from animals? Not good as far as fats are concerned, judging from the information in Table 1. This general information, however, has been the basis for many erroneous conclusions. It is important to note that all cuts of meats are not equal nor have the same fat and cholesterol content. When a more detailed breakdown of the foods from animals is done, a different picture emerges. Several common foods from animals across the Caribbean have been compared with meats. The answer to how meats measures up is in Table 2a and 2b. The food items are ranked according to total fat in Table 2a from least to most. In Tables 2b they are ranked according to cholesterol from least to most.

Most of the foods with a high total fat content tend to have a high saturated fat content. There was no

such association with cholesterol and total, saturated fat or calories. Seafoods and offals in general are among the items lowest in total and saturated fats. However, this changed drastically once the cholesterol content is considered. Of note also, is the difference in the fat content of poultry without skin compared to when the skin is not removed. Most cuts of poultry (with skin) have a higher cholesterol, total and saturated fat content than lean cuts of meats. Except for the light/white meat (without skin) of poultry, choices from that sub group have no advantages over meats, in relation to fat and cholesterol content.

Table 2a:
Comparison of Selected Foods From Animals
(Total and Saturated Fats)

FOOD ITEM DESCRIPTION (100g)*	TOTAL FAT (g)	SATURATED FAT (g)
Milk (skim) [½ cup or 125mls]	0.2	0.1
Whelks – Seafood	0.4	<.1
Parrot – Fish	0.4	0.1
Turtle – Seafood	0.5	0.1
Crab – Seafood	0.6	0.1
Turkey Breast (without skin)	0.6	0.2
Dolphin – Fish	0.7	0.2
Conch – Seafood	0.8	0.2
Lobster – Seafood	0.9	0.2
Salted codfish – Fish (1 ½ oz or 50 mg)	1.2	0.2
Chicken Breast (without skin)	1.2	0.3
Snapper – Fish	1.3	0.3
Shrimp – Seafood	1.7	0.3
Milk (2% low fat [½ cup or 125 ml]	2.4	1.5
Lung – Beef	2.5	0.1
Turkey Breast (with skin)	2.6	0.7
Kidney – Beef	3.1	1.0
Pork Tenderloin	3.4	1.4
Turkey Leg	3.6	1.1

Table 2a (cont'd):
Comparison of the Lipid Content of Selected Categories of Food From Animals

FOOD ITEM DESCRIPTION (100g)*	TOTAL FAT (g)	SATURATED FAT (g)
Beef Top Sirloin (select)	3.7	1.3
Heart – Beef	3.8	1.1
Liver – Beef	3.8	1.5
Beef Top Round (choice)	3.9	1.3
Milk (whole) [½ cup or/125 ml]	4.1	2.6
Turkey (whole)	4.3	1.2
Evaporated Milk (whole) [¼ cup or 6.25 mg]	4.7	2.9
Egg (hen) [1 each]	5.0	1.5
Pork Center Loin Chop/Roast	5.0	1.7
Pork Top Loin Chop	5.3	1.8
Condensed Milk (whole) [¼ cup or 6.25 mg]	5.4	3.4
Pork Loin	5.6	1.9
Pork Sirloin (Chops/Roast)	5.7	1.9
Mackerel (canned) – Fish	6.3	1.8
Beef Flank (choice)	7.4	3.2
Beef Tenderloin	7.9	2.9
Tuna (canned in oil) – Seafood	8.2	1.5
Chicken Leg	8.7	2.4
Chicken Breast (with skin)	9.2	2.7
Brain – Beef	9.3	2.2
Beef Ribs (choice)	9.4	3.8
Sardines (canned in oil) – Fish	11.4	4.5
Chicken (whole)	14.8	4.2
Chicken Thigh	15.3	4.3
Chicken Wing	16.0	4.5
Tongue – Beef	16.1	7.0
Beef Mince (lean)	20.7	8.3
Beef Mince (regular)	26.6	10.8
Cheddar Cheese	33.1	21.1
Cream Cheese	34.9	22.0
Duck (whole)	39.3	13.2

Ranking is based on total fat, from least to most. *Values are for 100 g raw product except where otherwise stated beside the item.

Table 2b:
Comparison of Selected Food From Animals
(Cholesterol and Calories)

FOOD ITEM DESCRIPTION	CHOLESTEROL (mg)	CALORIES
Milk (Skim) [½ cup or 125 mls]	2.5	44
Milk (2% low fat) [½ cup/125 mls]	10	62
Milk (whole) [½ cup/125 mls]	17	76
Evaporated (whole) [¼ cup/62 mls]	18	84
Tuna (canned in oil) – Fish	18	198
Condensed (wh ole) [¼ cup/62 mls]	21	226
Snapper – Fish	37	100
Crab – Seafood	42	84
Parrot – Fish	49	397
Turtle – Seafood	50	89
Beef – Flank (choice)	50	154
Pork Top Loin Chop	55	141
Beef Top Round (choice)	57	132
Chicken Breast (without skin)	58	110
Pork Loin	59	143
Beef Ribs (choice)	59	170
Beef Top Sirloin (select lean)	61	124
Turkey Breast (without skin)	62	111
Beef Tenderloin (choice)	62	160
Pork Center Loin Chop	63	140
Pork Sirloin Chops	63	142
Chicken Breast (with skin)	64	172
Pork Tenderloin	65	120
Whelks – Seafood	65	137
Turkey Breast (with skin)	70	123
Dolphin – Fish	73	85
Beef Mince (lean)	75	264
Salted codfish (1½ oz [50 g])	76	145
Duck (whole)	76	404
Chicken Wing	77	222
Mackerel (canned) – Fish	79	15
Chicken Leg/drumstick	81	161

Table 2b (cont'd):
Comparison of Selected Food From Animals
(Cholesterol and Calories)

FOOD ITEM DESCRIPTION	CHOLESTEROL (mg)	CALORIES
Chicken Thigh	84	211
Conch – Seafood	85	105
Beef Mince (regular)	85	310
Turkey Leg	87	118
Tongue (beef)	87	224
Chicken (whole)	90	213
Lobster – Seafood	95	90
Cheddar Cheese	105	403
Cream Cheese	110	349
Heart – Beef	140	117
Sardines (canned in oil) – Fish	142	208
Shrimp – Seafood	152	106
Egg – hen (1 each)	212	75
Lung – Beef	242	92
Kidney – Beef	285	107
Liver – Beef	354	143
Brain – Beef	1672	126

Ranking is based on cholesterol from least to most for 100g raw product except where indicated. Meats trimmed to ¼ inch fat.

Total fats, saturated fats, cholesterol and excess caloric intake in our food are linked to chronic non-communicable disorders such as diabetes, heart diseases, hypertension and some forms of cancer. Red meats have been singled out because they are known to have significant quantity of total fat, saturated fat and cholesterol.

But meats are not the only animal products with these nutrients; neither do they have the highest content. Additionally, there is no research to support that these nutrients are more harmful from red meats as opposed to other

animal sources. Emphasis, therefore, should be on restricting undesirable amounts of these nutrients in the diet despite the source.

It must be noted that total fat, type of fat: polyunsaturated or saturated, and cholesterol are primary considerations when looking at chronic non-communicable diseases together and reducing the overall risk for the development of any of these disorders. With the reduction and control of total fat in the diet there tends to be a reduction of saturated fats and cholesterol. The relationship to chronic diseases stems from the total and saturated fats content of foods, also the content of dietary cholesterol to a lesser extent. The connection or relationship certainly is not between meats specifically and chronic diseases.

MEAT CHOICES AND PREPARATION

A quick review of the data in Table 2 would identify seafoods in general as the best choices in the Foods from Animals group, when low total and saturated fat contents are being sought. This conclusion changes rapidly once the cholesterol content is considered. However, there are many fatty fish with high quantities of these nutrients. Overall the practicality of dramatically increasing fish intake diminishes when the nutrient cost value is explored. Fish and shellfish in general are more costly than other sub-categories in this food group. If good dietary skills are practiced then a variety of meats can be included in the diet plans.

It should be clear that the selection of appropriate cuts of meat is more important than the exclusion of meat from the diet. Except for the light/white meat (without skin) of poultry, choices from the subgroup have no advantage as to fat and cholesterol content.

Care should be taken to select cuts of meat that are lower in fats. Good or select grades tend to have a lower fat content than prime grades. Choices of red meat that provide less than 1.5 g saturated fats per ounce of meat include:

- ***Beef:*** lean round, loin, sirloin and chuck (well trimmed).
- ***Pork:*** lean ham, loin, shoulder or leg.
- ***Veal:*** Loin cutlet and rib.
- ***Goat:*** most cuts.

The flank of beef and lean and extra lean ground beef are fair choices. They may provide between 1.6 and 2.5 g saturated fat for each ounce.

Once a low fat/lean cut of meat is selected preparation becomes the next important step. Most of our traditional methods of preparing meat involve the excessive use of fats and oils. We do this in order to

ensure that our meals are tasty. There is no doubt that this is an important consideration in preparing meals. There are several ways in which we can maximize flavour while not increasing health risk by such actions as adding excess fats, oils and sodium to meals.

Here are a few tips to facilitate the inclusion of meat choices with lower fat content in the diet:

- Start by buying leaner cuts of meats
- Trim all visible fats and skin
- Choose low-fat cooking methods such as roasting, grilling, baking, boiling, braising, and stewing instead of frying.
- Add little or no margarine, oils and coconut milk while cooking.
- Drain fats and oil extracts from cooking, especially if browning is done first.
- Limit the use of gravies and sauces: make them with water rather than fat based.

In addition, avoid using excess amount of seasoning that may be detrimental to your health such as salt, monosodium glutamate (MSG), accents and seasoning salts. Instead use more herbs and spices for example scallion, thyme, garlic, onion, ginger, pimento, basil, rosemary, bay leaves, and other seasoning without added salt or sodium.

MEAT SAFETY

Another concern regarding meat is the importance of ensuring its wholesomeness. This is of primary concern and is affected by the selection of meats free from contaminants; the method of preparation, handling, service and storage of leftovers.

Recent concerns about Bovine Spongiform Encephalopathy (BSE) otherwise know as "mad cow disease" caused beef to be under careful scrutiny, However there are other aspects of meat safety that are crucial to us. Similar to most food from animal sources, all meats – raw, cooked, and gravies – are among the foods categorized in food safety terms a "hazardous" and "high risk" foods. This means that they can support the growth of bacteria or the production of toxins. They are also among the foods at the greatest risk of causing food-borne illnesses.

MEAT SAFETY TIPS

- Choose meats from safe source. Ensure that meats have been inspected and approved for human consumption.
- Buy some wholesome cuts of meat free from discolouration and unpleasant "off" odours.
- If raw meat is for short-term storage before use – store on

shelves below cooked and/or ready to eat foods.

- Ensure temperature below 4°C (40°) is maintained during refrigeration.
- If meat is not for immediate use; store raw meat in freezer below 0°C (18°F).
- Always store meat in a covered container.
- Thaw frozen meat in refrigerator whenever possible on shelf below ready-to-eat foods. Keep cool while thawing.
- If a microwave is available to thaw meat, use as specified by manufacturers instruction.
- Use promptly, do not leave in thaw state for extended period.
- Use separate utensils and cutting board for raw meats and cooked/ready to eat foods. All cutting boards should have a surface which is smooth and free from cracks and pits.
- All utensils, equipment and surface used in meat preparation must be cleaned and sanitized after every use for about 45 seconds.
- Cook all meats thoroughly before serving. Meats cooked rare are more likely to contain harmful organisms than meats that are well done.
- Meats should not be left at room temperature except during the time necessary for preparation, processing and serving.
- Ensure minimum internal temperature for meats during cooking.
  - All ground meats – 68°C (154°F)
  - Pork and pork products – 66°C(151°F)
  - Beef and other meats – 60°C (140°F)
- Avoid holding cooked meats for long periods. Keep meats covered and hot in an oven or steam table.
- If there is excess meat to be stored – cool thoroughly as fast as possible in a shallow pan of water.
- Refrigerate or freeze cooked meats immediately. Place on upper shelf in refrigerator (it is now ready to eat). Keep cooked meats in refrigerator for extended periods:
  - Roasts, steaks and chops – 3-5 days
  - Ground meats 1-2 days
  - Ham (not canned) 1-3 weeks
- Frozen meats may be kept for longer periods.
- Thaw only the portion of frozen cooked meats required for immediate use.
- Thaw frozen cooked meats in refrigerator.

- Reheat quickly within two hours to an internal temperature of 74°C.
- Reheat cooked meats before use.
- Never reheat meat more than once.
- Discard any excess after reheating.

MEAT AND THE DIET

Meats should continue to be a healthful part of a balanced diet for those who enjoy the taste and so choose to include it in their diet. This need not be a problem, since a basic guideline to healthy eating is that we eat a wide variety of foods in the appropriate proportions. So the use of meats should add the necessary variety to the diets. Of greater importance are the nutrients that meats bring to the diet. Meats contain all the essential amino acids, apart from several other nutrients. They also have phosphorous, potassium, sodium and magnesium. Excluding meats from the diet while indiscriminately increasing the intake of other animal products may not promote health. The best approach is moderation, overall, based on the inclusion of a wide variety of foods in quantities adequate to meet individual dietary needs. The dietary guidelines developed in the Caribbean should pave the way for enjoyment of meats and healthy eating.

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FISH

The Caribbean is renowned for its variety of fish. Supposedly arising from longstanding dietary habits, some fish are more appreciated on our tables and by our palates than others. Some types, for example, king fish is more commonly used in most of the islands while other types, for example, shark is probably used more in Trinidad and Tobago compared with Jamaica. Fish is frequently featured at cultural and religious celebrations and has been gaining popularity. Food fads come and go, but the inclusion of fish in the diet has been a perennial recommendation regardless of the days of the week such as Fridays or religious season such as lent. Fish is naturally a healthier choice compared with other foods from the Caribbean food group, Food from Animals.

Fish are often classified on the basis of their fat content:

- Less than 2% fat in the edible flesh – lean, e.g. dolphin
- 2-5% in the edible flesh – medium fat e.g. mullet
- More than 5% in the edible flesh – high fat e.g. salmon, mackerel, herring and others which usually have more highly pigmented flesh that is either yellow, pink or grayish.

Fish, fresh or frozen are marketed in various forms. These are either:

- *whole:* just as they come from the water;
- *drawn:* only the entrails are removed;
- *dressed:* scaled and eviscerated and usually have the head, tail and fins removed;
- *steaks:* cross-cut or slanted-cut sections of the dressed fish; and
- *fillet:* sides of the fish cut lengthwise away from the backbone.

Traditionally, the preference is for fresh fish but in recent years, frozen fish has been gaining acceptance in many households. Some fish are cured commercially and converted into salted fish. To a lesser extent drying and salting is done by homemakers or small entrepreneurs primarily for home use. Some canned fish are also available. Many convenience items containing frozen fish are now available. These include frozen, breaded, precooked fish fillets and fish sticks.

NUTRITIVE VALUE

Regardless of the type of fish, the edible flesh has similar nutritive value providing a range of nutrients, namely protein, fat, minerals, vitamins and water.

- ***Protein*** – all fish are valuable chiefly as a source of high quality protein with an abundance of essential amino acids. The percentage of protein is also similar to that of meat and is therefore inter-changeable with meat. A 3-ounce cooked serving of most fish provides about 20 grams of protein, or about a third of the average daily recommended protein intake.
- ***Fat*** – Although the types of fish differ from each other in their fat content, all kinds are generally lower in fat than medium-fat beef, poultry or pork. Specifically fish are rich in two of the three omega-3 essential (must be provided by the diet) polyunsaturated fatty acids: Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA). Mackerel, salmon, herring, sardines and tuna are fish sources of EPA and DHA but with the exception of tuna, all the others provide at least 1 gram of omega-3 fatty acids in 100 grams (3.5 ounces). Tuna provides a lesser amount of omega-3 fatty acids, but depending on the frequency and amount consumed, its contribution can be significant.
- ***Minerals*** – The edible flesh of all fish has a slightly higher percentage of mineral matter than meat. Salt-water fish is probably the most dependable source of iodine, the mineral that prevents the development of goitre. Fish is also rich in phosphorus and fish with edible bones, provided that they are eaten, supplies added calcium to the diet.
- ***Vitamins*** – Fat fish contain more vitamin A than lean varieties. Canned salmon is a fair source of vitamin A and a good source of riboflavin and niacin.
- ***Water*** – Practically all fish have a higher water content than beef.

DIETARY USES

The edible portion of fish makes it conducive for inclusion in the regular diet for older infants, for persons at other stages of the life cycle and for a range of therapeutic diets. Fish is easily digested. Fish can be pureed, chopped, flaked, added to other dishes, used in pies, included as a filling in roti or used as an entrée. There are probably as many different ways to use fish in the diet as the days of the month.

Fish Per 100 g	Kcal	Pro (g)	Fat (g)	SFA (g)	Chol (mg)	Calc. (mg)	Sod. (mg)	Pot. (mg)	Iron (mg)
Anchovy	86	17.9	1.1	-	-	469	-	-	0.7
Bonito	168	24.1	7.3	-	-	28	-	-	0.7
Butterfish, baked	187	22.2	10.3	-	83	28	-	-	0.7
Cavlli	115	20.9	2.8	-	-	-	-	-	-
Dolphin	85	18.5	0.7	0.2	73	-	88	416	1.0
Flying fish	91	21	0.2	-	-	45	-	-	0.5
Grouper, raw	87	19.3	0.5	-	-	0	-	-	0.0
Herring, raw, whole	195	16.4	13.9	3.3	77	33	74	423	1.1
Jacks	99	20.0	1.5	-	-	49	-	-	1.3
Kingfish	105	18.3	3.0	-	-	-	83	250	-
Mackerel, raw	223	19.0	16.3	-	-	24	130	360	1.0
Mullet	146	19.6	6.9	-	-	26	81	292	1.8
Salmon, raw, pink	119	20.0	3.7	-	-	27	98	310	0.7

Although palates are changing and accepting fish prepared by baking, steaming and grilling, there is a general, traditional preference for fried fish. As long as control is exercised with the use of added fat, most methods other than frying will provide less calories and thus be healthier options.

Eating fish allows for a greater variety of foods in the diet. It is worth considering to include fish in the diet more often. The following tips may be useful:

1. Slowly try substituting fish for one or more types of protein foods, thus establishing a twice-weekly routine until it becomes an established part of your diet plan.
2. Try a different type of burger – grilled fish steak burger or fish can be minced and converted into a patty or fish "loaf."
3. Try marinating and grilling fish "steaks" for a change of pace. Grilled fish kabobs are also a possibility with firm-fleshed fish.
4. Choose from the variety of marinades and spices to enhance the flavour and do not forget that old classic, lemon juice, garlic, bandania/shadon beni and herbs.

5. Have a couple of cans of tuna on hand for quick lunch or supper ideas. A tuna salad sandwich or a tuna and noodle casserole can be ready in no time. (Just go easy on the mayonnaise).
6. Consider a "seafood snack" of tuna or sardines on crackers between meals.
7. Introduce fish and seafood to your children when they are young, so they get into the habit of eating it.
8. Choose broiled, grilled or baked fish more often than fried, which is higher in total fat.

Give fish a place your household, explore the many varieties and expand your collection of fish recipes. You and your family's health will be the better for it.

HEALTH BENEFITS

The beneficial effects of the omega-3 polyunsaturated fatty acids have been highlighted in lowering blood cholesterol and preventing heart disease. Inuit peoples of Alaska and Greenland enjoy relative freedom from heart disease despite high-calorie, high-fat and high-cholesterol diets. This has been attributed primarily to the use of fish and other marine animals that are rich in omega-3 fatty acids, particularly EPA and DHA. A diet low in fat, especially saturated fat combined with regular fish consumption is noted for improving lipid profile.

For pregnant and breastfeeding women, fish makes good nutritional sense. First, it's a good source of low-fat protein, important when you're trying to get the most nutritional value for your extra calories. Second, the type of omega-3 fatty acid known as DHA is thought to be beneficial to the eyes. Scientists have found that women who ate fatty fish while pregnant gave birth to children with better visual development. Additionally, babies of mothers who had significant levels of DHA in their diet, while breastfeeding, experienced faster- than-normal eyesight development. Preliminary research also suggests that a diet rich in omega-3 fatty acids, DHA in particular, may help decrease the chance of preterm birth, thus allowing the baby more time for growth and development.

SELECTION, CARE OF FISH AND FOOD SAFETY

Selection – unfrozen, fresh fish has firm flesh, a stiff body and tight scales. The gills are red and the eyes bright and unsunken. Pressure on the body should not leave an indentation in the flesh unless it was frozen and thawed. The exterior of the fish has little or no

slime and the odour is characteristically fresh. Fresh fish will usually sink if placed in water. Frozen fish should be solidly frozen and should have little or no odour. All frozen fish should remain frozen until it is ready to be used.

Care – the delicate structure of fish makes bacterial invasion easy. Rapid spoilage is due partly to the high degree of activity of the enzymes present in fish and the low temperatures of the natural environment are thought to account for the unusual activity of body enzymes. At home, fish must be kept refrigerated the same as other perishables. Its strong odour can contaminate other foods and therefore it must be kept tightly covered.

Food Safety – As a general rule food borne illness can be prevented by:

- Purchasing wholesome fish
- Freezing the fish if use is not immediate
- Avoiding cross contamination
- Keeping hot foods hot
- Keeping cold foods cold
- Keeping a clean and safe kitchen or food establishment

CONCLUSION

Fish can be an important part of a healthy and balanced diet. It

is readily available, provides nutritious protein and contains beneficial fat that can ultimately contribute to a healthful diet. Eating a variety of fish, rather than concentrating on one species, is highly recommended. Eating the catch from your pastime can be even more fun. It is however advisable to check with your local health department to see if there are any advisories about fish caught from specific rivers or waterways. Individuals should be encouraged to eat fish throughout the year.

REFERENCES

Noss Whitney, E and Rady Rolfes, S. Understanding Nutrition, 9th edition. Wadsworth Thomson Learning, 2002.

EGGS

Over the last few decades, eggs have been the subject of criticism and scrutiny, vilified by well-meaning scientists and health professionals for their high cholesterol content. Regardless of the colour of the shell or their size they were deemed bad for the heart. It was previously thought that eggs contributed significantly to raising the serum cholesterol, a main contributor to the development of plaque that constricts the arteries and the onset of cardio-vascular disease. The yolk in a single large egg contains about 5 grams of fat, and approximately 200 mg of cholesterol so it was only natural to conclude that consuming eggs would result in exceeding the daily dietary recommendation for 300 mg of dietary cholesterol for the healthy adult.

Arising from the Women's Health Initiative Dietary Modification Trial, researchers at Harvard University showed that the type of fat in the diet, more than the total amount of fat, had a stronger influence in preventing heart disease, breast cancer, or colon cancer. It became clearer that "bad fats", meaning saturated and trans fats, raised low-density lipoprotein cholesterol (LDL-C) increasing the risk for certain diseases while "good fats" increased high-density lipoprotein cholesterol (HDL-C) suggesting that mono-unsaturated and polyunsaturated fats lowered the risk. Saturated fats are mainly animal fats; unsaturated fats (poly and mono) are found in products derived from plant sources; trans fats are fats produced by heating liquid vegetable oils in the presence of hydrogen. This process is known as hydrogenation. Trans fats are even worse for serum cholesterol levels than saturated fats because they raise LDL-C and lower good HDL-C. The key therefore is to substitute good fats for bad fats. In general, the higher your LDL and the lower your HDL, the greater your risk for atherosclerosis and heart disease.

Although it is still important to limit the amount of dietary cholesterol, especially in the presence of diabetes, dietary cholesterol isn't nearly the villain it's been portrayed to be. The level of serum cholesterol is more important. High serum cholesterol levels greatly increase the risk for heart disease. The average person makes about 75% of blood cholesterol in his or her liver, while only about 25% is absorbed from food. The biggest influence on blood cholesterol level is the mix of fats in

the diet. In this context, health experts have been vindicating the egg's reputation and they have been making a comeback. Moderate egg consumption, that is one a day, does not increase heart disease risk in healthy individuals.

EGG VARIETIES

The most commonly used eggs are those from chickens. However eggs are also available from other birds but these are not generally used for human consumption. Available on the market are "lower cholesterol" eggs that have been produced by feeding chickens a vegetarian diet in an attempt to reduce the cholesterol content. Omega-3 eggs are also being engineered by feeding chickens flaxseed, marine algae and fish oil. The outcomes of these studies are pending.

NUTRITIVE VALUE

While it's true that egg yolks have a lot of cholesterol and therefore may slightly affect blood cholesterol levels, eggs also contain nutrients that may help lower the risk for heart disease. Eggs contain mostly poly-unsaturated fat, which can actually lower blood cholesterol if one replaces food containing saturated fat with eggs. A large egg represents less than 4% of the daily caloric intake of a person eating 2,000 calories a day. It provides about 10% of a person's daily recommendation for protein, and valuable iron, B vitamins and minerals, including the folate and choline recommended for pregnant women.

Protein

Eggs are an excellent source of protein. Egg protein is of high biological value as it contains all the essential amino acids needed by the human body. Eggs therefore complement other food proteins of lower biological value by providing the amino acids that are in short supply in those foods. 12.5% of the weight of the egg is protein and it is found in both the yolk and the albumin. Although protein is more concentrated around the yolk, there is in fact more protein in the albumin.

On the evaluation scale most commonly used for assessing protein, egg is at the highest point, 100, and is used as the reference standard against which all other foods are assessed.

Vitamins

Eggs contain most of the recognized vitamins with the exception of vitamin C. The egg is a good source of all the B vitamins, plus the fat-soluble vitamin A. It also provides useful amounts of vitamin D, as well as some vitamin E.

Minerals

Eggs contain most of the minerals that the human body requires for

health. In particular eggs are an excellent source of iodine, required to make thyroid hormone, and phosphorus, for bone health. The egg provides significant amounts of zinc, important for wound healing, growth and fighting infection; selenium, an important antioxidant; and calcium, needed for bone and growth structure and functioning of the nervous system. Eggs also contain significant amounts of iron, the vital ingredient of red blood cells, but the bioavailability of this iron is inhibited by the presence of phosvitin in the yolk.

Nutrient Content of 1 Large Chicken Egg[1] (boiled, hard/soft)			
Energy	50 kcal	Protein:	6.3 g
Fat	5.3 g	CHO	0.6 g
SFA	1.6 g	Vit A	84.0 R.E./280 IU
MUFA	2.0 g	Vit. B_1	.03 mg
PUFA	0.7 g	Vit B_2	.26 mg
Chol	212.0 mg	Vit B_6	.06 mg
Sod.	62.0 mg	Vit B_{12}	.56 mcg
Pot.	63.0mg	Fol	22.0 mcg
Iron	0.59 mg		

[1]*Jean A. Pennington, Bowes & Church's Food Values of Portions Commonly Used (Linppincott, 1998) pg. 93*

Fat

10.8% of the egg content is fat. The fat of an egg is found almost entirely in the yolk; there is less than 0.05% in the albumin. Approximately 11% of an egg's fatty acids are polyunsaturated, 44% monounsaturated and only 29% saturated.

Cholesterol

Cholesterol and lecithin are fat-like substances and are essential to the structure and function of all cells in the body. Cholesterol helps to maintain the flexibility and permeability of cell membranes and is also a raw material for the fatty lubricants that help to keep the skin supple. Cholesterol is essential for the production of sex hormones, cortisol, vitamin D and bile salts. Lecithin is involved in general lipid transportation in the blood and in the metabolism of cholesterol.

Carbohydrate and Dietary Fibre

Eggs contain only traces of carbohydrate and no dietary fibre.

DIETARY USES

While it is well known that high blood cholesterol levels are associated with an increased risk for heart disease, scientific studies have shown that there is only a weak relationship between the amount of cholesterol a person consumes and their blood cholesterol levels or risk for heart disease. For some persons with high cholesterol, reducing the amount of dietary cholesterol has a small but helpful impact on blood

cholesterol levels. For others, the amount of cholesterol eaten has little impact on the amount of cholesterol circulating in the blood.

Eaten in moderation, eggs can be part of a healthy diet. However, persons living with diabetes should probably limit themselves to no more than two or three eggs a week, as the Nurses' Health Study found that for such individuals, an egg a day might increase the risk for heart disease. Similarly, people who have difficulty controlling their blood cholesterol may also want to be cautious about eating egg yolks and choose foods made with egg whites instead.

As with many other foods, eggs are easy to prepare in a number of different ways. They even used as a thickening agent in many recipes. They can be used alone or combined with many other food items thereby increasing the nutrient density of the food.

FOOD SAFETY

Since egg shells are porous, they are at risk of contamination with salmonella, bacteria that can cause extreme intestinal distress. It is therefore recommended that eggs should be cooked thoroughly and eaten promptly after cooking. Cracked eggs should not be purchased and raw eggs should not be eaten by individuals. This is even more critical for the elderly and immuno-compromised, for instance, persons with HIV/AIDS, because the response capacity of the immune system is suboptimal. Eggs should also be stored in their carton on a shelf in the refrigerator, not in the door.

CONCLUSION

Eggs are nutrient dense and according to current scientific

research, they can be included in the diet for most persons more often than was previously recommeded. The colour of the shell has no relationship to the nutrient content. However, eggs have been and are being engineered to alter the cholesterol and omega-3 content. Eggs can be used in a variety of ways in the diet but persons should adhere to food safety requirements regarding purchasing, storage and preparation of eggs.

CHEESE

Cheese, a food item widely used in the Caribbean, is a solid food made from the curdled milk of cows, goats, sheep, or other mammals. Curdling uses some combination of rennet (or rennet substitutes) and acidification. Bacteria acidify the milk and play a role in defining the texture and flavour of most cheeses. Some cheeses also contain molds, either on the outer rind or throughout.

TYPES OF CHEESE

There are more than 400 different types of cheese – with more than 2,000 different names – that derive their flavour from the different species of bacteria and molds, different levels of milk fat, variations in length of aging, differing processing treatments (cheddaring, pulling, brining, mold wash) and different breeds of cows, sheep, or other mammals. Other factors include animal diet and the addition of flavouring agents such as herbs, spices, or wood smoke. Whether or not the milk is pasteurized may also affect the flavour.

Cheese can be classified into 6 categories based on *the moisture content:*

1. Very Hard e.g. Parmesan and Romano
2. Hard e.g. Cheddar, Edam, Gouda and Gruyere
3. Semisoft e.g. Bel Paese, Limburger and Port du Salut
4. Blue Cheese e.g. Blue Vein, Gorgonzola and Roquefort
5. Soft e.g. Brie and Camembert
6. Unripened e.g. Cottage and Ricotta

Sometimes cheese is *classified according to the ripening methods*. Cheese such as Gorgonzola and Roquefort, ripened by microbes added to the curds, are called interior-ripened cheeses; cheese such as Brie and Camembert, ripened by the action of microbes rubbed on the surface, are called surface-ripened cheese.

Many of these classifications overlap because the texture of a cheese changes as it ages. Fresh cheeses, such as cottage cheese, are the soft, moist curds that have been cut and drained of their whey but never cooked or ripened. Cottage cheese is simply drained, mixed

with cream or milk, and seasoned. However, some fresh cheeses, such as cream cheese and ricotta, are lightly pressed or molded to improve their shape and consistency.

Soft cheeses, such as Brie and Camembert, have a creamy consistency with a cardboard-like rind and are usually surface-ripened. Semisoft cheeses have a smooth texture and are usually uncooked. The interior-ripened blue-veined cheeses – such as Blue cheese, Roquefort, and Gorgonzola – fall under the semi-soft category. Washed-rind cheeses, or cheeses that are rubbed with brine-soaked cloths during ripening, are also considered semisoft cheeses. Well known semisoft, washed-rind cheeses include Muenster and Limburger.

Hard cheeses have a firm, dense, uniform texture that ranges from waxy to crumbly. Many hard cheeses, for example Swiss, cheddar, and Gouda, derive their firm texture from the cheddaring process, in which layers of curd are stacked on each other to squeeze out excess whey. Very hard cheeses – for example, Parmesan and Romano cheeses are usually cooked, pressed into hoops or molds, and aged for as long as two years. Because of their texture, very hard cheeses are used for grating, and are sometimes called grating cheeses.

Cheeses are also classified into natural and processed categories. Natural cheese is made from milk using the three basic steps described above. Processed cheese is made by combining one or more kinds of natural cheese with coloring additives, flavouring substances, and emulsifiers, which are chemical ingredients that make the texture smoother and more uniform. The mixture is melted and then poured into containers of various shapes and sizes to solidify. Processed cheeses have a longer shelf life than natural cheeses because they do not age. Like natural cheeses, processed cheeses retain many of the nutrients found in milk, but may lack the flavor and texture of natural cheeses. Not all types of cheese are available throughout the Caribbean. Some islands/countries will have more varieties than others.

CHEESE PRODUCTION

Although hundreds of specialized techniques lend different types of cheese their distinct flavours and characteristics, three basic steps are common to all cheese making. ***First,*** proteins in milk are transformed into solid lumps called curds. ***Second***, the curds are separated from the milky liquid, called whey, and shaped or pressed into molds. ***Finally***, the

shaped curds are ripened using a variety of different aging and curing techniques.

Adding acids such as vinegar or lemon juice is used to curdle the milk when making a few cheeses. However, most cheeses are acidified to a lesser degree by bacteria, which convert lactose, the milk sugar into lactic acid. Curds are formed when an enzyme called rennin is stirred into milk. Rennin encourages casein, one of the proteins in milk, to solidify and clump together, or coagulate. Rennin is found in rennet, traditionally extracted from the stomach linings of calves, sheep and goats. It is now also laboratory produced. Substitute "vegetable rennets" have been extracted from plant species of the *Cynara* thistle family and this is used in the production of vegetarian cheese. Rennin aids coagulation only if the milk is slightly acidic, as it is when it becomes sour.

Rather than waiting for milk to become sour, cheese makers speed up the process by warming the milk and adding specialized bacteria that convert the lactose to lactic acid thus creating the acidic environment that is necessary for casein coagulation. As the casein clumps together, it traps fat globules and some of the milky liquid inside the clumps, forming moist, nutritious curds.

In the second step of cheese making, the curds are separated from the whey. The curds are cut into small chunks to drain the excess whey trapped inside. Different types of cheeses have varying moisture contents, determined by the amounts of whey allowed to remain in the curds. To produce cheeses high in moisture content, such as cottage cheese, cheese makers need only cut the curds and drain the whey before seasoning and packing the cheese into cartons for sale. Cheeses with lower moisture content undergo further treatment to condense the curds and remove more of the whey. The varying methods used to release excess whey play a large role in determining the final character of the cheese.

Some cheeses, such as Swiss cheese, are heated and agitated in a cooking process that further breaks down the curds and releases more of the whey, creating a denser style of cheese. To create cheeses that are denser still, the curds are stacked on top of each other, in a process called *cheddaring*, which relies on the weight of the layers to squeeze still more of the whey from the curd. At this point, cheese makers may knead the curds – twisting and pulling them by hand – to create a stringier, more elastic texture like that found in mozzarella or provolone.

The curds are then shaped by hand or pressed into molds of various shapes and sizes. Curds of nearly all cheeses are salted by

stirring the salt directly into the curds or by rubbing salt or a saltwater solution, called brine, onto the curd surface. Salt pulls moisture from the cheese, but more importantly, it acts as a preservative and slows down the final step of cheese making – the ripening.

During the ripening process, microbes such as bacteria slowly change the composition of the curds, creating cheeses with distinct flavours, textures, and aromas. The kinds of microbes used, the temperature and humidity conditions of the ripening environment, and the duration of the ripening process, all contribute to the final characteristics of the cheese.

In some cheeses, the bacteria added to create the acidic environment necessary for curd formation continue to ripen the cheese as well. In Swiss cheese, for example, these bacteria produce gas bubbles during ripening, creating its characteristic holes, or eyes. In other cases, microbes are added to the shaped curd. For example, a blue-green mold called *Penicillium roqueforti* is used to ripen cheeses such as Roquefort and Gorgonzola. This special mold creates bluish-green veins in the cheese and a characteristic sharp flavour and creamy texture. Other cheeses, such as Brie and Camembert, are ripened by bacteria rubbed on the outer surface of the cheese. The bacteria slowly work their way into the interior of the cheese, creating a soft, pungent interior and leaving a powdery, edible white rind on the outside.

Ripening usually takes place in carefully controlled environments. Conditions are often designed to mimic the natural environments of the ripening microbes, such as the cool, humid limestone caves of southern France, where Roquefort cheese originated. The moisture-laden air prevents the cheese from drying out as it ripens. Temperatures are kept cool, not only to encourage the activity of the ripening bacteria but to inhibit the growth of harmful bacteria that could spoil the cheese. The amount of time that cheeses are allowed to ripen, or age, also contributes to their final character. Generally, cheeses develop sharper flavours, harder textures, and deeper colors as they age.

SELECTING AND STORING CHEESE

Depending upon the type of cheese, there are different qualities to look for at the time of purchasing. Soft cheeses should be uniform in colour throughout, and the cheese should fill out the crust casing, which itself should be free from cracks and not too dry. Semi-firm cheese should not be too crumbly or dry with the colour

being relatively uniform. Hard cheeses should be uniform in colour and have a firm, uncracked rind that is not too dry or pasty. Bleu cheeses should be not too dry or too crumbly, and should feature veining that is evenly distributed.

It would have been to our advantage if our supermarkets/ groceries had a cheese department with a person who specializes in cheese. She or he could help consumers choose the best quality cheese for the intended use as well as introduce us to different cheeses that may not yet have been tried. This would help expand our variety and more greatly appreciate this wonderful food.

All cheeses, regardless of variety, should be well wrapped and kept in the warmest section of the refrigerator, that is the door. As storage life is related to the moisture content of the cheese, the softer the cheese, the shorter amount of time it will keep fresh. In general, firm and semi-firm cheeses will keep for two weeks while soft, bleu and grated cheeses will keep for about one week.

In some societies, stored cheese is a hedge against famine and is a good travel food. It is valuable for its portability and long life. Cheese is lighter-weight, more compact, and has a longer shelf life than the milk from which it is made.

NUTRITIVE VALUE

Cheese is a concentrated source of almost all the valuable nutrients found in milk, such as protein, vitamins, and minerals, as well as fat and cholesterol. The fat and cholesterol content in cheese varies depending on the milk used. Cheese made with whole milk, or milk enriched with cream, has the highest amount of fat, cholesterol, and calories. Cheese made with skim milk has the lowest and cheese made with low or partially skimmed milk has a moderate amount.

A one-ounce slice of cheese can provide the following percentages of an adult's daily recommended nutritional intake of the following nutrients: 20% calcium, 14% protein, 15% phosphorus, 6% riboflavin, 6% zinc and 4% vitamin B_{12}. A 30 gram (one ounce) serving of cheddar cheese contains about 7 grams of protein and 200 milligrams of calcium.

Calcium is needed for strong bones and teeth; phosphorus helps strengthen bones and generate energy in body cells; protein builds and repairs muscles; riboflavin helps convert food into energy; zinc assists with growth, normal metabolism and digestion and vitamin B_{12}, functions in building red blood cells that carry oxygen.

Cheese is used in as many different ways. Enjoyed with bread, crackers, and fruit, used as an

ingredient in cooked foods, or grated on salads and pastas, cheese is a healthy component of cuisines all over the world.

Nutritionally, cheese is essentially concentrated milk: it takes about 200 grams (seven ounces) of milk to provide that much protein, and 150 grams to equal the calcium. Cheese's high nutritional value and its beneficial roles in health make this food an important dairy food to include in a healthful diet.

NUTRITION FACTS

The following table gives nutrition facts[1,2] , for some types of cheese:

Dietary Uses

Because of its high protein and calcium content, cheese in moderation is an important component of a balanced diet. It is an especially good source of protein for individuals of any age group and can contribute a considerable amount of protein in the

Cheese (1 ounce/28 g)	kcal	Pro (g)	Fat (g)	SFA (g)	Chol (mg)	Sod. (mg)	Pot. (mg)	Calc. (mg)	Phos mg)
Cheddar	114	7.1	9.4	6.0	30	176	28	204	145
Blue	100	6.1	8.1	5.3	21	396	73	150	110
Camembert	85	5.6	6.9	4.3	20	239	53	110	98
Goat (hard)	128	8.7	10.1	7.0	30	98	14	254	207
Gouda	101	7.1	7.8	5.0	32	232	34	198	155
Swiss	107	8.1	7.8	5.0	26	74	31	272	171
Cream cheese (2 T)	99	2.1	9.9	6.2	31	84	34	23	30
Parmesan, grated (1T)	23	1.0	1.5	1.0	4	93	5	69	40
Cottage cheese, creamed (1 rounded T)	29	3.5	1.3	0.8	4	113	24	17	37

Pro = protein; SFA = Saturated Fatty Acids; Chol. = Cholesterol; Sod = Sodium;

Pot= Potassium; Calc.= Calcium; Phos.= Phosphorous

[1]*Jean A. Pennington, Bowes & Church's Food Values of Portions Commonly Used, Lippincott, 1998),pp 30-32.*

[2]*CFNI, "Food Composition Tables for Use in the English-Speaking Caribbean", (CFNI, 1995), pp 77-78.*

diet of pre-schoolers, school-aged and adolescent children whose growing bodies require higher amounts of protein per kilogram or body weight compared with adults. Many conventional vegetarians rely on cheese as a source of protein in their diets. However, it must be noted that "vegetarian cheese" may not necessarily be low in fat and cholesterol unless it was made from skimmed milk.

Cheese is eaten as purchased, combined with other ingredients or food items. Most cheese melts and browns when heated. Some varieties melt smoothly, especially in the presence of acids or starch. Cheese fondue, with wine providing the acidity, is a good example of a smoothly-melted cheese dish. Other cheeses turn elastic and stringy when they melt, a quality that can be enjoyed in dishes like pizza. Some cheeses melt unevenly, their fats separating as they heat, while a few acid-curdled cheeses, such as ricotta, do not melt at all and can become firmer when cooked.

Contraindications to Use of Cheese

Cheese is often avoided by those ***who are lactose maldigesters or lactose intolerant***, but ripened cheeses like Cheddar contain only about 5% lactose compared with whole milk cheese, and aged cheeses such as Swiss cheese contain little or no lactose. It is therefore possible that some cheese can be tolerated by some persons who are lactose intolerant.

Some ***people experience reactions to amines*** (protein compounds) found in cheese, particularly histamine and tyramine. Some aged cheeses contain significant concentrations of these amines, which can trigger symptoms mimicking an allergic reactions: headaches, rashes, and blood pressure elevations.

For ***individuals who are monitoring or reducing fat in their diet***, reduced fat varieties of cheeses may be available. Individuals can also include cheese in a fat reduced diet by making dietary trade-offs, for example, by balancing higher fat foods with lower fat foods. Some professional guidance from a dietitian is recommended.

Other Health Benefits

In addition to the nutritional contribution to the diet, cheese has several health attributes. Certain cheeses such as Cheddar, Mozzarella, Swiss, Blue, Monterey Jack, processed American cheese, and others have been demonstrated to reduce the risk of dental caries. Although the ***anticariogenic effects*** of cheese are not completely understood, several potential mechanisms are proposed. Consuming cheese may stimulate the flow of saliva, which has caries-reducing properties (e.g., increases

buffering capacity and promotes food clearance). Milk proteins in cheese have been demonstrated to neutralize plaque acids through their buffering capacity. Cheese appears to prevent acid demineralization and enhance remineralization of tooth enamel.

Several mechanisms for this protection have been proposed:

- The calcium, protein, and phosphorus in cheese may act to protect tooth enamel.
- Cheese increases saliva flow, washing away acids and sugars.
- Cheese may have an anti-bacterial effect in the mouth.

To help reduce tooth decay, it is recommended to eat cheese immediately after meals, or as a between-meal snack.

Because cheese is a calcium-rich food, providing 20-25% of the daily amount needed to build and maintain bone mass, its inclusion in the diet may help ***reduce the risk for osteoporosis, a bone-thinning condition, regulate blood pressure, reduce the risk of colon cancer and reduce symptoms of premenstrual syndrome.***

MILK

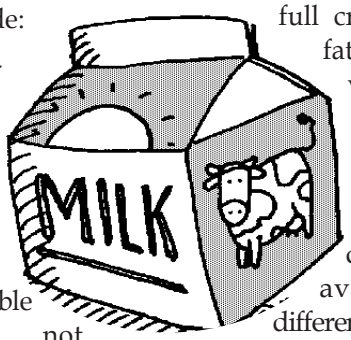
Milk is a nourishing fluid secreted by female mammals of various species that is ideal for feeding their offspring. Most of the world's milk is produced by cows. A lesser amount comes from goats, buffaloes and sheep. Many countries in the region are involved in rearing animals for milk production to supplement imported milks. Milk is often referred to as "the almost perfect food" because the newborn relies totally on its mother's nutritious milk for a specific duration of time. If milk was anything less than complete, survival of the young would be difficult. Milk is usually homogenized, pasteurized and fortified with vitamin D. During the homogenization process, milk fat is broken into small particles and dispersed throughout the milk instead of floating on the surface. Homogenization results in a uniform texture and a softer curd in the

stomach that aids digestion. Pasteurization is the heat process used to destroy potentially harmful bacteria and increase the keeping quality. Firstly, the milk is heated to at least 161°F (71.6°C) for 15 seconds and then it is heated to 280°F (137.7°C) for two seconds. The nutrient losses due to pasteurization are so small they are considered insignificant. Unpasteurised or raw milk is a health hazard because of the dangers of diseases due to bacterial contamination from *listeria, salmonella, campylobacter, escherichia, yersinia*, and *brucella*.

TYPES OF MILK

The common types of milk available on the market include:

- ***Full cream milk*** otherwise called ***whole milk*** should contain not less than 3.25% milk fat and not less than 8.25% milk solids-not-fat (carbo-hydrate, protein, minerals and water-soluble vitamins). Although not mandatory, whole milk may be fortified with vitamin D at a level of 400 International units (IU) per quart. If vitamin D is added, the label should state this fact.



- ***Reduced fat milk*** otherwise called ***low fat milk*** is produced when the fat has been removed to produce milk with one of the following contents: 0.5, 1.0, 1.5, or 2.0% milk fat along with not less than 8.25% milk solids-not-fat. This is marketed as either:
  - ***Skim or non-fat or fat-free milk*** containing less than 1% milk fat or
  - ***"Low fat" milk*** containing less than 2% milk fat.

  Vitamins A and D are removed with the milk fat and for this reason, these vitamins must be added so that it contains at least 2,000 IU of vitamin A and 400 IU of vitamin D per quart. This addition should be stated on the label.

- Flavoured milks can either be full cream or reduced fat. However, most varieties contain a lot of sugar.

In addition to adjustments with the fat content, milk is available in different forms: liquid, powdered/dry, evaporated, condensed and cultured.

Liquid milk

This is a common form in which milk is available. The unpasteurized milk requires minimum product alteration other than homogenization, pasteurization and fortification. A form of liquid milk is ultra-high-temperature (UHT)

milk, first produced commercially in the late 1960s. Such treatment allowed milk to be stored for extended periods of time and promised to provide a whole new system of supply, transport, and storage. However, UHT milk failed at that time to revolutionize the dairy industry primarily because of flavour changes associated with the high temperature treatment. Again, improvements in technology led to rapid changes in markets for and acceptability of UHT milk and other UHT dairy products. The UHT process pasteurizes the milk at very high temperatures for a short time, e.g. 302°F for about 4 seconds. The milk is then packaged in aseptic tetra-packed containers. UHT milk can be stored at room temperature with environmental conditions conducive to maintaining its wholesomeness for up to 3 months or more according to the manufacturer's recommendation. However, it requires refrigeration once the container has been opened.

The only significant nutritional problem associated with heat-treating milk, as in UHT, is the loss of vitamins for example, thiamin and vitamin B_6. However, as these are readily supplied in other foods, the loss is considered acceptable. Milk supplies a large proportion of dietary riboflavin and vitamin B_{12} or cyanocobalamin (49% and 36%, respectively). It is necessary to minimize losses of these where possible. Vitamins A (beta-carotene), D, E, , riboflavin, nicotinic acid, pantothenic acid, and biotin are not affected by UHT treatment. UHT processing of milk causes little physical or chemical change in milk fat. It may cause some reduction in the amount of polyunsaturated fats in milk triglycerides, which is of some concern when the dairy industry is attempting to increase the proportion of polyunsaturated fats in its products.

UHT treatment causes milk proteins to denature, and this may increase the digestibility of pro-teins and, thus, increase the nutri-tional value of milk. It is possible that heat treatment may reduce the antiinfective properties of milk by destroying immunoglobulins, but this would have little effect on the nutritive value. Further, fresh milk contains various folate-binding proteins, and these prevent gut micro-organisms from absorbing folic acid. UHT treatment, as well as pasteurization of milk, destroys this folic acid binding capacity and must be considered a disadvantage of heat treatment.

Conversely, heat treatment has little effect on the availability of

calcium. Although some casein-bound calcium may precipitate as calcium phosphate, the shorter heat treatment times allow for less deposition of this precipitate on heat exchange surfaces. Overall, retention of calcium and potassium is higher in UHT than pasteurized milk.

Powdered/Dry Milk

This product is made following evaporation of some of the water. The milk is then sprayed into a drying cham-ber to further reduce its moisture content. The result is a powder that is available primarily as dry whole milk and nonfat dry milk. Over the years, there have been significant product improvements so that powdered milk can now be recon-stituted instantly. Due to the low moisture content, powdered milks have a long shelf life. However dry whole milk can deteriorate faster than nonfat dry milk because of oxidative changes in the fat. Stability can be increased by use of special packaging such as vacuum-pack containers.

Evaporated Milk

This product is made after about 60-80% of the water is removed from whole or non fat liquid milk. The result is a concentrated product that is canned or tetra-packaged. Un-opened, these can be kept at room temperature for about six months. Once opened, they should be refri-gerated and used within three to five days. The canned product should be transferred to a clean container and refrigerated.

Condensed Milk

This product is similar to evaporated milk because it is made by partial removal of approximately 60% of the water from whole or reduced fat milk. A standardized amount of a suitable sweetener, usually sucrose, is added to prevent spoilage. The sweetener comprises about 40 to 45% of the condensed milk. This product is perishable and spoilage may occur rapidly at temperatures above 44.6^{o}F (7°C).

Lactose Free or Lactose Reduced Milk

These types of milk are pro-duced by adding the enzyme *lactase* to reduce the amount of lactose (milk sugar). Lactose reduced milk contains about 70% of its original value and lactose free is 100% lactose reduced. A reduction of about 50% lactose concentration is required to avoid the symptoms of lactose intolerance in the majority of cases. These alterations make them acceptable to persons who have difficulty digesting regular milk because they lack the enzyme lactase. A sweetener, for example

glucose is added to give the product the same sweetness as normal milk.

Cultured Milks

Cultured milks are fluid products that result from the souring of milk or its products by bacteria that produce lactic acid. Cultured milks are unlike acidified milks which are obtained by addition of food-grade acids which produce an acidity of not less than 0.2%, expressed as lactic acid. The term "cultured" is used because pure bacterial cultures are used in commercial manufacture. Other terms such as "fermented" or "sour" are synonymous with cultured because lactic acid, which imparts the sourness, is produced by fermentation of lactose. Examples of cultured milks are acidophilus milk and buttermilk.

Acidophilus milk: This product is made from pasteurized milk, usually low fat or skimmed, cultured with *lactobacillus acidophilus* and incubated at 1000F (380C) for at least 18 hours until a soft curd forms. Acidophilus milk is often promoted as a "health food." *Lactobacillus acidophilus* is considered to be a beneficial bacterium, a normal bacterial component of the gut micro flora that helps to maintain the balance of micro-organisms in the intestinal tract.

Buttermilk: Conventionally, buttermilk is a by-product of butter-making, the fluid remaining after churning cream to make butter. Buttermilk is now a milk product cultured with lactic acid. It is available in both skim and low-fat varieties. Some butter-milk has reduced lactose content, which can make it an option for persons who have difficulty digesting lactose in regular milk.

Specialty Milks

Several specialty milks are available though not all of them are available in the Caribbean. Two specialty milks that will be mentioned are imitation milks and low sodium milk.

Imitation milks purport to substitute for and resemble milk. These products usually contain water, corn syrup solids, sugar, vegetable fat (coconut, soybean, cottonseed) and protein from soybean, fish, sodium caseinate or other sources. These imitation milks do not contain dairy products but may contain derivatives of milk such as casein, salts of casein, milk proteins other than casein, whey, and lactose. Sometimes vitamins A and/or D are added. Ingredient and nutrient composition vary widely. Imitation milk products are inappropriate for feeding infants and young children unless they are especially formulated for these age groups.

Low sodium milk is produced after 95% or more of the naturally occurring sodium in milk is removed by ion-exchange where-by the

sodium is replaced with potassium. The sodium is reduced from 49 mg to about 2.5 mg per 100 g of milk which is then pasteurized and homogenized. Such a product is available for rarely used therapeutic diets that necessitate a very low sodium intake.

NUTRITIVE VALUE

Milk is probably the most controversial food item today. Unfortunately, there is some inaccurate information in the general community about the health benefits of milk. Changing one's milk intake on the basis of these fallacies may mean the unnecesssary restrictions of this energy rich, nutrient dense food that provides high levels of essential nutrients compared to its caloric content. Nutrition and dietetics professionals recommended that milk, and other dairy products, should be included daily as part of a balanced diet. Milk has long been a widely used food item, not only for its flavour but because of its unique nutritional package. Milk is a rich source of essential amino acids, which makes them particularly useful in diets for infants and children. Milk products contain a good balance of macronutrients, protein, fats and carbohydrates. It is also a very important source of calcium and riboflavin and provides significant amounts and a good balance of most other essential nutrients, with the notable exception of iron.

In addition, milk products contain "high quality proteins" with a ratio of amino acids appropriate to human requirements. Apart from being important nutrients themselves, milk proteins also enhance the value of poorer quality cereal and vegetable proteins in the diet by providing the amino acids in which these proteins are deficient. The amount of fat in whole milk is of concern to the increasingly "health-conscious" public because of the association of fats with increasing body weight and with cardiovascular disease. For this reason, there has been an increased demand for reduced-fat milks that contain lesser amounts of saturated fatty acids. Even when vitamins A and D are added, they may be considered "poor quality milks" by some persons because the fat content of milk is important to enhance the bioavailability of nutrients, particularly the fat-soluble vitamins. Caution must be exercised with respect to such terms as "vitamin enriched" or "mineral fortified," as these terms may give the impression that the milk products are no longer "natural," and, for this reason, consumers may be apprehensive of these products.

Milk contains a wide range of vitamins and minerals. One liter of whole milk provides more than the Caribbean Recommended Dietary Allowance (RDA) of thiamin, riboflavin, calcium, and phosphorous;

more than 10% of the RDA of seven other vitamins and 10 minerals. Calcium, the most important mineral in milk required in relatively large amounts compared with other minerals, is provided primarily by milk and milk products, with the exception of butter. Calcium in milk has high bioavailability and is absorbed better than that from vegetables or pharmaceutical preparations of calcium, which often have relatively low bioavailability.

Extracted primarily from Bowe's & Church's Food Values of Portions Commonly Used (1998), the following data show the nutrient content of the three main types of milk, whole milk, low fat milk and skim milk, compare with milk from other sources.

Reduced fat milks are also lower in calories, compared to whole milks, which contain 160 calories per 8 fluid ounces; 2% low fat milk has 120 calories and skim milk has 86 calories per 8 fluid ounces. Removing some of the fat in the milk to make 2% or skim milk also makes a difference to the amount of fat-soluble vitamins A, D and E, which are lower in the lower-fat milks. However the amount of B vitamins, thiamine (B_1), riboflavin (B_2), nicotinic acid, B_6, folic acid, pantothenic acid and B_{12} in each of the three types of milk, is almost the same. These vitamins as well as Vitamin C are water-soluble and so are not removed along with the fat. The levels of the minerals potassium and sodium are relatively similar for all three types of milk. However the mineral calcium, of which milk is the richest source, is approximately the same. Goats' milk is similar to cows' milk but it is slightly higher in calcium. The following table shows comparative data for selected nutrients in the common types of milk.

A glass of whole milk contains five grams of saturated fat, two-percent milk contains 2.9 grams of saturated fat, and a glass non-fat milk contains 0.3 grams of saturated fat. An 8-ounce glass of whole milk also contains 34 milligrams of cholesterol; three glasses of whole milk contain about the same amount of cholesterol as one lean ground beef patty. This can be modified by choosing a lower fat milk.

HEALTH BENEFITS

The role of milk in health relates to its relationship to several major health problems, such as osteoporosis, cardiovascular disease, and dental caries.

Osteoporosis: is a progressive degenerative disease characterized by bone loss. Under normal circumstances, bone mass increases during the first two or three decades of life, after which bone is lost slowly as resorption of bone exceeds its deposition. Post-menopausal women lose bone faster than men of comparable age. This coincides with a

Selective Nutrient[1] Content of Common Types of Milk

Milk	kcal	CHO g	Pro g	Fat g	Sat. Fat. g	Chol mg	Minerals				Vitamins				
							Ca mg	P mg	Na mg	K mg	A IU.	B_1 mg	B_2 mg	Nia mg	Fol mcg
8 fluid ozs Long Life (UHT treated)*	163	11.8	8.25	9.5	-	-	300	-	125	350	258	.10	.48	0.3	13
8 fluid ozs whole , 3.5% fat	154	11.4	8.0	8.5	5.4	34	291	228	120	369	322	.09	.40	0.2	12
8 fluid ozs Low Fat, 2%	121	11.7	8.1	4.7	2.9	18	297	232	122	377	500	.10	.40	0.2	12
8 fluid ozs Non Fat	86	11.9	8.4	0.4	0.3	4	302	247	126	406	500	.09	.34	0.2	13
8 fluid ozs Evap.-whole	338	25.4	17.2	19.0	11.6	74	329	255	266	764	612	.12	.80	0.4	20
8 fluid ozs Buttermilk, cultured	99	11.7	8.1	2.2	1.3	9	285	219	257	371	81	.08	.38	0.1	12
1 fluid oz (2Tb) Condensed, sweetened.	122	20.7	3.0	3.3	2.1	13	108	96	48	141	125	.03	.16	0.1	4
Dry powder– whole– ¼ cup	159	12.3	8.4	8.5	5.4	31	292	248	119	426	295	.09	.39	0.2	12
Dry powder– skim- ¼ cup	109	15.6	10.8	0.2	0.1	6	377	290	161	538	11	.12	.46	0.3	15
Goats' milk – 8 fl. oz	168	10.9	8.7	10.1	6.5	28	326	270	122	499	451	.12	.34	0.7	1
Sheep milk - 8 fl oz	264	13.1	14.7	17.2	11.3	66	474	387	108	334	360	.16	.87	1.0	17
Buffalo milk – 8 fl oz	236	12.6	9.2	16.8	11.2	46	412	286	127	434	434	.13	.33	0.2	14
Soy milk – 8 fl oz.	79	4.3	6.6	4.6	0.5	0	10	118	29	338	77	.39	.17	0.4	4

*Food Composition Tables for Use in the English-speaking Caribbean (1985); - = no data available or available data not reliable.

CHO = Carbohydrate; Pro. = Protein; Sat. Fat. = Saturated Fat; Chol. = Cholesterol; A = Vitamin A; B_1 = Thiamin; B_2 = Riboflavin; Nia = Niacin; Fol = Total Folacin

¼ cup dry powder reconstituted = 8 ozs fluid

[1]*Jean A Pennington, Bowers & Church's Food Values of Portions Commonly Used. (Lippincott, 1998), pp 221-223.*

decrease in plasma estrogen levels and an inhibition of osteoblast activity. Calcium intake of 1200-1500 mg per day (240 mL milk provides about 290 mg calcium) is recommended for women to protect against bone loss that may ultimately manifest as osteoporosis.

Cardiovascular disease: Plasma cholesterol levels are influenced more by dietary saturated fatty acids than by dietary cholesterol. Full cream milks contain saturated fatty acids and there has been much pressure to reduce their consumption, even though dietary cholesterol associated with dietary fat is thought to be relatively less important in the development of cardiovascular disease.

Dental caries: Both milk and milk products have been identified as having anticariogenic effect resulting from the buffering effect of milk on acid produced by plaque bacteria or, possibly, by minerals or proteins acting directly on the enamel of the teeth, independently of pH. Consequently, a potential benefit has been noted for the consumption of milk by children and adults who also consume foods eg, breakfast cereal with a high sucrose content, likely to induce dental caries. Additionally whey proteins and casein have been shown to prevent tooth deminera-lization by both buffering plaque acidity and helping in the formation of a surface layer on the enamel.

Isn't Milk Fattening?

Overweight results from consuming too many calories and getting too little exercise. There are a variety of milks with different calorie and fat contents. Take a look at the Nutrition Facts labels on milks. A glass of fat-free milk, for example, has only 80 calories, no fat and all the calcium of other milks.

The following table highlights the health benefits of selected nutrients found in milk:

Dietary Uses

Like many other foods that are used in the Caribbean, milk can also be used in numerous ways to help meet the dietary needs of individuals of all age groups because of its nutrient density. For example, milk proteins increase the value of poorer quality cereal and vegetable proteins in the diet by providing the amino acids these proteins lack. After exclusively breastfeeding, the American Academy of Pediatrics recommends feeding infants, beginning at 12 months of age, whole not low fat or reduced fat milks. However, the World Health Organization (WHO) suggests that from 6 months onward, full cream can be introduced in the diet for older infants as long as diluting guidelines are followed

Health Benefits of Milk

Selected Nutrients	Health Benefits
Protein	• Builds & repairs body tissues and cells. • Tertiary source of energy.
Vitamin A	• Maintains health of the skin. • Has a role in maintaining normal vision, bone growth & reproduction.
Thiamin	• Important for the production of energy in body cells.
Riboflavin	• Keeps many tissues healthy, such as the skin, eyes & nerves. • Releases energy within cells.
Niacin	• Vital for obtaining energy in body cells.
Folacin	• Essential for the formation of bo th white & red blood cells.
Vitamin B_6	• Helps the body to use protein. • Assists in the formation of red blood cells.
Vitamin B_{12}	• Helps in the formation of healthy red blood cells that carry oxygen from the lungs to working muscles • Helps protect nerves. • Supports normal growth.
Vitamin D	• Aids in the absorption & use of calcium & phosphorus in the body for bones & teeth.
Calcium	• Necessary for growth & maintenance bones & teeth • Helps muscles contract (including the heart). • Has a role in bl ood clotting. • Involved in proper hormone function. • Helps transmit nerve impulses.
Phosphorus	• Aids in the formation and maintenance of strong bones and teeth.
Potassium	• Regulates the body's fluid balance • Helps maintain normal blood pressure
Magnesium	• Necessary for the release of energy in cells. • Required for replication of genetic material (DNA & RNA). • Helps control calcium blood levels. • Helps relax muscles after contraction.
Zinc	• Involved in protein building. • Has a role in the immune re sponse. • Helps keep skin, bones and hair healthy

along with supplementation of the diet with essential micronutrients and additional calories to meet the nutrient needs of the infant. Both authorities recommend with-holding low fat or reduced fat milks from the diets of young children until after 2 years of age. The fat and cholesterol in whole milk are required because they form part of the structure of brain and nerve cells. Children over the age of two years could be offered reduced fat milk and children older than five years can safely consume skim milk.

In the Caribbean, it is not unusual to find that outside of infancy and childhood, milk may not be consumed as a beverage. However it is widely used in a variety of dishes and the consumption of milk products, for example cheese, ice cream and to a lesser extent yogurt is very common. Evaporated milk is a good choice for cooking because when heated, it curdles less easily compared to other milks. Since it is more nutrient-dense, it will be a plus contributor to the diet. Unless contraindicated due to lactose intolerance or any other diagnosis, it is recommended that some milk be included in the diet of every individual.

Lactose Intolerance

Lactose intolerance is the symptomatic response to the consumption and malabsorption of lactose. Lactose-intolerant individuals, in avoiding milk and other dairy products, may consume suboptimal levels of calcium, riboflavin, and phosphorus. Like milk protein allergy, lactose intolerance is an over-diagnosed or a self-diagnosed problem. Lactose, the sugar in both human and cow's milk, is normally digested by the intestinal enzyme, lactase, which breaks the lactose down into glucose and galactose. When the amount of lactose in the diet exceeds the supply of lactase, some of the undigested lactose is digested by bacteria in the intestines. The rest ferments and is converted into the gas, carbon dioxide, which causes bloating, diarrhoea, and abdominal pain, and to lactic acid, which accounts for the red, irritated, burn-like ring around the anus, especially noticeable in lactose-intolerant children. Other more subtle symptoms are: headaches, fatigue, and bad breath.

Lactose intolerance is rare in infants, but seems to be more common as people get older, giving rise to the notion that persons, other than children have outgrown the need for milk. There are degrees of lactose intolerance, depending on the supply of lactase in the gut. Some children and adults can tolerate only one glass of milk, or they can drink milk with a meal, but not separately as a beverage especially on an empty stomach. Smaller portions of milk

(4 oz) consumed more often may be better tolerated.

Some of these individuals can tolerate yogurt and cheese, but not milk as a beverage. (The lactose in fermented yogurt is somewhat predigested.) Lactose intolerance seems more common than milk-protein allergy which involves the skin and respiratory systems, whereas lactose intolerance is limited to abdominal symptoms. Generally, lactose intolerance is noted to be more prevalent in individuals of Asian, Hispanic, and African descent. Secondary lactose intoler-ance may appear after the intestinal lining has been injured by allergy or infection and lasts only until the intestinal lining is healed. It is especially common in children after a diarrhoea-producing viral illness.

STORING AND HANDLING MILK

Milk is perishable. To preserve its safety and quality, the following tips are recommended:

1. Refrigerate milk at 40°F or less as soon as possible after purchase and store in the original container.
2. Return milk to the refrigerator immediately after pouring out the amount needed. Never return unused milk to the original container.
3. Keep milk containers closed to prevent the absorption of other flavours. An absorbed flavour changes the taste, but the milk is still safe.
4. Protect milk from exposure to strong light since light can reduce its riboflavin content and cause off-flavours.
5. Look for the "sell by" or "use by" dates on milk cartons. If properly cared for, milk generally stays fresh for 2 to 3 days after this date. Some dairy processors guarantee their products for a specific time after this date. Ask your grocer who may have more details.
6. Keep canned milks like evaporated and sweetened condensed milks in a cool dry place and invert the cans every 2 months. These milks generally keep for about a year at room temperature. Once opened, canned milks should be poured into an opaque covered container, refrigerated and used within a few days.
7. Store dry milks in a cool, dry place and keep in an airtight container after opening. Once reconstituted, dry milk should be refrigerated and handled like other fluid milks.
8. Freezing of milk is not recommended. It causes undesirable changes in the milk's texture and appearance.
9. Microwaving milk is not recommended to extend milk's shelf

life or as a means of pasteurization.

CONCLUSION

Milk is included in the Foods from Animals Group, one of the Six Caribbean Food Groups. It's importance in the human diet continues to receive great attention. Continuous condemnation of milk seems to be unjustified. As a single food, milk is a good mixture of useful and numerous essential nutrients in appropriate proportions for human nutrition. The nutritional and health benefits outweigh the negative views held by some. Today, there are many types of milk available to consumers who can exercise informed choice and select a type that is appropriate for his/her dietary needs. Like many other food items, milk is versatile and can be used alone, as a beverage or incorporated with other items to prepare many of the sweet and savoury dishes that abound in the Caribbean. Unless contraindicated, persons should be encouraged to include some milk in a healthy balanced diet.

REFERENCES

1. Towers, Philip A. The role of milk in human health: an Australian perspective, Nutrition Today, September–October, 1997 [cited 2006 April]. Available from: http://www.findarticles.com
2. Pennington, Jean A.T. Bowes & Church's Food Values of Portions Commonly Used, 17th ed. Philadelphia: Lippincot, 1998.
3. Caribbean Food and Nutrition Institute. Food Composition Tables for Use in the English-speaking Caribbean, 1995.
4. Cataldo, C.B., DeBruyne, L.K., and Whitney, E.N. Nutrition and Diet Therapy. New York: West Publishing Company, 1995.

SUGARS

Sugars occur naturally in food and may be added to food. Sugars are single sugars, *mono-sacchaarides* or double sugars, *disaccharides* each with distinct characteristics in nutrition. All their chemical names end in "ose" which means *sugar*. The monosaccharides are glucose, fructose and galactose. Glucose is the most-used sugar inside the human body. The disaccharides are lactose, maltose and sucrose. The intensely sweet fructose predominates in fruits, in honey and as part of table sugar. Glucose and fructose are the most common monosaccharides in nature. Galactose bound to glucose results in lactose which does not occur free in nature but is instead tied up in milk sugar. Maltose occurs wherever starch is broken down, an intermediary product during the digestion of starch in the human body.

The sugar industry is closely entangled in Caribbean history, our national psyches as well as our agriculture. However in recent years, sugar has lost its position on the world market to the extent that many of the industries no longer exist in some countries because they has been deemed not to be economically viable.

Generally the term "sugar" is taken to mean sucrose, also called "table sugar." Sucrose is extracted from plant sources. The two most important sugar crops are sugarcane *(Saccharum spp.)* and sugar beets (*Beta vulgaris*), in which sugar can account for 12%-20% of the plant's dry weight. On the ingredient listing of food labels, the term sugar usually means sucrose. Sugars on the Nutrition Facts panel of a food label is a combination of naturally-occurring sugars in foods and added sugars. Products listing sugars among the first few ingredients contain substantial amounts per serving. There are many terms that either describe sugar or refer to sugar. These include:

Brown sugar – about 95% pure sucrose that still contains some of the molasses;

Confectioner's sugar – finely powdered sucrose, 99.9% pure;

Corn sweeteners – corn syrup and sugar solutions derived from corn;

Corn syrup – mostly glucose, partly maltose, produced by the

action of enzymes on cornstarch; high fructose corn syrup is mostly fructose, glucose and maltose make up the balance;

Dextrose – another (older) name for glucose;

Fructose, glucose, galactose – the monosaccharides;

Granulated sugar – about 99.9% pure crystalline sucrose; table sugar;

Honey – a concentrated solution comprising primarily glucose and fructose produced by enzymatic digestion of sucrose in nectar by bees;

Lactose, maltose, sucrose – the disaccharides;

Levulose – an older name for fructose;

Molasses – a thick brown syrup from the refining of sugar cane to make sugar;

Sorbitol, mannitol, xylitol – sugar alcohols that can be derived from fruits or commercially produced from dextrose;

White sugar – pure sucrose, produced by dissolving, concentrating and recrystallizing raw sugar; also called granulated sugar.

Invert sugar – mixture of glucose and fructose, formed by splitting of sucrose in an industrial process, or formed during certain cooking procedures to prevent crystallization of sucrose in soft candies and sweets.

SOURCES OF SUGARS

Sugars are present naturally in fruits and some vegetables. They are also derived from cane and beet.

Sugar in Fruit and Vegetables

Eating sweet-tasting fruits and vegetables is not the same as eating sweets such as candy or soft drinks. Vegetables and fruits differ from concentrated sweets in nutrient density. In fruits the sugar is diluted in water, packaged with fibre and mixed with many vitamins and minerals. In contrast, all types of refined sugars reach the body in a concentrated form practically devoid of nutrients. It is for this and other similar reasons that sugar is considered to have "empty calories".

Cane versus Beet Sugar

There is little perceptible difference between sugar produced from beet and that from cane. Testing for impurities can distinguish between the two, and tests have been developed to reduce fraudulent abuse of European Union (EU) subsidies, and also aid in the detection of adulteration of fruit juice.

The residues of sugar production differ substantially and from place to place. While cane molasses can be used as an

ingredient, beet molasses is unpalatable and generally used for industrial fermentation or as animal feed. Cane pulp can be burnt; beet pulp is dried, pelleted and used as an animal feed.

USES OF SUGAR

Sugar is the cheapest instant source of energy and can have medical and therapeutic value. In specific concentrations, glucose is an essential component of intravenous fluid as well as oral rehydration solutions which are used in the treatment of diarrhoea.

Sugar is a multi-purpose carbohydrate that contributes significantly to the flavour, aroma, texture, color and body of a variety of foods. Sugar reacts chemically with yeast used in the making of bread, helping it to rise. In all baked products, sugar contributes to flavour and crust colour as well as prolonged shelf life. In jams and jellies, sugar preserves against the growth of yeasts and molds. Sugar syrups protect frozen and canned fruits from browning and withering. Sugar is an important contributor to bulk, texture and body in ice cream, beverages, baked goods and other products. Many condiments, for example salad dressing, tomato sauce, ketchup rely on sugar to soften acidity, blend flavours and contribute mouth feel and taste.

SUGAR AND HEALTH

Sugar and other refined sugars have been implicated in causing nutritional problems such as obesity and other health problems such as dental decay and gum disease, diabetes, increasing the risk of heart disease and causing disruptive behaviour in children and adults.

Sugar and Obesity

Obesity is the sum result of consistently overeating especially if calories consumed are in excess of the amount used by the body. In many countries the prevalence of obesity has been attributed to increased use of sugars but it has also been suggested that sugar is not always eaten alone but in combination with other energy-producing nutrients, fat and carbohydrates with the simultaneous decline in physical activity. However it should be noted that concentrated sweets make it easier to consume large amounts of calories quickly. It is therefore usually recommended to reduce calories from sugars in most weight reduction meal plans.

Sugar and Dental Health

Tooth decay occurs because bacteria break down carbohydrates (sugars and starches) to form acids in the plaque which then demineralize (dissolve) the

nearby tooth enamel. The most significant diet-related factors are:

- ***Frequency*** – Frequent snacking on carbohydrate containing foods increases the amount of time the teeth are exposed to the demineralizing effects of the various acids. The amount of carbohydrate consumed is not as significant to the formation of dental caries as the frequency of consumption.
- ***Form*** – Sticky carbohydrates are retained on the teeth and allow acid production to be prolonged. In addition to sugars-containing sticky foods (e.g. chewing gum, raisins and other dried fruits, some candies) researchers are finding that starchy foods (e.g. breadsticks, cornflakes, potato chips) may linger in the mouth longer than some sweet foods.
- ***Duration*** – the length of time the teeth are exposed to sugar also contributes to tooth decay. Bacteria produce acid for 20 to 30 minutes after exposure to sugar. The longer the eating or drinking time of a sugary item, the greater the risk of tooth decay.

Sugar and Diabetes

Diabetes "mellitus" is a disorder of the body's ability to manage sugar because of the absence of or an insufficient amount of insulin. Elevated blood sugar is the result of inefficient utilization of carbohydrates. The question of whether sugar consumption is related to diabetes has been exclusively examined through epidemiologic surveys and experimental data. The consensus of the scientific community is that sugar consumption is not related to onset of diabetes. Many studies show that the risk of diabetes is inversely related to carbohydrates and sugar consumption. Rather the development of diabetes is more related to over consumption of total calories resulting in obesity which increases the risk of diabetes. Once a person develops diabetes the intake of sugar and other simple carbohydrates is usually restricted. However, there is little actual evidence to support this practice. Research now indicates that total intake is more important than the source of the calories and that eating modest amounts of sucrose as a part of a meal plan does not lead to higher amount of blood sugar as was commonly supposed. However, metabolic control must be maintained.

Sugar and Coronary Heart Disease

This issue has been thoroughly studied in recent years because of one scientist's widely publicized 1960 theory that heart disease is linked to excessive sugar intake. The medical community has resoundingly rejected this theory.

The prevailing view point is reflected in one scientist's conclusion after reviewing the literature that the evidence available does not support the view that sugar-levels in persons with diabetes is a causative factor in the development of coronary heart disease (CHD).

In 1979, the American Society of Clinical Nutrition stated that there was no consistent and independent relationship between intake of sucrose or other carbohydrates and the prevalence of CHD. In an attempt to confirm the various risk factors involved in CHD, many studies of lifestyle and diets of different populations have been conducted. A recent review of three major studies: (i)the Framingham Study, (ii) the Honolulu Heart Study and (iii)the Puerto Rico Heart Health programme found no association between sugar consumption and CHD risk. The UK panel on diet and cardiovascular disease also found no evidence that sugar was specifically related to CHD despite a barrage of pre-publication by food activists that sugar was a major contributory factor. It is generally agreed that the primary dietary factors involved in CHD are the nature and amount of fat in the diet. That is why dietary guidelines frequently advocate a decrease in fat intake to be accompanied by an increase in carbohydrates consumption. These guidelines often recommend that the increased carbohydrate intake should take the form of complex carbohydrates but sugar can be moderately included.

Sugar and Hyperactivity In Children

This statement is not supported by any medical evidence according to the American Medical Association, hyperactivity is a complex behavioural syndrome and the American Council on Science and Health have questioned whether or not it can be related to diet at all. The 1989 (UK) Committee on Medical Aspects of Food Policy ("COMA") concluded that sugar has no significant specific effect on behaviour or psychological functions. Research shows that the perceived effect of sugar on children's behaviour has more to do with the influence of people around them than with any sugar containing food they are eating.

Nutritional Value of Sugars

All sugary items are nutritionally similar to sugar. Each teaspoonful (1/3 of a tablespoon) of any sweet can be assumed to supply about 20 calories and 4 grams of carbohydrate. Although molasses contains about 1 milligram of iron per tablespoon, it is less sweet than other sweeteners, therefore it takes more molasses to

Item	Amt	Kcal	CHO (g)	Sod (mg)	Pot (mg)	Ca (mg)	P (mg)	Fe (mg)
Honey, strained/extracted	1Tbsp	64	17.3	1	11	1	1	.09
Molasses	1 Tbsp	53	13.8	7	293	41	6	.94
White, granulated	1 Tbsp	50	13.0	0	0	0	0	.01
Sugar, brown, packed	1 Tbsp	52	13	5	48	12	3	.26

achieve the same sweetness level. Spoon for spoon, sugar contains fewer calories than honey because the dry crystals of sugar take up more space than the sugars of honey dissolved in water.

It would be unwise to rely on any sugars (brown, white, jelly, molasses, honey) to contribute any significant amount of nutrients, especially when compared with recommended daily allowances. They however, primarily provide calories, thus the term "empty calories." Honey is no better for health than other sugars even though it is considered to be "natural."

Sugar in Processed Foods

Although sugars are considered to be consumed primarily as sucrose, it is worth remembering that there are many other food items that contain sugar. Some commonly-used items and the sugar equivalents are:

- ½ cup canned corn
  = 3 teaspoons sugar
- 12 ozs. cola beverage
  = 8 teaspoons sugar
- 1 tablespoon ketchup
  = 1 teaspoon sugar
- 1 tablespoon creamer
  = 2 teaspoons sugar
- 8 ozs. sweetened yoghurt
  = 7 teaspoons sugar
- 2 ozs. chocolate = 8 teaspoons sugar

Using Less Sugar

Here are some tips for reducing sugar in your diet to make room for more nutritious foods:

- Read ingredient labels. If sugar is listed as the first, second or third ingredient, the product is expected to contain a large amount of sugar as a sweetener. Identify all the sugars in a product (sucrose, honey, glucose, molasses, dextrose, corn sweetener, fructose, high-fructose corn syrup, lactose, maltose, mannitol, fruit juice concentrate, sorbitol). Select items lower in added sugars when possible.
- Buy fresh fruits or canned fruits packed in water, juice, or light syrup rather than those in heavy syrup.

- Buy fewer foods that are high in sugars such as soft drinks, fruit-flavoured punches and sweet desserts. Be aware that some low-fat desserts may be very high in sugar.
- Add less sugar to coffee, tea, cereal or fruit. Get used to half as much, then see if you can cut back even more.
- Use less sugar in the foods you prepare at home. Try new recipes or adjust your own. Start by reducing sugars gradually until you've decreased them by one third or more.
- As you reduce the sugar in your baked goods by about $^1/_3$ the amount called for in the recipe and add spices like cinnamon, cardamom, coriander, nutmeg, allspice, clove, or mace to enhance the sweet flavour of foods.
- Serve sweet food warm – heat enhances sweet tastes.
- Gradually cut down the amount of sugar in tea, coffee and cereals as well as jams, honey, marmalade and syrup.
- Use low sugar versions of your favourite desserts and sweets.
- Avoid buying sugar and honey coated breakfast cereals.
- Choose low-calorie drinks and foods instead of the regular variety OR dilute if the sugar content is high.
- Choose fresh fruit as snacks instead of sugary snacks.

COCONUTS

The coconut is one of the species of the coconut palm (Cocos nucifers) tree family. Coconut palms are found mainly in the tropical, sea coastal areas thriving best on rich, sandy soil. This tropical palm belongs to a different family from the oil palm or date palm. The native habitat is unknown, but it appears to have originated in Southeast Asia. Marco Polo was among the first Europeans to describe coconuts. In some Caribbean countries, the coconut is sometimes identified by other names such as "Nariel" in

Guyana and Trinidad and Tobago and "Coco" in Belize.

Almost the entire tree has a purpose. The husks yield coir, a fibre that is highly resistant to salt water and is used in the manufacture of many items for example ropes, mats, baskets, brushes and brooms. Some other parts can be used for craft, clothing, and housing or with plants. The edible parts provide about 50% water and 30-40% oil in the meat or jelly.

Whole coconuts are harvested either green or mature. When green, the meat is soft and rubbery and can be easily scooped out and eaten. When mature, the meat is firm and can be used in a variety of ways. Copra, the dried meat is used to make coconut oil and coconut meal or copra meal, a fibrous product. Desiccated or shredded coconut is a familiar product on grocers' shelves. It is sometimes sweetened or toasted and used in the food industry. In the Caribbean, shredded coconut is widely used at home and in food establishments.

HEALTH BENEFITS

Coconut oil is made up of predominantly saturated fatty acids. This fact has led many to conclude that, like most saturated fats, coconut oil causes increased storage of fats and elevates serum cholesterol and therefore should be avoided. We contend here that coconut oil is a unique saturated fat and does not present the health hazards like others, when it is used in small amounts (ie. no more than 10% of daily fat calories).

The potential health benefit or hazard of a fatty acid is determined mainly by its chain length and type. Long chain fatty acids [LCFA], which are approximately 18-24 carbon chains long, Medium chain fatty acids [MCFA] with approximately 12-16 carbon chains have been particularly linked with improved health status. Short chain fatty acids [SCFA] have approximately 6-10 carbon chains.

Table 1:
Fatty Acid Composition (%) of Coconut Oil

Short chain saturated fatty acids [SCFA]	16
Medium chain saturated fatty acids [MCFA]	65
Long chain saturated fatty acids [LCFA]	10
Monounsaturated fatty acids [MUSA]	07
Polyunsaturated fatty acids [PUFA]	02

Table 1 show that, despite its high saturated fat content of approximately 93%, coconut oil is comprised mainly of the good saturated fat, i.e. [MCFA] and is the second highest source of MCFA after that of human breastmilk.

Table 2 shows that unlike other oils and fats, more than 45% of the fatty acids on coconut fat are lauric

Table 2:
Fatty Acid Types (%)
of Coconut Oil

C6:0	Caproic acid	0.5
C8:0	Caprylic acid	9.0
C10:0	Capric acid	6.8
C12:0	Lauric acid	46.4
C14:0	Myristic acid	18.0
C16:0	Plamitic acid	9.0
C18:0	Stearic acid	1.0
C18:1	Oleic acid	7.6
C18:2	Linoleic acid	1.6
C20:0	Arachidic acid	<1

acid (C12:0). Natural coconut fat/oil in the diet leads to a normalization of body lipids because of the presence of lauric acid, a medium chain triglyceride, which along with other medium chain triglycerides, does not raise serum cholesterol or contribute to heart disease, but are in fact healthy. Additionally MCFAs are short enough to be absorbed directly into the portal blood and because they bypass the lymph, they can be in the bloodstream in about twenty minutes after ingestion for oxidization in the liver.

Table 2 also shows the proportion of other fatty acid types in coconut oil. The combination of lauric, caprylic and capric fatty acids is a nutritional asset because these medium and short chain fatty acids are useful in the treatment of certain digestive diseases. Medium chain fatty acids (MCFA) help to create a healthy digestive tract, which in turn allows for better digestion and absorption of the nutrients from foods. MCFA are more easily digested than fats found in other oils because they are processed directly in the liver and immediately converted into energy. There is therefore less strain on the liver, pancreas and digestive system and these MCFA provide the body with a wonderful, quick source of energy. MCFA provide an immediate source of energy while supplying fewer calories (1tb. MCFA oil = approx. 115 kcal) than other fats 1tb. vegetable oil = approx. 135 kcal). Coconut oil is not hydrogenated, contains no trans fatty acids and may now have a competitive edge, since mandatory listing of trans fatty acids is now required on nutrition facts labels in the U.S.A and other countries.

For many years, coconut fat/oil received negative press because of its high level of saturated fatty acids but not all saturated fats are alike and that coconut's unique form of saturated fat, when used in recommended quantities, can be beneficial to health.

Desiccated coconut is about 69% coconut fat, as is creamed coconut. Full coconut "milk," the whitish fluid obtained from shredded coconut immersed in water or from dehydrated and processed coconut meat, is approximately 24% fat.

As far as fat is concerned, there is no such thing as a lean coconut meat/milk. Keep in mind that 30%

of daily calories can come from fat in the diet of a healthy person. Coconut can be a portion of those calories. Coconut milk is relatively high, with about 40 grams of fat in eight ounces of liquid or approximately 4 grams fat and 38 calories per tablespoon compared with 11.5 grams fat and 111 calories in the same amount of margarine. Coconut milk/oil of any type is high in saturated fat and calories, but it is a "healthier" type of fat than manufactured fats, such as hydrogenated margarines. If fat calories are of concern, they can be reduced by dilution with water or pure vegetable broth that is without added fat. It must be emphasized that coconut meat/milk is a source of dietary fat, but not a source of dietary cholesterol because cholesterol is obtained only in foods of animal origin. It is because of its total fat content that coconut is included in the Fats and Oils Caribbean Food Group.

Coconut oil reduces one's need for vitamin E whereas unsaturated oils can deplete vitamin E. Coconut has a small amount of folic acid and moderate amounts of potassium, phosphorus, and magnesium; raw coconut has about five grams of dietary fiber per one-ounce serving. Food manufacturers have lost the benefit of lauric acid in food products and consumers have lost many health benefits that can result from regular but moderate consumption of coconut products.

Coconut water, the free-flowing clear liquid from inside the coconut, is the other edible portion of the coconut that has some nutritive value. It is fat and cholesterol free but provides approximately 46 calories, 252 mg of sodium and 600 mg potassium per 8 ounce glass (compared with the same amount of cranberry juice cocktail that provides 144 calories, 5 mg of sodium and 45 mg of potassium). Though higher in sodium and potassium, coconut water is much lower in calories than cranberry juice cocktail. Because of the caloric content, coconut water is included in the Fruits group, one of the six Caribbean Food Groups.

DIETARY USES

Coconuts have been an integral part of the diet in many tropical countries. As a cooking oil, it is highly resistant to heat and spoilage and is therefore very stable. Traditional ways of cooking with coconut

Coconut ice, sugar cake, chip chip.	Grated coconut and sugar boiled together.
Coconut turnover	Sweet bread with coconut filling
Sweetbread	Baked sweet dough with shredded coconut, dried fruit and spices
Coconut milk frozen joy	Sweetened coconut milk, frozen and eaten as a lolly
Gizada	Short crust pastry open tart, with sweet coconut filling.
Coconut and pineapple punch	Pineapple juice and coconut milk. Add some rum for a Pina Colada
Peach and coconut punch	Blend peaches and coconut milk.
Coconut Biscuits or Coconut Macaroons	

milk for flavour is better than using margarine and can therefore be used in porridge, rice and peas, cook-ups and soups. Shredded coconut can also be converted into snack items and the milk can be incorporated into punches and desserts such as:

Clinically MCFA is used with patients in catabolic states such as AIDS, cancer or with malabsorption problems. At the Tropical Metabolism Research Institute, University of the West Indies, Mona Campus, Jamaica, coconut oil used in a recovery diet to facilitate catch-up growth among malnourished children. It is reported that plasma levels of vitamin E and whole blood levels of glutathione (GSH) became normal and remained relatively normal throughout recovery. The use of coconut oil resulted in the maintenance of normal antioxidant in contrast to diets containing corn oil.

The natural, sugary fluid contained inside the hollow area of the meat is refreshing and palatable coconut water. Extracted from young or mature but not extremely mature coconuts, it is most commonly consumed to quench thirst. It can also be used in the treatment of diarrhoea to replace lost body fluid and provide some electrolytes especially potassium. Coconut water can be used to replace lost potassium as a result of usage of diuretics. It is sometimes referred to as having the ability to "flush the kidneys, thus it is an excellent, affordable and available replacement for a well-known imported substitute. Conversely, because of its high potassium content, coconut water is inadvisable for persons with chronic renal failure.

Coconut milk can be made thicker or thinner depending on one's preference – just add more or

less water. If using it for sauces you might want a thicker milk. For use in smoothies or as a beverage ingredient, you might want thinner milk. For cooking, coconut milk is a versatile ingredient, offering creaminess without dairy. Coconut milk is the backbone of "creamy" dishes without the cream. It can be a thickener, used instead of heavy cream, used as a substitute for water in both stews and puddings, used to deglaze a pan, or as a cooking liquid for veggies (try corn) or for noodles. It can be frozen with a small amount of sweetener to make a sorbet.

If you are going for fresh coconut, select a coconut that "sloshes" when it is shaken and has firm, dry eyes. An untapped coconut can be stored in a cool, dark, dry place for up to three months. Young coconut (often with a white husk) can be used for its coconut juice and for its slightly sweet pulp. Drink the juice as is, or add to other fruit juices, such as mango nectar, or pineapple or orange juice. Use the pulp as an addition to rice or grains (coconut-raisin couscous), grated into veggies, such as carrots or green beans, chopped into hot or cold cereal, or shredded into muffins and quick breads. More mature coconuts have sweeter juice and pulp, so adjust your seasoning accordingly. Coconut milk is not a replacement or substitute for breastmilk or other animal milks and should therefore not be used to feed infants or children.

CONCLUSION

The coconut has erroneously received negative ratings over the years. However because of the persistence of researchers, coconuts are slowly taking their rightful place in the culinary and non-food sectors. It must be remembered that not all saturated fats are alike and that coconut fat is unique, being rich in medium chain triglycerides that do not have the same deleterious effect on human health as some long chain saturated fats. Additionally, coconuts are cholesterol and trans fatty acid free, another plus for human health. Coconuts are also beneficial for their mineral content. Further, the inedible components are useful in the manufacture of many non-food products. It is therefore likely that populations will be experiencing the return of coconut usage.

Consumption of Soy May Reduce Risk of Fracture in Postmenopausal Women

Postmenopausal women who consumed high daily levels of soy protein had reduced risk of bone fracture, according to a study in the Archives of Internal Medicine.

Women experience accelerated bone loss at a rate of 3% to 5% per year for about 5 to 7 years after menopause, putting them at a high risk for bone fracture. The US Food and Drug Administration and new clinical guidelines advise against the use of hormone therapy as a first-line treatment for the prevention of osteoporosis in postmenopausal women and they emphasize alternatives including exercise and increasing intake of calcium and vitamin D. Some evidence also suggests a potential role for soy in preventing postmenopausal bone loss, however, at least among Chinese women.

Researchers from Vanderbilt University School of Medicine, Nashville, Tennessee examined the relationship between soy food consumption and bone fractures in postmenopausal women. The women were part of the Shanghai Women's Health Study, a study of approximately 75,000 Chinese women aged 40 to 70 years, conducted between March 1997 and May 2000. They found that soy consumption may reduce the risk of fracture in Chinese postmenopausal women, especially among those in the early years following menopause. Those in the highest soy protein intake group who consumed about 13g or more of soy per day had a 37% reduced relative risk for fracture compared to the lowest intake group. Chinese women in the highest soy isoflavane group also had a 35% reduced relative risk for fracture compared to the lowest isoflavone group. The big question – still unresolved – is what the effects of say are in American women given the different amounts of products that they consume. (Arch Intern Med. 2005;165:1890-1895)

[Source: Nutrition Today, November/ December 2005, Volume 40, Number 6]

Total Cholesterol Level Among us Adults Continues to Decline

The total cholesterol level among older adults has declined significantly, whereas there has been little

change among younger adults, according to a study in *JAMA*.

Serum total and low-density lipoprotein (LDL) cholesterol contribute significantly to atherosclerosis and its related adverse effects, according to background information in the article. Previous and analyses of data from the National Health and Nutrition Examination Surveys (NHANES) showed that mean levels of total cholesterol of US adults had declined from 1960-1962 to 1988-1994, and average levels of LDL cholesterol had declined between 1976-1980 and 1988-1994.

Margaret D. Carroll, MSPH, of the Centers for Disease Control and Prevention, and colleagues evaluated trends in lipids between 1960 and 2002 and examined potential contributing factors to the trends observed. The researchers analyzed data from 5 distinct cross- sectional surveys (National Health Examination Survey [NHES] and NHANES) of the US population during 1960-1962, 1971-1974, 1976-1980, 1988-1994, and 1999-2002 that included blood lipid measurements taken from 6,098 to 15,719 adults.

The researchers found the age-adjusted [average] total cholesterol level of adults 20 years or older decreased from 206 mg/dL in 1999-2002 and the age-adjusted [average] LDL cholesterol level decreased from 129 to 123 mg/dL during this same period. Significant and substantial declines in [average] total and LDL cholesterol levels were observed in men 60 years or older and women 50 years or older but not in younger adults. In general, [average] high-density lipoprotein (HDL) cholesterol levels did not change during this period. The age-adjusted percentage of adults 20 years or older with serum total cholesterol level of at least 240 mg/dL decreased from 20% to 17%, thereby achieving one of the Healthy People 2010 objectives. The authors say that a factor that likely contributed to the decrease in total and LDL cholesterol observed predominantly in the older age groups is the use of cholesterol-lowering medication. Between 1995-1996 and 2001-2002, there was an increase in the number of physician-office visits and hospital visits of men and women aged 45 years or older with statins prescribed. The researchers add that dietary data from NHANES 1999-2002 demonstrated only a small change in the overall intake of saturated fat or cholesterol (*JAMA* 2005; 294:1773-1781).

[Source: Nutrition, Today, Volume 40, Number 6, November/December, 2005.]

Update on Raw Food Movement...

Raw "foodies" believe that cooking foods can have deleterious effects. They claim that these include destruction of enzymes in food that "helps digestion" and release of cancer-causing chemicals in meats and oil. It is true that cooking vegetables at high temperatures in water can cause a significant vitamin and mineral loss if the cooking water is not consumed with the vegetables. Water-soluble vitamins, such as vitamin C and folate, are leached out, and losses from leaching and high temperatures can reach 40%, and cooking does inactivate enzymes.

It is also true that broiling or barbecuing meats until they are blackened creates cancer-causing compounds called heterocyclic amines, which have been linked epidemiologically to breast, colon, lung, and stomach cancers. High cooking temperatures can also cause the protein, fat, and sugar in meats to form advanced glycation end products (AGEs), which may cause inflammation, although less is known presently about them.

Moreover, high temperatures can create substances in oils that make cholesterol more likely to stick to your arteries and generate potentially cancer-causing substances in the oils themselves.

However, what the raw food advocates don't emphasize are some of the good things that cooking does. Cooking softens the hemicellulose of vegetables, allowing the nutrients that are present in the food to be more accessible for digestion. Nutrient losses from cooking can be kept to a minimum by choosing steaming or stir-frying with minimal amounts of oil.

In addition, undercooked meats and fish can harbor bacteria that can lead to food-borne illness, and cooking kills them. For those who want to go raw, raw produce should always be washed well before serving and kept separate from raw meats. If the raw fruits or vegetables are coated with wax, scrub it off with a highly diluted solution of dish detergent. Raw meats and fish should be purchased from reliable vendors and held at a temperature of less than 41[degrees]F before consumption. People with immunocompromised systems should not eat raw meats.

Meats and fish should be cooked with as little oil as possible and at the lowest temperature necessary to kill microorganisms without charring the food.

[Source: Consumer Reports on Health, August 2003.]

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The Key to Preventing and Possibly Reversing Disease May Already be in Your Fridge

That's the easy-to-swallow prescription found in Superfoods RX by Steven Pratt, M.D. and Kathy Matthews ($24.95, HarperCollins). After analyzing the most disease-preventing, anti-aging diets in the world, scientists have found that 14 nutrients consistently turn up. Based on years of research, Pratt pulls it all together in one source.

Superfoods RX outlines 21st Century nutrition-foods that are high in micronutrients (vitamins, minerals, phytonutrients) instead of macro-nutrients (fats, carbs, protein):

- Beans lower cholesterol, combat heart disease and stabilize blood sugar.
- Blueberries lower the risk of heart disease and cancer and help maintain healthy skin.
- Broccoli boosts the immune system, lowers the incidence of cataracts and builds bones.
- Oats lower cholesterol, reduce the risk of coronary heart disease and Type II diabetes.
- Oranges support heart health and prevent cancer, stroke and diabetes.
- Pumpkin helps lower the risk of various cancers and supplies nutrients necessary for healthy, youthful skin.
- Wild Salmon lowers the risk of heart disease and cancer.
- Soy helps prevent cardiovascular disease, cancer and osteoporosis, helps relieve menopause symptoms.
- Spinach decreases the chance of cardiovascular disease, a host of cancers and cataracts.
- Tea boosts the immune system, helps prevent cancer and osteoporosis.
- Tomatoes lower the likelihood of cancer, raise the skin's sun protection factor and play a role in preventing cataracts.
- Turkey is a healthy source of protein, low in fat, and provides multiple nutrients.
- Walnuts reduce the risk of developing heart disease, diabetes and cancer.
- Yogurt promotes strong bones and a healthy heart, and is a great source of calcium.

Dr. Pratt shows readers how to incorporate these foods into everyday meals with recipes designed by Chef Michael Stroot of The Golden Door. Superfoods RX shows readers how to eat well so they can feel better and live a longer, more vibrant life.

[Source: Healthy Living Today www.portfolioeatingplan.com)]

Almond: Grab a Handful for your Heart...

First, the Food & Drug Administration recently announced a health claim for almonds and several other nuts, saying: "Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts, including almonds, as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease." One and a half ounces equals 1/3 cup, or about 34 almonds.

Then, The Journal of the American Medical Association published a study about almonds' significant role in a cholesterol-lowering eating plan that works as well as a starting dose of cholesterol-lowering drugs.

This "Portfolio" eating plan was created by the University of Toronto. Patients in the "Portfolio" eating plan study ate a menu of foods low in saturated fat and high in plant sterols, such as almonds, soy burgers, oat bran, beans and other heart-healthy foods. Comparison groups either ate a low-fat diet, or combined a low-fat diet with lovastatin, a cholesterol-lowering drug. In four weeks, both the people taking the lovastatin and the people eating almonds and foods high in plant sterols lowered their cholesterol by approximately 30 percent.

Scientists have known about almonds' heart-healthy benefits for many years, but this recent news is just one more reason to "grab a handful for the heart," according to Carolyn O'Neil, M.S., R.D.

"Almonds are a perfect snack-they're tasty and crunchy," she said. "And there's all the research on their ability to lower cholesterol because they contain heart-healthy unsaturated fats. Plus, ounce for ounce, almonds are the most nutrition-packed nut."

A 1.5-ounce handful of almonds is a leading source of vitamin E and magnesium and offers protein, fiber, potassium, calcium, phosphorus and iron in 246 calories. O'Neil suggested eating them as a snack, in place of less nutritious foods such as popcorn, pretzels and potato chips.

Some of her other favorite ways to eat almonds:

- Eat a handful of whole, natural almonds as a snack with a piece of fruit.
- Sprinkle a few sliced almonds in granola, cold cereal and hot cereal.
- Sprinkle some slivered almonds in a salad.
- Include chopped almonds in a stir-fry-roast a few in a dry pan or wok, and then set them aside before cooking the other ingredients. Sprinkle them on at the end so they stay crunchy.

[Source: Healthy Living Today www.portfolioeatingplan.com)]