

ROLE OF DIETARY FAT AND CHOLESTEROL IN HUMAN HEALTH

Dietary Fat

Dietary lipid serves as a concentrated source of food energy, a source of essential fatty acids, and facilitates the absorption of fat soluble vitamins. The various types of fatty acids found in foods can exert positive, negative or neutral effects in several metabolic and physiological functions in the body. Some of the effects occur on lipoprotein and cholesterol metabolism, others are mediated through eicosanoid biosynthesis. Although dietary lipid impacts many aspects of nutrition and health, it also contributes desirable properties to foods which make them palatable.

Cholesterol

Cholesterol is an important component of all animal derived food sources. Cholesterol is a sterol present in all cells of the human body, it is a precursor of steroid hormones, vitamin-D, and bile acids. The body can synthesize cholesterol from CHO and lipid precursors and it can catabolize cholesterol to reduce tissue concentrations. Cholesterol is carried in the blood with other lipids and fatty acids bound to lipoproteins. The amount and type of dietary fat can effect blood lipid concentrations in humans. Keys, Anderson and Grande demonstrated that saturated fat tends to elevate but polyunsaturated fats tends to lower blood cholesterol levels respectively. More recent data indicate that oleic acid a cis-monounsaturated fatty acid and stearic acid (18:0) have neutral effects on blood Cholesterol. The National Research Council's Food and Nutrition Board Committee on Diet and Health (1989) has recommended that dietary Cholesterol should be less than 300 mg per day

Although the egg has been targeted as a rich source of cholesterol, the egg provides an essential source of linoleic acid and the proportions of saturated: monounsaturated are balanced relative to the ration suggested by the American Heart Association. The egg also contains high concentrations of stearic and oleic acids which have neutral effects on plasma cholesterol levels.

ANTINUTRITION FACTORS OF EGGS

There are four anti-nutritional factors associated with the egg. There are:

1. Allergic factor
2. Avidin
3. Ovomuroid
4. Ovoinhibitor

Allergic factor

Infants with adequate stores of iron at birth do not need iron rich foods until they are about six months old. If egg yolk has frequently been one of the first much supplementary foods given to infants since the protein of raw or slightly cooked eggs is normally absorb directly into the bloodstream, it may be antigenic, especially to infants thus some infants develop allergic reactions to eggs.

Avidin

Diets containing large amounts of raw egg white proved to be detrimental to animals and human subjects since it caused dermatitis. It is now known that egg whites contain the protein called avidin which is responsible for the dermatitis. The dermatitis is reversed by removing the egg white or addition of biotin

to the diet. Only about 0.05% of avidin is present in egg white and it is inactivated by heat (Li-Chan and Nakai, 1989). One molecule of avidin binds four molecules of biotin. The binding of biotin renders the vitamin unavailable for absorption in the intestine.

Ovomucoid

Scientists have long recognized that ovomucoid, a protein in fresh egg white, is a factor responsible for the antitryptic activity of eggs.

Ovoinhibitor

Another protein in egg white is Ovoinhibitor, which is also an effective inhibitor of intestinal trypsin since large amounts of raw egg white must be ingested in adverse effects might occur in laboratory experiments but not with the usual human diet.

NUTRITIONAL IMPORTANCE OF EGG

Eggs are an important source of food for primitive men and become a popular source of food that still provides a major source of essential nutrients in contemporary diets.

Egg protein

Eggs are a rich source of protein that is of a high biological value. The protein quality of the egg is often the standard for measuring the quality of all other food proteins. One egg can supply from 6 to 15% of daily human requirement of essential amino acids. Egg protein is an extremely rich source of methionine and tryptophan and of the semi-essential arginine. These amino acids are to be deficient in human diet.

Egg fat

Eggs are also an important source of essential unsaturated fatty acids, linoleic and oleic acid, a monounsaturated fatty acid. Egg fats are present in the yolk only and are very finely distributed. Therefore, they are very easily emulsified and digested. It has been estimated that 30-40% of fat are completely digested in the stomach. Egg fats are a mixture of true fat and phospholipids (91%). The phospholipids comprise three compounds—Lecithin, cephalin and sphingomyelin. The egg is also a rich source of cholesterol.

Egg yolk

Egg yolk serves as the major supplementary source of iron for young babies and also an important source of iron, phosphorus, trace minerals and low in calcium except shell. Eggs contribute significantly to the body's nutrient needs during rapid growth, and are therefore an excellent food for young children and teenagers.

Egg vitamin

Eggs are a rich source of fat-soluble vitamins A, D, E, K and many of the water-soluble B-vitamins. The egg is a potential source of Vit-D and avoid of Vit-C.

Calorie

Eggs are valuable and readily acceptable in diets for the elderly who may have lower caloric needs but have greater difficulty in digesting and absorbing nutrients. Eggs have comparatively low caloric content, important for persons with all ages and eggs make them a valuable food source for those recovering from illness.

SOME MISCONCEPTION ABOUT THE NUTRITIVE VALUE OF EGGS

There are mainly four major misconceptions about the nutritive value of eggs.

1. Shell color of egg
2. Yolk color of egg
3. Fertile or, infertile egg
4. Organic egg

Shell color

In some regions of the United States, consumers considering egg shell color an indication of high quality and higher nutritive value. They are willing to pay more for eggs with the desired shell color. The color of the shells whether dark or white is directly related to the breed or strain of hens and has no effect on the nutrient composition of the eggs.

Yolk Colour

Many people think that all foods with a deep yellow color are higher in nutritive value than those of a lighter shade and that darker yolks are therefore nutritionally better than lighter ones. Yolk color does impact consumer preference and yolk color is greatly influenced by oxycarotenoids (known as Xanthophyll pigments) in the hens diet. Xanthophylls, the major substance causing yolks to have a deeper color has little or no nutritive value. The idea that yolk color influences nutrient composition may have originated years ago when hens had the run of the farm and consumed a variety of feedstuffs containing Xanthophyll. The practical rations used today for commercial egg production are fortified with adequate amounts of vitamins and minerals to produce nutritious eggs. These rations include enough Xanthophyll containing ingredients to produce yolks with the desired yolk color.

Fertile Eggs/Infertile Egg:

Fertile eggs are more nutritious than non-fertile eggs. No scientific proof exists to confirm such a recommendation with the possible exception that the developing embryo might provide slightly more nutrients. Of course if an embryo has developed enough to significantly increase the nutrient content, few people would wish to use the egg. Fertile eggs are more rapidly than do non-fertile eggs.

Organic Eggs

Organic eggs may be promoted as much safer and more nutritious than those produced by hens on the usual commercial rations. Since pesticides, herbicides and commercial fertilizers must be proved safe before they can be used in the prescribed amounts at specific times in crop production; there is no reason for concern about eating eggs produced by hens on commercial rations. Organic eggs are no higher in nutritive value than regular eggs. If the ration for hens on an organic diet is not so well balanced as the usual commercial laying ration, the nutritive value of organic eggs tends to be lower.

FACTORS AFFECTING NUTRIENT CONTENT OF EGGS

There are several Factors affecting nutrient content of eggs. These are

1. Age of bird
2. Breed /strain of bird
3. Ration and environmental factor of hen
4. Egg storage condition and length of storage time
5. Processing of egg
6. Level of nutrient composition.

Parent stock /Commercial layer production

Care of chick's environment before arrival

Preheat or warm up both house and water before chicks arrive. In summer, start heating at least 24 hours and in winter at least 48 hours before the chicks arrive.

On arrival, take care of the following

1. Unpacking: Unpack chicks as soon as possible. Do not place the chick boxes in the warm house if unpacking takes longer, but place them in the service room in front of the house with a room. Never put chick boxes on a cold floor. Unload all chick boxes. Remove the lids and put them loosely on top of the box.
2. Chick distribution: Place chicks quickly and gently near feeders and drinkers. For cage rearing, distribute chicks evenly among the cages starting at the far end of the house.
3. In case of parent male: Place males under separate brooders (at least of 2 brooders) or into a warmer pen if warm room brooding is used. A comfortable temperature for the first 2 to 3 days for males 1-3 °C (2-5°F) warmer than that required for the female.
4. After placing the chicks, again check the working order of the equipment and temperature.
5. Temperature: Keep the temperature at chick level at 36 °C for the first 5 hours. Thereafter change to 34 °C. In case of floor brooding, use brooder guards/ chick guards and attraction lights to keep chicks near to heat source.
6. Water supply: For the first half day water is more important than feed. Provide only fresh, clean, drinking water. Supply water at many places around the brooder and take care the water has a temperature of 17-22 °C.
7. Stimulation of drinking: Stimulate drinking the first few hours by using a high light intensity. Touching the nipple or water in the fountain can stimulate chicks, which do not drink.
8. Feed supply: Supply broken wheat /maize (fine particles) for first hours and then starter diets

After a few hours, check whether the chicks have settled down well. The chicks behavior is the best indicator of their well-being:

- a. The chicks are evenly spread out and moving freely-temperature and ventilation are all right.
- b. The chicks are crowding together or avoiding certain areas within the house-temperature is too low or there is a draught.
- c. The chicks are laying about on the floor with outspread wings, gasping for air -temperature is too high.

At first signs that the chicks are not feeling well, fix reason and check more frequently.