

MUSCLE FOODS AND HUMAN HEALTH

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INTRODUCTION

Food is a necessity for human life. But owing to social, religious, economic or sentimental taboos, many societies tend to avoid certain food stuffs or treat them as luxury. Muscle foods played an important role in the diet of man from time immemorial. With advancement in scientific knowledge nutritional properties of various foods have been studied in detail. However, muscle foods for all their superiority are driven into certain controversies recently on health reasons. The scope of this article is to weigh the benefits against risks for the consumption of muscle foods.

NUTRITIONAL PROPERTIES OF MUSCLE FOODS.

Meat is held in high esteem in most communities. It has a prestige value and is regarded as a food of high nutritive value.

There are five major classes of nutrients present in all foods including muscle foods : Proteins, lipids, carbohydrates, vitamins and minerals.

PROTEINS

Muscle foods have higher quality protein than vegetables because they have amino acid profiles that match or exceed our body's requirement for amino acids. There are approximately 20 amino acids that constitute the protein of both muscle foods as well as of our body. Of the 20 amino acids, 9 are considered essential. Essential amino acids cannot be synthesized by our body and hence need to be supplemented in the diet. The world Health organization has estimated an ideal amino acid profile to meet our body's requirement. Muscle foods meet or exceed the estimated ideal concentration for all essential amino acids. But cereals like rice and wheat have low concentrations of lysine. Adult males (above 25 years) require approximately 63g of proteins per day (USRDA). The protein of most of the muscle foods on a wet weight basis is between 15% and 35%. On processing and cooking, this figure will increase. Thus a small serving of muscle foods provides protein sufficient in all the essential amino acids at a higher rate. The protein of muscle foods has an NPU (Net Protein Utilization) of 0.75-0.8 when compared to an NPU of 0.5 - 0.6 of plant food protein. Muscle foods are highly digestible about 0.95 compared with 0.8 - 0.9 for many plant foods.

LIPIDS

The basic component of most food lipids is the fatty acid. Normal range of fat in red meat is 10-40% on raw carcase basis which is further reduced during processing. Fats form an

important constituent of the diet in areas with low calorie intake. Fat in muscle foods is also important from the view point of meat flavour and contains several fat soluble vitamins such as A, D, E, K and also essential fatty acids such as linoleic and linolenic acids.

CARBOHYDRATES

Muscle foods are low in carbohydrates. The only one available naturally is animal starch or glycogen. But in processed products like cured meat, the carbohydrate level is higher.

VITAMINS

Meat and meat products are important sources of all the B-complex vitamins including thiamin, riboflavin, niacin, biotin, vitamin B6 and B12, Pantothenic acid and folacin. The last two are especially abundant in liver which, together with certain other organs is rich in vitamin A and supplies appreciable amounts of vitamins D, E and K. Vitamin B12 is primarily found in muscle foods.

MINERALS

Minerals are abundant in muscle foods since both human and animal biological systems are mineral dependant in similar ways. Mechanically deboned meat is sufficient in calcium. The most important mineral in muscle foods is iron. Iron in muscle foods is in the haem form which is better absorbed than the non haem iron form present in plant foods. The haem iron when eaten along with non haem iron increases the bioavailability of the latter and this is called the meat factor. This factor is absent for milk and egg. This may be because of the gastric acid production during digestion of muscle foods, which reduces the duodenal PH and thus increases absorption of iron. Meat factor may also play a role in the absorption of other trace minerals also. Meat is the richest source of zinc in the diet and supplies one-third to one-half of the total zinc intake of meat eaters. In addition to bioavailability, nutrient density (availability of nutrients for a fixed calorie intake) is also high for muscle foods.

CONTROVERSIES OF MEAT AND HEALTH

Nutritional value of a food item also involves assessment of possible nutritional adverse properties. The two major health hazards often said to be associated with consumption of muscle foods are coronary heart diseases (CHD) and cancer.

MUSCLE FOODS AND CHD

Damage to and deterioration of the coronary blood vessels leading to atherosclerosis is the picture in CHD. There are three ways in which muscle foods have been linked to CHD.

1. CHD in a society becomes prevalent when affluence of the people increases. When people become affluent, consumption of muscle foods increases.
2. The plaque formed in the coronary blood vessels contains high levels of cholesterol and animal foods are the only source of dietary cholesterol.
3. Onset of CHD is related to diets high in fat and fats rich in saturated fatty acids. Muscle food are reasons for both.

Cholesterol is an essential biochemical that is the precursor to many hormones, bile salts and is a cell membrane constituent. Every cell requires it and manufactures it. Despite many years of intensive investigation the real cause of CHD is not known but a large number of risk factors have been identified including a family history of CHD, smoking lack of exercise, various types of stress and certain disease states together with a number of dietary factors. The saturated fatty acids, myristic and palmitic, have been established as the most important of the dietary risk factors. High levels of total blood cholesterol are associated with the incidence of CHD and high intakes of saturated fatty acids elevate blood cholesterol levels: hence the association between dietary saturated fatty acids and CHD. Saturated fatty acids (SFA) have been equated with animal fats and so meat fat is generally perceived as being saturated, but in fact, this is only relative. For example pork lard is 40% SFA, beef tallow is 43-50% SFA. But vegetable oils which contain 20-25% SFA are often perceived as unsaturated. This perception of meat fat as being saturated has led to the belief that meat, should be avoided. In fact it has been shown that a reduction of total fat intake while still including in the diet 180g of lean meat containing 8.5% fat can result in a reduction in blood cholesterol levels. For most individuals dietary cholesterol has little or no effect on blood cholesterol levels because reduced synthesis in the body compensates for increased dietary intake.

MUSCLE FOODS AND CANCER

A cancer mainly associated with muscle foods is the cancer of colon. Postulated reason for this relating is that muscle foods increase faecal transit time and produce higher levels of toxic compounds through fermentation reaction. However scientific evidences for this are lacking. Breast cancer has been related to diets high in fat. But it has been proved that unsaturated fats are more susceptible to lipid oxidation and production of free radicals which in turn may act as cancer causing. It is to be noted that, unfortunately, lipids of plant origin (eg: Vegetable oil) are highest in unsaturated fatty acids. Moreover, researches have proved that conjugated linoleic acid, synthesized by rumen and present in ruminant meat is an anti-cancer agent. Epidemiological studies involving muscle foods will be inconclusive without simultaneously considering other risks such as habits of smoking, alcoholism, physical activity, genetics, life style etc. Till then it is impossible to single out muscle foods as causative agents for cancer.

CONCLUSION

Meat is not an essential part of the diet but without animal products it is necessary to have some reasonable knowledge of nutrition in order to select an adequate diet. Even small quantities of animal products supplement and complement a diet based on plant foods so that it is nutritionally adequate, whether or not there is informed selection of foods.

REFERENCE

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