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A primary focus of human nutrition is the prevention of nutrient deficiency or overfeeding, and achieving the recommended dietary allowance (RDAs) for essential nutrients. The World Health Organization (WHO) estimates that fully half of the human family, some 3 billion people, suffers from malnutrition (Gardner & Halweil, 2000). The irony of the present system is that millions of wealthy consumers in the first world are dying from diseases of affluence (heart attacks, strokes, diabetes, cancer) brought on by gorging on fatty grain-fed meats, while the poor in the third world are dying of diseases of poverty brought on by the denial of access to land to grow food grain for their families. We are long overdue for a global discussion on how best to promote a diversified, high-protein, low fat diet for the human race.

A source of protein is an essential element of a healthy diet, allowing both growth and maintenance of the 25,000 proteins encoded within the human genome, as well as other nitrogenous compounds, which together form the body's dynamic system of structural and functional elements that exchange nitrogen with the environment. The protein requirement can be defined as: the lowest level of dietary protein intake that will balance the losses of nitrogen from the body, and thus maintain the body protein mass, in persons at energy balance with modest levels of physical activity, plus, in children or in pregnant or lactating women, the needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health (WHO & FAO, 2007). To satisfy the metabolic demand, the
dietary protein must contain adequate and digestible amounts of nutritionally indispensable amino acids (histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine), and amino acids that can become indispensable under specific physiological or pathological conditions (conditionally indispensable: e.g. cysteine, tyrosine, taurine, glycine, arginine, glutamine and proline), plus sufficient total amino acid nitrogen, which can be supplied from any of the above amino acids, from dispensable amino acids (aspartic acid, asparagine, glutamic acid, alanine and serine) or from other sources of non-essential nitrogen. Based on the mean requirement estimates for the indispensable amino acids identified above and assuming a estimated average requirement (EAR) of 0.66 g/kg per day, intakes of about 0.18 g/kg per day and 0.48 g/kg per day of indispensable and dispensable amino acids, respectively, or preformed α-amino nitrogen (28 mg nitrogen/kg per day and 78 mg nitrogen/kg per day, respectively), should be sufficient to maintain body nitrogen homeostasis in healthy adults. (Food and Nutrition Board, 2002). However, the mean and population-safe (recommended dietary allowance; RDA) protein requirements were found 41% and 50% higher than the estimated average requirement (EAR) and to be 0.93 and 1.2 g /kg/day, respectively (Humayun et al., 2007). Average protein requirement depends on the biological quality of the protein.

Protein-deficient diets are almost certain to be generally nutrient-poor diets, deficient to varying degrees in a range of other nutrients, and also often associated with other environmental factors that can adversely influence health. When the predominant deficiency is protein, severe growth failure and muscle wasting may
develop in children and unintentional weight loss may also occurs in adults and is complicated by an infection such as measles or diarrheal illness (Torun, 2006). This additional illness results in an inflammatory response that secondarily reduces serum protein production and results in edema due to low oncotic pressure. Thus, protein-deficient diets are almost certain to be generally nutrient-poor diets, deficient to varying degrees in a range of other nutrients, and also often associated with other environmental factors that can adversely influence health. For the elderly, the population group with the highest protein: energy ratio of their requirement, and therefore most vulnerable to protein deficient diets, potentially adverse health outcomes of protein deficiency (e.g. poor bone health) are certainly multifactorial diseases. In the case of young children, the population group traditionally believed to be the most vulnerable, deficiency syndromes that have been associated in the past with protein deficiency, namely stunting and kwashiorkor, are now believed to reflect quite complex interactions between multiple nutritional deficiencies and other adverse environmental factors, including infection.

Good quality proteins rich sources of all essential amino acids are widely present in animal products such as milk, meat, fish, cheese, and eggs. Animal protein foods are preferred by most consumers and contain other constituents important in human nutrition. However, animal protein consumption in developing countries is very low. In India it was estimated that protein consumption of 52 g per day animal protein constitutes a meager 6 g, compared to 92 g and 65 g in USA and 92 g and 61 g in Australia (Sugunan, 1995). Milk is produced in surplus in
North America and northern Europe at a high level of consumption. In the Far East, excluding Japan, and in Africa, however, milk production per inhabitant is very low and the cost is high. Meat and poultry foods are still expensive protein sources to low income populations. Fish and new fish protein concentrates compete advantageously with other animal protein sources. However, due to the high cost and uncertain availability in the future, efforts have been made to partially or totally replace dietary fish meal by alternative protein sources (Abbott, 1966).

Different unconventional sources of food protein (yeast, chorella etc.) can be produced in large quantities at comparatively low cost, but because of difficulties in making it acceptable and attractive, its use in human nutrition has met little success (Anderson et al., 1975). It may be such that sources of protein will provide large quantities of animal feed in the future. This could both reduce the cost of livestock products from human consumption and release for human use protein feed that would otherwise have been consumed by livestock. So, an acceptable and low cost alternative protein source is required for the population groups with inadequate diets and to replace protein sources with high cost and uncertain availability in future.

Cardiovascular disease (CVD) has become a ubiquitous cause of morbidity and a leading contributor to mortality in most countries (Lopez, 1993; Murray & Lopez, 1994). This underscores the importance of dietary fat, a modifiable risk factor for cardiovascular disease. There is overwhelming evidence linking elevated plasma levels of total cholesterol and its principal carrier, low-density lipoprotein
(LDL), to cardiovascular disease (Ashwell, 1993). Studies have shown that saturated fatty acids when replaced by polyunsaturated fatty acids can reduce not only LDL but also high-density lipoprotein (HDL) cholesterol. Apart from the effects on lipoproteins, dietary fatty acids modify platelet aggregation, vascular reactivity, and immune functions through their effects on the synthesis of eicosanoids in platelets and endothelial cells of the arterial wall. High intakes of n-6 fatty acids and saturated fatty acids increase platelet aggregation. Whereas the n-3 eicosapentaenoic and docosahexaenoic acids decrease platelet aggregation and bleeding time, they lower triacylglycerol and have hypolipidaemic, vasodilatory, anti-inflammatory, and hypotensive effects, as compared to n-6 arachidonic acid. In many developing countries, plant foods supply most of the essential fatty acids, and the ratio of n-6 to n-3 is the ratio of linoleic acid to α-linolenic acid. There are developing countries where fish supply eicosapentaenoic acid and docosahexaenoic acid. The balance between linoleic acid and α-linolenic acid should be maintained in developing countries at an n-6/n-3 ratio of 5:1 to 10:1. Saturated fatty acids do not contribute equally to hypercholesterolaemia or hyperaggregability of platelets, and further, their effects can vary with dietary levels of cholesterol and polyunsaturated fatty acid (Hayes & Khosla, 1992; Khosla & Hayes, 1994).

As recently reviewed by Drewnowski and Popkin (1997), the global availability of cheap vegetable oils and fats has resulted in greatly increased fat consumption among low-income countries. The transition now occurs at lower levels of the gross national product than previously and is further accelerated by
rapid urbanization. In China, for example, the proportion of upper-income persons who were consuming a relatively high fat diet (>30% of daily energy intake) rose from 22.8% to 66.6% between 1989 and 1993. The lower- and middle income classes also showed a rise (from 19% to 36.4% in the former and from 19.1% to 51.0% in the latter) (Peto, 1996). The Asian countries, with a diet that is traditionally high in carbohydrates and low in fat, have shown an overall decline in the proportion of energy from complex carbohydrates along with the increase in the proportion of fat. The cheap vegetable oils and fats of foods are contributing to the increasing rate of CVD mortality.

Edible marine and fresh water invertebrates constitute an important food source, supplying proteins of high nutritional value, polyunsaturated fatty acids, vitamins and minerals for human nutrition. However, the availability of traditional seafood products has undergone significant changes in recent decades; particularly as a result of over-fishing. Increasing interest is thus being paid to the identification of non-traditional species with potential food value. Previous studies have reported that marine oil and marine protein modify serum lipid levels (Tanaka et al., 1998; Garg & Li, 1994) and have a therapeutic role in the prevention and treatment of coronary artery disease (Charnock, 1999; Nair et al., 1997).

Snail meat is a source of high quality proteins with all essential amino acids (Dong, 2001; Adeyeye et al., 2004; Milinsk et al., 2006). Several experiments also reported beneficial and cardioprotective effects of snail meat (Gonzalez et al., 2001). Snail lipid is reach in monounsaturated and polyunsaturated fatty acids with essential fatty acids and omega-3 in its composition (Dong, 2001; Milinsk et al.,
Snail lipid has omega-6 and omega-3 fatty acids with a chain length of 22 carbons (Milinsk et al., 2006). With higher omega-3 fatty acid content, quite low in other meats, snail meat is found to be a factor affecting higher lifespan and lower cancer rate in certain people (Cheney 1988). Snail lipid contains a large amount of phospholipids and levels of triacylglycerol or diacylglycerol are very low (Zhukova, 2007).

Snail meat also complements trace and minor elements (calcium, magnesium, phosphorus, sulphur, potassium, sodium, zinc and iron) needed for proper growth and development in human being (Dong, 2001; Yildirim, 2004; Fagbaru et al., 2006).

*B. bengalensis* belongs to a class of gastropoda snail (subclass-Prosobranchia, order- Caenogastropoda, family-Viviparidae). In India it is a highly cherished food item of the tribal and village people. The major portion of the meat of *B. bengalensis* is protein. Dietary protein requirement of village people are met to some extent by *B. bengalensis*. A significant amount of its lipid content is phospholipid. The fatty acid composition of the lipid shows that it is a rich source of higher unsaturated fatty acids like eicosapentaenoic acid (EPA) and docosahexaenoic acid. *B. bengalensis* is highly abundant in India and it can be utilized as a food source and also in medicinal purpose. However its consumption is limited owing to lack of adequate information about its nutritional and biological potential. There is a desire to better utilize the snail protein for human consumption.
Due to presence of phospholipid and good quality protein it is a common practice to take *B. bengalensis* as a food item. But no published report is available on the biochemical and nutritional aspects of *B. bengalensis* as a whole or lipid present in it. So, critical research investigation is required on this species.

The main objectives of the present study are:

i. Characterization of lipids, proteins and other nutritionally important components present in *Bellamya bengalensis*.

ii. Nutritional evaluation of the whole body mass of *B. bengalensis* in comparison with casein.

iii. Nutritional evaluation of isolated lipid of *B. bengalensis* in comparison with soybean oil.

iv. Recovery of phospholipid from *B. bengalensis* lipid and their nutritional evaluation.