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DEPARTMENT OF MICROBIOLOGY
MUSLIM ARTS COLLEGE



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CERTIFICATE

This is to certify that Prof./Dr./Mr./Mrs./Ms *T. KUMARAN, Assl. Prof. & Asst., Department of Zoology, Muslim Arts College, Thiruvithancode* has participated / presented a research paper entitled *Nutritional profile of healthy Shrimp and its products* in the National Seminar on "Climate change and Biodiversity" organized by the PG & Research Department of Zoology & Department of Microbiology, Muslim Arts College, Thiruvithancode - 629 174, held on 27th September 2023.

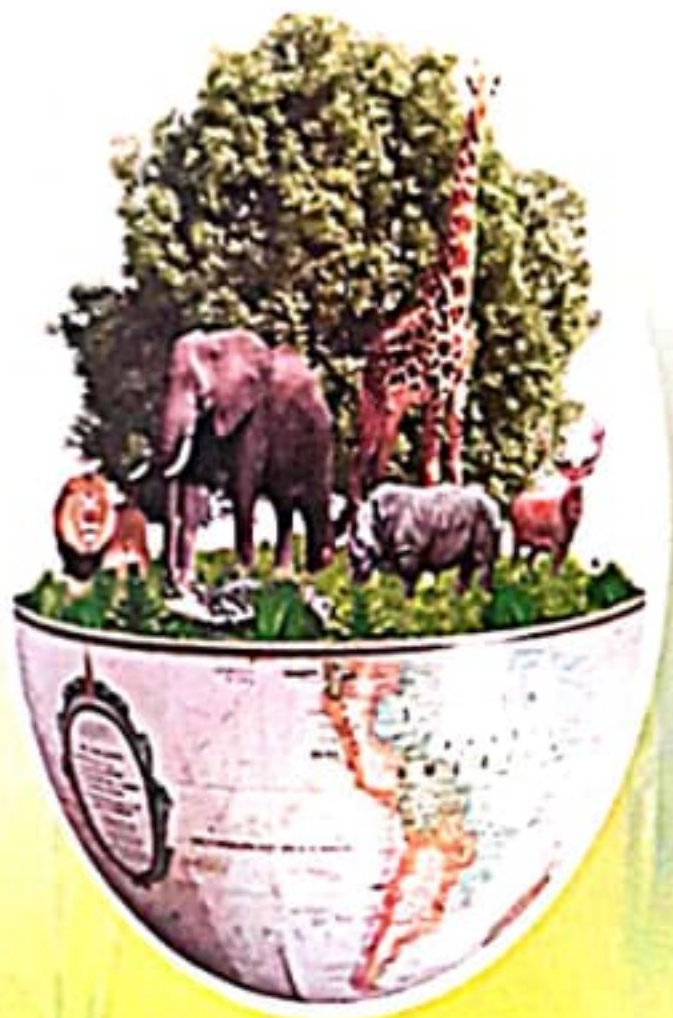
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NUTRITIONAL PROFILE OF HEALTHY SHRIMP MEAL AND ITS PRODUCTS

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ABSTRACT

Fish food helps human beings maintain good health by providing all essential nutrients. Shrimps have low fat, less cholesterol and high PUFA content compared to eggs, and the current understanding on dietary cholesterol linked with egg consumption clearly confirms the nutritional value of shrimps. An attempt has been made in this article to evaluate the nutritional value of shrimp in man's platter, mainly focusing on its nutritional composition, daily value of major nutrients and dietary cholesterol. This may put to rest the negative perceptions and controversies on shrimp cholesterol and might pave the way for accepting it as a nutritional food for healthy human beings.

Key words: Shrimp, Nutrition, Cholesterol, Healthy human

INTRODUCTION

Shrimp is one of the most delicious seafoods and is part of almost every nation's traditional meal. Shrimp production is expected to grow more than 50% globally during 2010–2030, indicating its vibrant production potential. Fresh and clean shrimps can be served either cooked or uncooked with sauce. From a nutritional standpoint, shrimps are high in protein, low in saturated fat⁴ and calories, and have a neutral flavour. Due to these characteristics, shrimps form a natural additive in salads, pastas, cu. Despite the several nutritional parameters of shrimp based on which it can be considered as a healthy food, there is reluctance among dieticians and health professionals as well as consumers because of its relatively higher cholesterol (Robinson, Assmann Carney,) Curry, soups and stir-fried dishes. Shrimps have also been identified as a rich source of vitamin B₁₂. Egg from poultry has been identified as a high cholesterol food item for human and its consumption has been a matter of debate for cardiovascular health. Several studies agree that cholesterol in egg does not contribute much to blood cholesterol, and support the idea of eating an egg each day. An attempt has been made in this article to evaluate the nutritional value of shrimp in man's platter, mainly focusing on its nutritional composition, daily value of major nutrients and dietary cholesterol.



Worldwide shrimp culture

Shrimp has proved to be one of the great aquaculture cash crops of the 1980s and a source of prosperity in a number of developing countries. This has happened because supplies of wild, caught shrimp have stagnated, with catches around the world approaching, or even surpassing, their maximum sustainable yields. Since 1977, world landings have stabilized in the region of 1.6 million. India is the second largest producer of fish and also second

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largest producer of fresh water fish in the world. The sector plays an important role in the overall socio-economic development of India. The sector has gained importance as it contributes significantly to the national food security, livelihood generation, agriculture diversification and enhanced foreign exchange earnings.

Fish Nutrition and Feeding

Based on recent scientific literature on the nutrient requirements of fish and shrimp and other compounds that are commonly found in, or added to, feeds for fish and shrimp. Information on antinutrients and other undesirable substances found in fish feeds is also presented. The brackish water sector encompasses the cultivation of giant tiger prawn (*Penaeus monodon*) and exotic white leg shrimp (*Penaeus vannamei*). Tiger shrimp (*P. monodon*) has been the major contributor in the shrimp production, but for the past few years downward trend in production has been observed in giant tiger prawn production due to frequent disease outbreaks. With the introduction of non native white legged shrimp (*P. vannamei*) in the period 2005-09, the brack water aquaculture has got a major thrust. From a production of 90,000 MT in the year 2010, it rose to 2, 70,819 MT in 2013-14. It had also increased the export earnings by leaps and bounds. As per the published reports, *P. vannamei* accounted for INR 20,000 crores of exports which is around 66% of the total exports in the year 2013-14. The superior traits of the species such as higher tolerance capacity, lower feed requirements, higher survival rate, fast growth rate and others contributed to the growth in the brackish water aquaculture production.

Prawns in our Diet

Prawns nutrition makes them a great source of protein as they have less saturated fat and more vitamins than other protein sources. For instance, prawns have almost 22 times as much vitamin E as beef and 19 times as much as chicken. The Dietary Guidelines for Americans recommends that people consume about 8 ounces (227 grams) of seafood per week, while the Harvard T.H. Chan School of Public Health recommends up to 12 ounces (about 340 grams). Regular consumption of shellfish like prawns is important because of their healthy fats. Marine animals such as prawns have omega-3 fatty acids that are hard to obtain from other protein sources.



Omega-3 Fatty Acids in Prawns

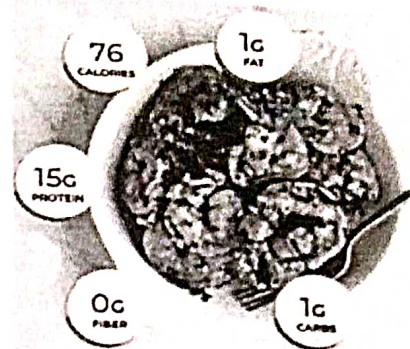
Omega-3 fatty acids are essential fats that can be found in many foods. Fatty fish, like salmon, are well-known sources of these fatty acids. However, you can also obtain these healthy omega-3 fats from foods like seaweed, shrimp and prawns. Plants with omega-3s usually have alpha-linolenic acid (ALA). In contrast, marine animals tend to be rich in different omega-3 fatty acids: EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). EPA and DHA are the healthy omega fats that are considered clinically useful as they've been used to counteract and mediate various health issues. They're also important for the health of developing infants. Omega-3 fatty acids are consumed naturally in your food. The recommended 8 ounces of seafood per week results in the equivalent of 250 milligrams of EPA and DHA per day. These fatty acids are associated with many health benefits. They can reduce inflammation, help counteract neuropsychological issues and improve cardiovascular health. Omega-3 fatty acids can help reduce the chance of heart problems like heart disease, stroke and heart failure.

Prawn fat:

Shrimps has one of the lowest fat content among non vegetarian food items. The average lipid content in the edible proteins of shrimps is 1%. The lipid class composition the shrimps is 65-70% phospholipids, 15-20% cholesterol, and 10-20% total acyl glycerols.

Nutritional value

85 grams of cooked shrimp contains the minerals such as 60 mg of calcium, 0.43 mg of iron, 33 mg of magnesium, 201 mg of phosphorus, 220 mg of potassium, 94 mg of sodium, 1.39 mg of zinc, 0.322 mg of copper and 0.028 mg of manganese. The same amount serves 63.18 g of moisture, 84 calories, 20.38 g of protein, 0.24 g of total fat, 1.04 g of ash and 0.17 g of carbohydrate

**Benefits of shrimps**

- **Lose weight:** It is an excellent source of Vitamin D and protein. The high presence of leptin avoids the problems such as inexplicable cravings and overeating
- **Slows down ageing:** Skin aging is the common problem which is caused due to the sunlight. The addition of shrimp to the diet promotes the skin health.
- **Prevent hair loss:** The minerals in Shrimp help to promote the hair health.
- **Cardiovascular problems:** The shrimp paste possess fibrinolytic enzyme which is essential for the thrombolytic therapy which breaks the harmful blood clots in the blood vessels
- **Brain function:** The high content of iron in Shrimp is essential for the process of bonding of oxygen in hemoglobin. Iron assist to rise in flow of oxygen to muscles, provides endurance and strength
- **Anti-cancer properties:** Shrimp has as taxiing that helps to lower the chances of cancer. It also possesses selenium that reduces the chances of cancer such as lung and prostate cancer.
- **Lowers menstrual pain:** Shrimp has omega-3 fatty acids which is beneficial cholesterol that balances the adverse effects of Omega-6 fatty acids and also helps to eradicate the menstrual cramps in women

Protein and other vital nutrients from prawn food

Three-fourths of the edible portion of shrimp are water. Nearly 80% of the remaining portion (dry matter) comprises of protein. The average protein content of fresh shrimp is 19.4 g/ 100 g and it contributes 87% of the total energy. Our body cannot synthesize certain amino acids and they must be obtained through diet; these are called essential amino acids, indicating that it provides more essential nutrients per calorie and can be considered a healthy food choice like fish (Nutrition). Another advantage of eating shrimp is its significant lower lipid content. Analysed lipid levels in shrimp were around 1.15 g/100 g. No other meaty food can claim such a low lipid level as fresh shrimp. The lipid class composition of shrimp comprises of 65-70% phospholipids, 15- 20% cholesterol and 10-20% total glycerols. Eating shrimp (100 g/day) would provide approximately ten vitamins and ten minerals. Shrimp contains important vitamins like vitamin A (180 IU), vitamin D (2 IU) and vitamin E (1.32 µg), vitamin B₁₂ (1.11 µg) and vitamin B₃ (1.77 mg). All these nutrients are known to exhibit considerable level of variation in relation to molting stage of shrimp.

Comparison of shrimp, egg and meat* on their cholesterol, saturated fatty acids and atherogenic index

S.No	Non-vegetarian food	SFA ^a (g/100 g)	Cholesterol ^a (mg/100 g)	Atherogenic index ^b
1	Shrimp	0.25	173	0.36
2	Egg	4.0	400	0.40
3	Chicken	0.6	100	0.50
4	mutton	0.7	70	0.1
5	Beef	0.8	90	0.70
6	Pork	13		0.67
	Health	Lowest in shrimp Good for health	Moderate in shrimp but not harmful due to low SFA	Lowest in shrimp Good for health

Alternatives to Fish Oil

Fish fed diets that contain fish oil are a rich source of omega-3 fatty acids in the human diet. However, when fish are cultivated using alternative feeds that do not contain fish oil, their omega-3 fatty acid content is reduced. Currently, there are no ideal substitutes for fish oil as a source of long chain polyunsaturated fatty acids.

One possibility is obtaining fatty acids from sectors of the marine ecosystem other than fish. Significant quantities of fish oil (and meal) could be recovered from seafood processing waste, and this source could extend the period before supplies of fish oil, become limiting to aquaculture production. Another option that is currently being employed is to extract fatty acids from land plants, specifically the oilseed plants that produce vegetable oil. However, vegetable oil differs from fish oil in its fatty acid composition, as higher plants do not produce long chain fatty acids. Irrespective of fish species, fish given feed that contains vegetable oil instead of fish oil will contain less of the fatty acids that are beneficial to human health.

CONCLUSION:

At present aquaculture is regarded world wide as one of the fastest growing food producing sub sectors compared to cereal and live stock production. Shrimp is the richest source of protein with the lowest amount of fat. The overall benefits of eating shrimp are overwhelmingly high and this emerging as a functional food mainly due to its cardio protective character.

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