



Silkworm Pupae as a Future Food for Humans with Nutritional and Medicinal Benefits

(*Anusha Nitta and Vijayakumari Natarajan)

Division of Entomology, Tamil Nadu Agricultural University,
Coimbatore - 641003, Tamil Nadu, India

*Corresponding Author's email: anushanitta2@gmail.com

Insects have historically been consumed by humans in Asia, Africa, and Latin America and have been the subject of extensive scientific study in recent years. Among the edible insects, silkworm larvae and pupae are one of the emerging insect-based nutritious food sources with high proteins, oils, polyphenols, vitamins, and chitosan. Silkworm pupae, particularly from species like *Bombyx mori*, are gaining attention as a potential future food source due to their high nutritional value and possible medicinal benefits. The idea of consuming insect-based foods, including silkworm pupae, is part of a broader trend towards sustainable and alternative protein sources.

Boiling/Steaming: The most common method involves boiling or steaming the pupae, which makes them soft and tender.

Frying: They can also be deep-fried or stir-fried to add a crispy texture.

Seasoning: Often, the pupae are seasoned with spices, soy sauce, or other flavourings to enhance their taste.

Nutritional Benefits: The edible form of silkworms is usually the pupae, which are the intermediate stage between the larva and adult moth. Silkworm pupae are highly nutritious, containing significant amounts of protein, healthy fats, and various vitamins and minerals. They are considered a good source of complete protein, meaning they provide all essential amino acids necessary for human health. Silkworm pupae are rich in protein, containing about 50-60% protein by dry weight. The protein is highly digestible and contains all the essential amino acids, making it a complete protein source. They are also a good source of healthy fats, particularly polyunsaturated fatty acids, which are beneficial for heart health. Silkworm pupae are rich in essential vitamins like vitamin B2 (riboflavin), B12, and E. They also contain important minerals such as iron, zinc, magnesium, and calcium. The carbohydrate content in silkworm pupae is relatively low, which makes them suitable for low-carb diets.

Medicinal Benefits: Silkworm pupae contain bioactive compounds like flavonoids and polyphenols, which have antioxidant properties. These antioxidants help combat oxidative stress, reducing the risk of chronic diseases such as cancer and heart disease. Some studies suggest that the consumption of silkworm pupae can help reduce inflammation, which is linked to many chronic conditions, including arthritis and cardiovascular diseases. The pupae are believed to boost the immune system due to their rich nutrient profile, including vitamins, minerals, and essential fatty acids. Some research indicates that silkworm pupae may have a role in managing blood sugar levels, which could be beneficial for people with diabetes.

Sustainable Food Source: Silkworm farming for pupae has a relatively low environmental footprint compared to traditional livestock farming. They require less land, water, and feed, and they produce fewer greenhouse gases. The use of silkworm pupae as food could help reduce waste in the silk industry, where the pupae are often a byproduct of silk production. Silkworm pupae can be produced on a large scale with existing sericulture infrastructure, making it a viable option for meeting future food demands.

Culinary Applications: In many cultures, silkworm pupae are already consumed as a delicacy. They can be boiled, fried, roasted, or ground into powder and added to various dishes. Silkworm pupae can be incorporated into protein bars, powders, snacks, and other processed foods, making them more accessible and appealing to a broader audience.

Challenges and Considerations

While silkworm pupae are consumed in some parts of the world, particularly in Asia, there may be resistance in other regions due to cultural or psychological barriers to eating insects. Ensuring the safety and proper regulation of silkworm pupae as food is essential. This includes monitoring for potential allergens and establishing clear guidelines for production and consumption. The taste and texture of silkworm pupae can be an acquired taste for some. However, with the right culinary techniques, they can be made palatable for a wider audience.

Conclusion

Silkworm pupae hold promise as a future food with significant nutritional and medicinal benefits. Their potential as a sustainable, nutrient-dense, and eco-friendly protein source makes them an attractive option for addressing global food security challenges. As the global community seeks alternative protein sources, silkworm pupae could play a crucial role in meeting the dietary needs of a growing population while promoting health and sustainability.

References

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