



HELICULTURE - A POTENTIAL TOOL FOR NUTRITION SECURITY IN INDIA

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INTRODUCTION

India has done well to expand food production and build up adequate safety stocks of food grains. The food grain production of India increased from 50 million tonnes in 1950-51 to near 300 million tonnes in 2019-20. Over the last 30 years, India has changed from being a food-deficit country to an independent food producer. Even though India attains food security, but attainment of nutritional security is still a million dollar question so it appears more practical and realistic to concentrate on nutritional security at this time than of food security. In order to meet the nation's nutritional needs, it makes sense to expand the livestock industry. This is because animal protein is more valuable nutritional than plant protein due to the higher concentration of important amino acids and micronutrients like vitamins and minerals. But due to the rising cost of conventional animal proteins, India is in need of alternate source of animal protein. This article legitimizes the idea of snail farming in the nation to support the necessity of incorporating food snails into conventional farming systems as an alternative source of animal protein.

HELICULTURE

The process of growing or rearing edible land snails for human consumption is known as heliculture. Snail farms can be

located outside or inside in climate-controlled structures, or in enclosed spaces like greenhouses or plastic tunnel homes. Heliculture is an agricultural activity currently experiencing a renewed interest as a profitable practice in a widespread area. Furthermore, snails can reproduce and hatch indoors in a controlled setting before growing up in outdoor enclosures such as pens.

EDIBLE SNAILS

The majority of snails are members of the families Viviparidae, Piliidae, Planorbidae, and Lymnaeidae, and they inhabit stagnant water. The edible snails are *Pila globosa*, *Bellamya bengalensis*, *Bellamya bengalensis f. typica*, *Bellamya bengalensis f. balteata*, *Melania tuberculata*, *Bellamya dissimilis*, *Cipangopaludina lecythis*, *Pomacea canaliculata*, *Pila scutata*, *Pila theobaldi*, *Pilo virens*, *Brotia costula*, *Lamellidens marginalis*, *Anisus convexiusculus*, *Helix* spp., *Cornu aspersum maxima*.

TAXONOMIC STRUCTURE OF COMMONLY REARED SNAILS

Domain	: Eukarya
Kingdom	: Animalia
Phylum	: Mollusca
Class	: Gastropoda
Order	: Stylommatophora
Family	: Achatinidae

Genera	: Lissachatina, Archachatina, Achatina
Species	: Achatina, marginata, fulica, aspersum, etc

*Helix* spp.*Pila globosa**Cornu
aspersum
maxima*

ECOLOGICAL REQUIREMENTS OF SNAIL FARMING

Snails are extremely sensitive to their surroundings. Humidity and temperature are critical factors in the care and growth of animals. For example, *Achatina fulica* needs ideal mating conditions of 22–32 °C and relative humidity of >86%. Though *Achatina fulica* and *Helix* sp. are not native to India, they are the most well-known food snails. It is possible to cultivate these snails in environments that are somewhat controlled (Semi- controlled environment)

FEED

For rearing snails, it is preferable to use tender leaves (such as cassava, pawpaw, eggplant cabbage, lettuce, etc.), fruits (such as mangoes, pear, plum, tomatoes, bananas, cucumbers, paw paws etc.), tubers (such as yam, cassava, sweet potatoes, plantains, etc.), or even some domestic waste (such as the peel from fruits and tubers, leftover cooked rice, beans, etc.).

HOUSING

Snails are reared in polythene tunnels that house the farm with equipped climate control systems and function as green houses. A temperature between 27 and 30 degrees is maintained in these systems. Usually the term “pen” refers to the area used to raise the snails. Each pen was composed of propylene and had dimensions of 1 m x 2 m x 0.5 m (length x breadth x height). A controlled freshwater intake and wastewater outflow were built, with a maximum water level of 5 to 7 cm. To prevent pollution from organic materials such as feed and snail excrement, water was not allowed to be stagnant inside the pen.

NUTRITIONAL PROFILING

In late Pleistocene and early to mid-Holocene archeological sites, humans have been using snails as sustenance for thousands of years. Snails frequently have protein contents higher than those found in typical animal diets. The essential amino acids needed by humans are present in snail protein, which is high in quality due to its amino acid composition. South Asians mostly consume wheat, rice, or maize which are cereals that are low in lysine. On the other hand, snail flesh is considered to be a good source of lysine. A 75 kg person's daily essential amino acid requirements can be met by 100 g of snail flesh. Compared to traditional animal-based diets, snails have a relatively lower fat level. However, they have higher PUFA than SFA contents. Conversely, it has been demonstrated that polyunsaturated fatty acids (PUFA) provide preventive effects against inflammatory and cardiovascular disorders, which makes heliciculture more attractive.

Snails are a great source of minerals. It is important to mention about iron because it

is frequently low in newborns, pregnant women, children, teenagers, and other people of childbearing age. Many developing nations including India are in a more critical situation with regards to iron supply. Surprisingly most edible molluscs have a carotenoid level in the range of 10 and 140 μg /100g of the raw edible component and the carotenoids are converted to vitamin A in the human body.

BENEFITS

Snail comprises of 15% protein, 2.4% fat, and 80% water. They are also excellent providers of vitamins B12, K, E, and A. The blue secretion extracted from the shell is used in traditional medicine to promote health development in infants. Additionally, it's said that snail meat is excellent for the treatment of ulcers and asthma. In ancient Rome, it was also thought to have aphrodisiac qualities and was advised for dignitaries in the evening. Snails (and/or their extracts) are used to treat smallpox, chronic bronchitis, stomach pains, wound healing, and smooth relaxing.

CHALLENGES

One of the main obstacles to the widespread adoption of snail farming is social and cultural constraints. Some may be obligated by their religious convictions to abstain from this delicacy, most people may develop a general molluscophobia. Another major issue is safety worries about eating snails. For example, consumption of raw or undercooked snail has been shown to cause cases of angiostrongylus infection.

CONCLUSION

One of the key factors driving the development of the national economy is small business and farming in the context of the active development of a market economy. The practice of snail farming is becoming more and more popular, and in the years to come, the sector is expected to undergo significant change. With the dynamics of pharmaceutical and cosmetic industries more research to unearth more bioactive compounds will be directed into the industry



Snail farms - Pen