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Entomophagy: Embracing Insects as the Sustainable Superfood of Tomorrow

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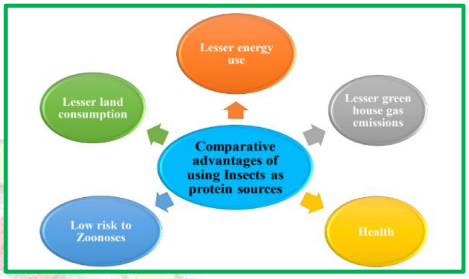


Approximately seventy percent of the world's agricultural land is presently devoted to meat production, either directly or indirectly. As the global population expands and consumer demands rise, ensuring an adequate supply of animal protein becomes increasingly challenging. It's imperative to explore alternative protein sources, and insects offer significant potential in addressing global food security concerns. Currently, around 2.5 billion people worldwide incorporate approximately 2,111 species of insects into their diets. This practice, known as entomophagy, encompasses the consumption of various insect types, including beetles (31%), caterpillars (18%), ants, bees, and wasps (14%), grasshoppers, locusts, and crickets (13%), cicadas, leafhoppers, and other insects (10%), termites (3%), dragonflies (3%), and flies (2%) (Jongema, 2017).

Nutritional value of edible insects

Insects serve as an exceptionally nutritious food source, boosting high levels of protein, fat, vitamins, minerals, and fibre. However, the nutritional composition of edible insects varies depending on the species and can be quite diverse even within the same group. Factors such as diet, life stage, habitat, and environmental conditions influence this variability.

Globally, per capita protein consumption spans from approximately 56 g/day in lower-income regions to 96 g/day in higher-income areas. Interestingly, while animal protein accounts for about 65% of protein intake in high-income countries, it only contributes to 15% of protein consumption in low-income nations. Edible insect species present a promising protein source that is highly digestible for humans. Integrating insects into diets could significantly enhance protein intake and overall nutritional quality. The protein content in dry insect matter varies across species, ranging from 35% (termites) to 61% (crickets, grasshoppers, locusts), and can reach as high as 77% in certain species. This range aligns closely with the protein content found in pork and beef (40-75 g/100 g dry weight). Most edible insect species full-fill recommended amino acid levels, including phenylalanine, tyrosine, tryptophan, threonine, and lysine (Toti, 2020).

Table 1: Nutrient composition of some edible insects (per 100 g edible portion on fresh weight).

	Coleoptera	Lepidoptera	Hymenoptera	Orthoptera	Hemiptera	Isoptera
Energy (kcal)	78-155	358-361	79-184	89-227	63-165	93-535
Protein (g)	13-21	49-55	7-14	13-68	19-20	21-21

Fat (g)	1-19	4-22	3-13	1-43	2-57	2-42
CHO (g)	1-3	12-18	5-6	1-5	3-8	20-21
Fiber (g)	5-7	4-15	1-3	2-10	4-5	5-6
Fe(mg)	0.3-24	0.03-109	3-103	0.1-42	0.4-29	0.-31
Zn (mg)	5-6	2-11	4-15	4-13	4-46	3-8
Vit A (IU)	8-27	4.3-4.4	-	21-25	21-150	03-0.7
Vit E (IU)	0.7-1.2	8.3-8.6	-	1.0-2.3	1.4-13	0.8-1.0
Thiamine (mg)	0.2-0.3	-	0.2-0.3	0-0.4	0-0.6	-
Riboflavin (mg)	1.1-3.5	-	0.2-0.9	0.4-3.4	0.9-1.5	1.5-4.2
Vit.B12 (mg)	-	-	-	5-9	-	-

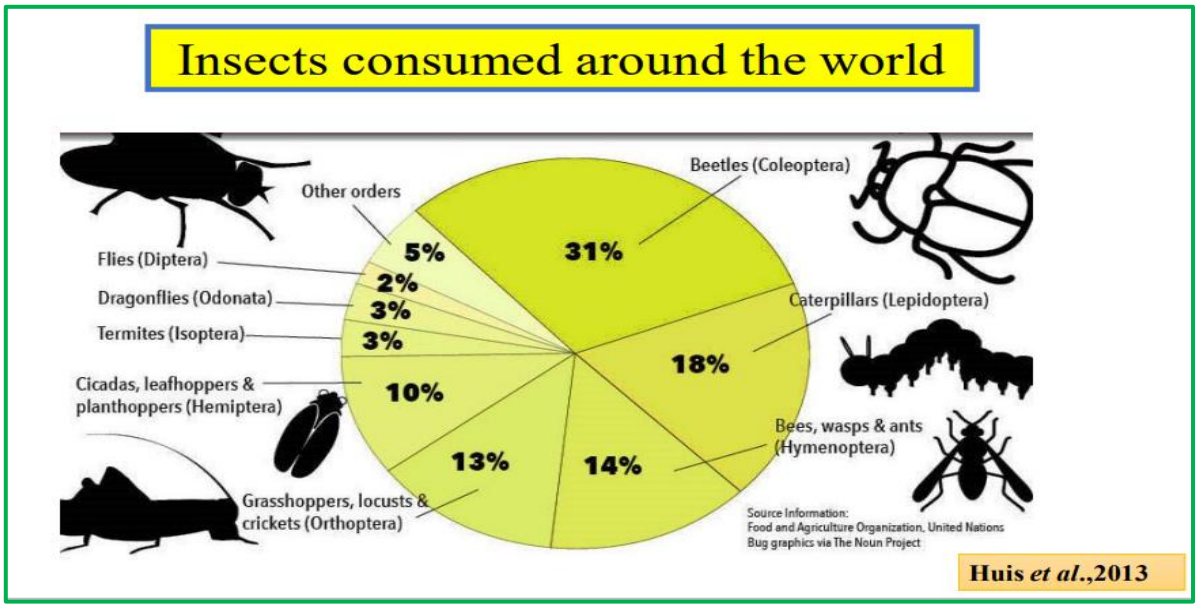
Food security

The Food and Agriculture Organization (FAO) of the United Nations predicts that the world population will surpass 9 billion by 2050, necessitating a 100% increase in food production. However, as the human population grows, the availability of land for food production decreases, a trend likely to worsen due to the impacts of global warming. Climate change is expected to diminish agricultural land, exacerbating food insecurity, particularly in low-income countries. This could lead to increased malnutrition and poverty, widening the food security gap between nations of different income levels. Addressing these challenges will require improvements in socio-economic conditions and access to food worldwide.

Edible insects have emerged as a potential solution to food scarcity, particularly in regions grappling with malnutrition and food insecurity. Establishing insect production sectors could offer a policy-driven approach to alleviating food insecurity and ensuring nutritional adequacy in these vulnerable areas.

Insect species as food and feed

Insects are the Yellow mealworms, the lesser mealworm, and the Super worm (larvae of beetles from the family of Tenebrionidae); several cricket species, of which the most important one is the house cricket, *Acheta domestica*; migratory locust, Silkworm, Termites, European honey bees, Rhinoceros beetle, Red palm weevil, Wax moths and Dragonflies etc.



Conclusion

Entomophagy, the consumption of insects, represents more than just a passing fad; it stands as a solution to urgent global challenges like food insecurity and environmental decline. Looking ahead, it's evident that insects hold a crucial position in forging a resilient and sustainable food system. Embracing entomophagy not only broadens our dietary horizons but also lessens our environmental impact, fostering a healthier planet for future generations. Let's persist in exploring the vast potential of insect cuisine and chart a course toward a brighter, more sustainable future-one crunchy bite at a time.

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