Designer Rice vs Fortified Rice & GI Economy

Published On: 25-04-2026

Scientists at CSIR–National Institute for Interdisciplinary Science and Technology (CSIR–NIIST), Thiruvananthapuram, have developed a “designer rice”, a nutritionally enhanced innovation aimed at addressing malnutrition and lifestyle diseases, sparking discussion on its comparison with fortified rice and glycaemic index (GI) concepts.

What is Designer Rice? (New Innovation)

Designer rice is a functional food developed using food-processing technology (not genetic modification), where broken rice is re-engineered into nutritionally superior grains.

It is produced by:

Converting broken rice into flour

Mixing with protein and micronutrients (iron, folic acid, Vitamin B12)

Reforming into rice-like grains

Key Features

High Protein Content: ~20% (vs 6–8% in normal rice)

Low Glycaemic Index (<55): Releases glucose slowly

Micronutrient Enrichment: Helps combat anaemia

Circular Economy: Uses rice milling by-products (broken rice)

What is Fortified Rice? (Policy Tool)

Fortified rice refers to regular rice enriched with essential micronutrients to improve public health.

Defined by Food Safety and Standards Authority of India as adding nutrients to improve food quality

Typically contains:

Iron

Folic acid

Vitamin B12

Process

Production of Fortified Rice Kernels (FRKs) via extrusion

Mixing FRKs with normal rice (1:100 ratio)

Policy Linkages

Distributed via schemes like:

Public Distribution System (PDS)

PMGKAY

Mid-Day Meal

Aimed at tackling hidden hunger and anaemia

Designer Rice vs Fortified Rice:

Designer rice is a re-engineered product made from broken rice using food restructuring technology, offering high protein and low glycaemic index, and targeting both nutrition and lifestyle diseases. In contrast, fortified rice is regular rice enriched with micronutrients through extrusion and blending, mainly aimed at addressing public health issues like micronutrient deficiencies.

Glycaemic Index (GI) and Glycaemic Load (GL):

Glycaemic Index (GI):

Measures how quickly food raises blood glucose (scale 0–100)

Low GI (<55): Slow release of glucose (healthier)

High GI (>70): Rapid spikes (linked to diabetes risk)

Glycaemic Load (GL):

Combines GI + quantity of carbohydrates consumed

More accurate measure of real-life impact of food on blood sugar

Concept of GI Economy (Emerging Idea)

The concept of a "GI-based food economy" emphasizes:

Production and consumption of low-GI foods

Addressing non-communicable diseases (diabetes, obesity)

Shifting agriculture toward nutrition-sensitive crops

Designer rice fits into this model by offering a diabetes-friendly staple food alternative.

Significance for India

Nutritional Security

India faces high levels of anaemia and protein deficiency

Designer rice + fortified rice can complement each other

Health Transition

Rising burden of lifestyle diseases (diabetes)

Low-GI foods support preventive healthcare

Agricultural & Economic Impact

Value addition to broken rice (waste utilization)

Promotes food processing industry and innovation

Conclusion

The emergence of designer rice marks a shift from calorie-centric to nutrition-centric food systems. While fortified rice addresses micronutrient deficiencies at scale, designer rice represents a next-generation innovation targeting both nutrition and lifestyle diseases, aligning with India's goals of nutrition security and sustainable food systems.