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Popular Article

Designer Egg: A Modern Approach to Human Health

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Introduction

People became aware of food-health links in recent decades. Food is functional if it improves human health in addition to providing nutrition. It must improve health and reduce disease risk. Functional foods should have extra nutrients that provide health advantages beyond nutrition. Functional foods are part of a healthy diet and may improve health or lower illness risk. Functional food may contain vitamins, omega-3s, or antioxidants. Eggs are popular worldwide due to their high nutritious content, low cost, and versatility in cooking. Humans need all necessary amino acids and chicken eggs provide retinol, riboflavin, folic acid, vitamin B6, vitamin B12, choline, iron, calcium, phosphorus and potassium. Though health-conscious people are mostly lacking in essential fatty acids (EFA) and high in PUFA, omega-3 fatty acids, vitamins and minerals. High intakes of Polyunsaturated Fatty Acids (PUFA) improve newborn health and reduce the risk of atherosclerosis, heart attack and stroke according to research. Omega-3s help boost brain growth, reduce heart attack risk, improve tissue oxygen delivery and support rheumatoid arthritis, inflammatory illnesses, and other ailments. Several attempts were made to change eggs by adding healthy substances or removing detrimental ones to reduce chronic diseases. This modification created a functional egg. Dietary supplements, herbs and medications with therapeutic effects can be used to create eggs. Designer egg expands the health benefits of functional meals.

Normal Egg Composition

The typical egg has 74% water, 13% protein, 11% fat, 1% carbohydrate and a little amount

of additional nutrients such minerals, vitamins and carotenoids. About 9–12% of an egg is shell, 60% is albumen and 30–33% is yolk. Approximately 33% of the yolk is lipid with 63.3% being triacylglycerols, 29.7% being phospholipids (including 73% phosphatidylcholine and 15% phosphatidylethanolamine) and 5.2% being total cholesterol.

EGG COMPONENT	**Amount**
Moisture	76.15g
Protein	12.56g
Total Lipid	9.51g
Carbohydrate	0.72g
Cholesterol	372mg
Calcium	56mg
Calorie	143kcal

USDA national nutrient database for standard reference, release 23 (2010)

Health Benefits of Chicken Egg

Eggs have many health benefits, including:

- Strong muscles: Egg protein keeps muscles working and slows their loss. Vitamins and minerals in eggs support cell function including the brain, neurological system, memory and metabolism. Good energy production: Eggs include all the vitamins and minerals needed to produce energy in all cells.
- Immune health: Vitamin A, B12 and selenium is essential. Lower heart disease risk: Choline breaks down homocysteine which causes heart disease. Healthy pregnancy: Egg nutrients prevent congenital defects. blindness. Other vitamins improve vision.
- Weight loss and maintenance: Eggs high protein content may keep people full and energized. Filling up minimizes snacking and calorie intake. Eggs include vitamins and minerals that support healthy skin and prevent tissue degradation. Strong immune systems also improve appearance. Only a balanced diet can reap the health benefits of egg**.**

Concept of Designer Egg

According to Bhat et al. (2013), "Designer Eggs" are defined as eggs whose content differs from the typical egg. According to Singh and Neelam (2010), eggs are a great way to include several healthful components. It is possible to alter the eggs cholesterol level, Essential fatty acids, vitamin E, vitamin D, folic acid, minerals (iron, zinc, selenium, iron and chromium), carotenoids, lutein and Enrichment with herbs. Because more and more people are looking for organic, natural ingredients in their diet, a new trend in chicken fortification is to add antioxidants from herbs to the feed.

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Ways To Produce Designer Eggs

- Changing the hen's metabolism in a way that makes it produce chemicals that ultimately end up in the egg.
- Modifying membrane transport properties to allow chemicals to enter the egg.
- Changing the hen's food such that the egg lays more of the target chemicals.

Pharmaceutical Alterations

- Thanks to recent developments in biotechnology, it is now possible to breed genetically engineered hens that lay eggs enriched with specific compounds such as insulin, which can be used to treat diabetes.
- Injecting a specific antigen into a hen's body triggers antibody synthesis, which flows through her bloodstream and eventually concentrates in her egg. Collecting antibodies from her eggs is subsequently used in human healthcare.

Demand of Designer Egg

Humans rely on foods for more than just satiety; they also supply essential nutrients. The needs of consumers have evolved significantly during the past few decades. People think that the meals they eat have a direct impact on their health. Boost customers' emotional and physical health. In industrialized nations, it raises the demand for functional meals. Developing nations also benefit greatly from the many export prospects it presents. There is more to food than just filling our bellies and supplying us with nutrients. The needs of consumers have evolved significantly during the past few decades. More and more people think that what they eat has a direct impact on their health. Boost customers emotional and physical health. Functional foods are becoming more popular in industrialized nations. Aids emerging nations by opening them lucrative export markets.

Salient Features of Designer Egg

- High vitamin content -Designer eggs can have more vitamins, especially A and E. Egg nutrient content varies with hen diet, however hens may pass vitamins with varied efficiency. It is highest for vitamin A (60-80%), B12, riboflavin, biotin and pantothenic acid (40-50%), D3 and E (15-25%). Economic production of high-vitamin eggs should be prioritized.

- High mineral content -As most minerals, especially calcium and phosphorus, reside in egg shells, changing the calcium and phosphorus levels of edible egg (albumin and yolk) is challenging. Researchers have increased the micro mineral content of these portions, especially selenium, iodine, zinc, copper and chromium, through dietary supplementation.

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Eggs can replenish iodine deficit in many underdeveloped nations, including India. Eggs with more selenium can be produced by feeding hens selenium yeast.

- Change in colour -Egg yolk colour indicates pigment concentration and can vary with dietary supplements such marigold chilli, maize or spirulina. A recent study indicated that increased carotene intake reduced mascular degeneration, a significant cause of elderly blindness.
- A low cholesterol -An average egg has 200-220 mg of cholesterol. Many researchers have used genetics, nutrition and medicine to lower chicken egg cholesterol. Adding less than 1 ppm of chromium to laying hen diets lowers egg cholesterol and improves egg quality. An all-vegetarian diet high in protein, fibre and vitamin E produces low-cholesterol eggs.
- Fat/fatty acid profile -Although changing the total fat level in poultry diets does not significantly affect egg total fat, it can vary egg fatty acid profiles. High intakes of Polyunsaturated Fatty Acids (PUFA) improve newborn health and reduce the risk of atherosclerosis, heart attack and stroke according to research. Safflower oil, marine algae, fish oil (Shimizu et al., 2001), fish meal and vegetable oil in chicken feeds boost egg yolk omega-3 fatty acids, which are essential for adults and children.
- Omega-3s help boost brain growth, reduce heart attack risk, improve tissue oxygen delivery and support rheumatoid arthritis, inflammatory illnesses and other ailments. High levels of this fatty acid improve egg quality and shelf life. Fed hens' canola oil, eggs with a decreased saturated and unsaturated fatty acid ratio have been studied.

Conclusion

Designer eggs offer nutritional benefits and qualities not available in regular eggs. Designer egg expands the health benefits of functional meals. Adding seeds, oil, marine algae, vitamins and minerals to the diet can cut cholesterol and increase β-3 fatty acid levels in eggs. Vitamin and mineral-enriched eggs include more micronutrients and antioxidants. Functional feeds and herbs boost egg appearance and nutrition. Generic shell eggs are a cheap, high-quality source of protein, vitamins, minerals, and other nutrients. Eggs can supply more than superb nourishment by feeding hens customized diets. Egg products with value can be sold to health-conscious consumers. Designer eggs with novel functions are in high demand, but commercial manufacturing is still lacking. Commercial production and commercialization of new-generation eggs and egg products require more research. More study is needed to improve designer egg quality, examine long-term impacts and persuade consumers of their benefits.

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