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Popular Article

Nutritional Approaches for Production of Designer Eggs

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Introduction

Now a days, consumers are increasingly concerned about their health, and as a result, global demand for functional foods is growing. Eggs are a higher-quality, healthier food with the drawback of having a high cholesterol level. However, compared to the amount of cholesterol produced by the human body, the level of cholesterol found in eggs is significantly less. Additionally, the eggs can be enriched with other minerals like ginseng, iodine, fluorine, manganese, selenium, vitamins B complex, and conjugated linoleic acids. (CLA). However, the fortification of different nutrients in an egg is solely reliant on nutritional manipulation of the laying hen ration. By altering their nutritional status and appealing to a group of customers who are ready to pay for these changes in the eggs, these eggs can also gain market share. The content of modified enriched eggs has been changed from that of normal eggs. These eggs could be categorized as processed, value-added, or nutritionally improved eggs. Vegetarian eggs and eggs with altered fat contents are the two most popular types of changed eggs. Eggs free of animal fat and byproducts can be made by hens fed a grain-based diet. However, eggs with modified fat content are promoted as having higher levels of iodine, higher levels of vitamin B, lower levels of cholesterol, less saturated fat, and higher levels of omega-3 fatty acids. Generic eggs have a saturated fat composition of 1 g and a cholesterol level of

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215 mg per egg, whereas modified fat eggs have a 190 mg cholesterol level per egg. The organic and free-range eggs, however, are advertised as value-added eggs. If the feed is the same grade as the generic eggs, the nutritional value of the organic eggs will be the same.

Modified Or Enriched Egg

The content of modified or enriched eggs has been altered from that of normal eggs. These eggs could be categorized as processed eggs, eggs with additional value, or eggs with nutritional enhancements. Vegetarian eggs and eggs with altered fat contents are the two most popular types of changed eggs.

Herbal Designer Eggs

Herbal enriched eggs can be made by incorporating herbal active principles such as allicin, betaine, eugenol, lumiflavin, lutein, sulforaphane, taurine, and many more active principles of the herbs, depending on the herbs fed to the hens. Additionally, compared to regular eggs, these eggs' whites contained about 25% less cholesterol. Human volunteers who received such HEDE had their TG levels significantly reduced, their good HDL cholesterol levels rose, their immunity was strengthened, and their hemoglobin content increased. Function of the active components in functional eggs that have been herbally enriched and how they relate to human health.

Herbs	**Principle ingredients**	**Benefits to human health**
Garlic, onion and their leaves	Allicin	Lower LDL cholesterol and anticarcinogenic effect
Sugar beet and grape pulp	Betaine	Decrease plasma homocysteine
Spirulina, alfalfa and red pepper	Carotenoids pigment	Antioxidants and anticarcinogenic
Turmeric powder	Flavonoids compounds	Antimicrobial and antioxidant
Flax seed, canola meal, fish meal and worms	Omega-3 PUFA	decreased LDL cholesterol, hypertension and atherosclerosis
Basil leaves	Eugenol	Immunomodulator properties
Broccoli, cabbage, cauliflower and reddish leaves	Sulphoraphane	Anticarcinogenic and antioxidant
Milk, meat and egg products	Taurine	Impede atherosclerotic plaque formation

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1) Omega-3 fatty acid enrichment eggs

The quantity of fat in the egg yolk as a whole cannot be changed by feeding, but the type of oil used in the hen's diet can change the fatty acid composition. Various feeds, including flax seed (also known as linseed), sea algae, fish oil, and rapeseed oil, are used for that purpose. The eggs that have been enhanced with omega-3 fatty acids now contain more of these ingredients. The first is the increase of egg by means of linolenic acid, which is a precursor of DHA.

Benefits

- Omega-3 fatty acid supplementation may reduce the chance of heart disease by 50–70%.
- Additionally, it has been suggested that omega-3 fatty acids aid in the development of brain tissue in both infants and pregnant women.
- It aids in improving the tissue's ability to receive oxygen.
- It promotes improved brain performance.
- Provide relief in the therapy of rheumatoid arthritis
- It improves skin and soothes arthritis.
- beneficial for treating inflammatory diseases and enhancing immune reactions

2) Low cholesterol designer eggs

The demand for low cholesterol eggs is very high right now because health-conscious consumers are suffering from cholestrophobia. This can be resolved by either lowering the quantity of cholesterol in each egg, shrinking the yolk, or changing the yolk's lipid composition. while the amount of cholesterol in the yolk remained unaffected, dietary tamarind supplementation caused a quadratic decrease in serum cholesterol as tamarind intake increased. Certain compounds, such as pravastatin, lovastatin, and simvastatin, can lower plasma cholesterol when taken as supplements. So, we can lower the risk of coronary heart disease and heart attacks by lowering the plasma cholesterol content.

3) Vitamin E enriched designer eggs

By adding natural sources of vitamin-E found in butter, milk, vegetable, and nut oils to poultry feed, greater vitamin-E contents can be achieved.

Benefits

Blood free radicals are reduced by vitamin E.

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- decreases in the risk of cancer and the aging process due to a decrease in the production of free radicals.
- Due to its antioxidant properties, it may lower the chance of developing heart disease.
- Antioxidant properties of vitamin E prevent the formation of unpleasant smells.

4) Pigment fortification of yolk

The latest innovation in the area of designer eggs is the carotenoid fortification of eggs. Because of their beautiful nature of more intense yellow color, pigment enriched eggs are appealing to customers. Canthaxanthin is a carotenoid that is typically fed to hens whose diets contain large amounts of it in order to produce pigment-enhanced yolks. These carotenoid pigments come from a variety of plants, including maize, marigolds, and chiles. Another source of carotenoids is blue green algae, which is also high in protein content but also contains a pigment known as spirulina pigment that can be used to increase the number of carotenoids in egg yolks. The carotenoid pigments that are typically found in chicken egg yolks are hydroxyl compounds known as xanthophylls.

Benefits

- It helps to stop retinal degeneration.
- It is accountable for the attractive color of the yolk.
- It functions as an antioxidant and an anticancer substance.
- Lutein is in the role of protecting the retina.

5) Immunomodulating designer eggs

Natural substances found in eggs include lysozyme (G-globulin), G_2 and G_3-globulin, Ovo macro, and others. The globulin antibodies are natural immunostimulants and antimicrobials found in eggs that can be used to treat immunosuppressed patients like AIDS patients. These eggs are not only very nutritious but also have potent antimicrobial and immunostimulant qualities. Omega-3 fatty acids and antioxidants can be used to enhance the eggs immunomodulating qualities. The ability to increase IgG levels was greatest after feeding Tulasi at a dietary level of 0.3-0.5%. Other herbs with immunomodulating qualities include ashwagandha, fenugreek, spirulina, turmeric and rosemary which can be added to chicken feed to increase the effectiveness of the eggs immune-stimulating abilities.

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