



## Designer Eggs: An 'EGG'CELLENT Approach

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A portion of our consumers who are willing to pay extra for healthier eggs can have the contents of chicken eggs altered in ways that make them more enticing and desirable. "Designer eggs" are eggs whose contents differ from regular eggs in some way.

Designer eggs are made by giving chickens that lay eggs a particular diet that is high in specific vitamins and other minerals.

### Vitamins enhancement

- Designer eggs, particularly those with increased concentrations of vitamins A and E, have been created.
- To some extent, the vitamin content of the egg depends on the dietary concentration of any particular vitamin. With different vitamins, there are differences in the efficiency of vitamin transfer into the egg.
- When assessing the economic viability of marketing such eggs, vitamin transfer efficiency and vitamin cost must be taken into account. Stores currently have eggs with more vitamin E.

### Cholesterol reduction

- A large egg typically contains 200-220 mg of cholesterol. Changing one's diet or using medication are two ways to lower the cholesterol in eggs (drugs).
- Drugs have been effective in reducing egg cholesterol by up to 50%.
- Drugs reduce cholesterol in eggs by either preventing the hen from synthesising cholesterol or by preventing the transport of cholesterol from the blood to the ovary's developing yolk.
- The FDA has not yet given the medications that have demonstrated potential in decreasing cholesterol commercial usage.
- It has been demonstrated that adding chromium to laying hen diets at levels less than 1 ppm reduces egg cholesterol and enhances the quality of the egg's inside.
- Reduced hen energy consumption is the most efficient strategy to lower egg cholesterol levels.

Therefore, producing low cholesterol eggs can be achieved by feeding hens a particular, entirely vegetarian diet that is higher in protein and fibre and enhanced with vitamin E.

### Fats and fatty acids enhancement

- Polyunsaturated fatty acid intake has been linked to a lower incidence of atherosclerosis and stroke in people. It has also been demonstrated that consuming these fatty acids helps baby growth.
- The amount of total fat in the egg yolk hardly changes when the total fat content of the hen's diet is changed. However, it is simple to alter the fatty acid profile of egg yolk lipid (or the ratios of the various fatty acids) by simply altering the type of fat consumed.
- To boost the amount of omega-3 fatty acids in the egg yolk, several feeds, including flax seed (linseed), safflower oil, perilla oils, chia, marine algae, fish, and vegetable oil, have been added to chicken feeds.
- An alternate food source for increasing consumer intake of these "good" fatty acids could be eggs that are high in omega-3 fatty acids.
- Analysis of the eggs while they were being stored shows that the shelf life of the enriched eggs was on par with that of regular eggs.
- A variety of brands sell eggs that have been supplemented with omega-3 fatty acids.
- Eggs fortified with omega-3 fatty acids have a similar taste and cooking characteristics to conventional chicken eggs found in grocery stores. However, the yolk of these eggs is usually deeper yellow.
- Designer eggs with a lower saturated to unsaturated fatty acid ratio are also available on the market. To change the proportion of saturated to unsaturated fatty acids, canola oil is frequently employed. Eggs that are 25% lower in saturated fat than standard eggs can be created by changing the feed.

### Minerals enhancement

- The majority of the minerals in an egg are found in the shell. The shell contains 20 mg of phosphorus and about 2,200 mg of calcium. Changes to the albumen and yolk's calcium and phosphorus content have had very little success.

- The concentrations of selenium, iodine, and chromium can be raised, though. The hen's food has been supplemented to achieve this. The health of humans depends on these three minerals. In order to produce designer eggs rich in these minerals, there has been some interest in doing so.
- Pigments Enhancement:
  - The yolk's colour is a reflection of how much pigment it contains. Additionally, the dietary intake of any given pigment directly affects the type of pigment in the egg and its concentration. Even within the same nation, consumer preferences for yolk colour might differ substantially. The Roche Color Fan is used to describe colour (RCF). Using solely natural pigments made from natural source materials, yolk colours from 6 to 15 can be produced.
  - Natural sources might come from plants like corn, marigolds, or chilies. Spirulina, a high protein blue-green algae, has also been demonstrated to be a very effective source of pigment for chicken skin and egg yolk. Pigment-enhanced eggs may help reduce macular degeneration, a leading cause of blindness in the elderly.
  - The risk of age-related macular degeneration was decreased with increased consumption of carotenoids. Zeaxanthin and lutein, which are frequently present in dark-green leafy vegetables like spinach and collard greens, were the most powerful carotenoids.
  - The majority of the carotenes found in egg yolks are hydroxy substances known as xanthophylls. Two of the most frequent xanthophylls discovered in egg yolks are lutein and zeaxanthin.
  - Pigmented feed ingredients such yellow maize, alfalfa meal, corn gluten meal, dried algae meal, and marigold-petal meal are high in lutein and zeaxanthin. When these varied feed components are supplied to laying hens, both lutein and zeaxanthin are effectively transported to the yolk.
  - Highly coloured yolks have been frequently manufactured by the egg processing industry for usage in mayonnaise, pasta, and pastry goods. Indian consumers are more receptive to the dark yolk colour. There is a sizable market for these eggs given the rising issue of macular degeneration in the elderly.