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Mini Review

The Role of Chicken Eggs in Human Nutrition

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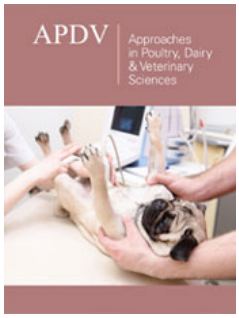

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Poultry is one of the most widespread food industries worldwide. Chicken is the most commonly farmed species, with over 90 million tons of chicken meat produced per year [1]. In 2012, total shell egg production was up to 66.4 million tons [2]. Chicken eggs are one of the best sources of high-quality protein along with important vitamins and minerals. In both developed and developing countries an increased egg production and consumption could significantly improve nutritional needs of adults and children. Eggs are also an economical source of nutrients for a healthy diet and life, especially important for the mental development of growing children [3-5].

Production of Eggs

Globally, annual egg production has increased 2.3% from 2000 to 2010, although the regions varied [6]. Figure 1 indicates the world's top egg producing countries for the year 2018. In China, some 458 billion eggs were produced in 2018. USA was second, producing around 109 billion eggs in 2018. Based on FAO data and China's projected 2% percent compound annual growth rate, this country will produce 34.2 million tons of eggs by 2020 and 39 million tons by 2030 [7].

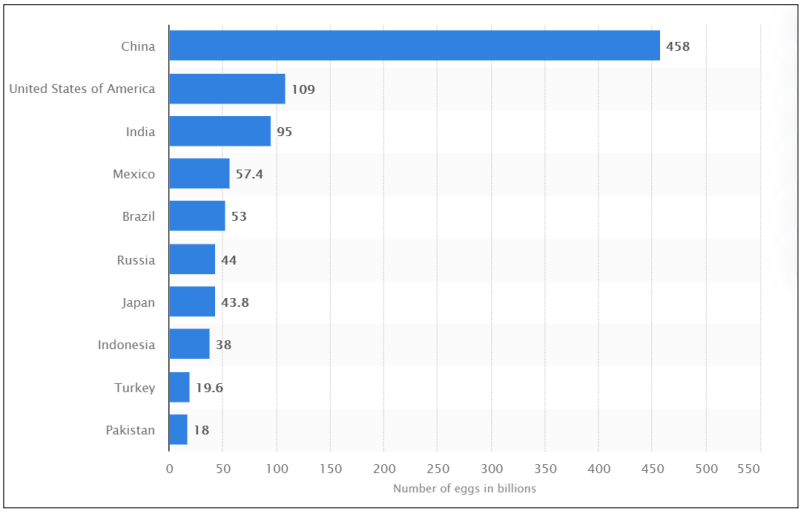

Figure 1: Leading egg producing countries worldwide in 2018 (in number of eggs in billions).

(Source: Statista 2020. https://www.statista.com/statistics/263971/top-10-countries-worldwide-in-egg-production/)

Consumption of Eggs

Eggs are an inexpensive source of high-quality protein, essential vitamins, and minerals that are needed for a healthy diet and a healthy life. By 2050, the world's population is expected to reach 9 billion, with the enormous increase to protein needs. Global egg consumption has tripled in the past 40 years with consumer quality expectations increasing just as rapidly [8]. Overall, world countries vary largely in egg consumption levels. In general,

annual consumption of eggs determined greatly by the country's wealth, ranges from 300g/per capita in African countries to 19.1 kg in Japan. With undernutrition remaining a significant problem in many parts of the developing world, eggs may be regarded as part of the solution to make up malnutrition [9].

Chicken Eggs: A Good Source of Protein and Other Essential Nutrients

Eggs can provide not only high-quality protein but also important vitamins, minerals and essential fatty acids. A typical egg contributes 2-4% of an adult's daily average energy requirement (i.e., approx. 6.5g protein), 15% of VB6, 10-20% of folate and a similar percentage of total saturated and polyunsaturated fatty acids (PUFA). Higher levels (20-30%) of vitamins A, E and B12 are provided by eggs. A survey in Australia showed that eggs were ranked as the 3rd most important supplier of n-3 PUFA (6%), after meat (20%) and seafood (71%) [10]. Another study reported that eggs were comparatively a rich source of selenium (9.00-41.4μg/100g) once again coming 3rd just after seafood and meat [11]. Eggs are rich in some essential amino acids, such as lysine, threonine, methionine, cysteine, and tryptophan. Net protein utilization (NPU) is an index of protein quality, which can be calculated by multiplying protein digestibility with biological value. NPU of grain is 40, whereas eggs are up to 87. Although NPU of rice is about 60, rice is low in protein quality. Eggs are also high in lutein which lowers the risk of cataracts and muscular degeneration in the elderly, particularly among people living in developing countries.

Egg composition is relatively consistent in terms of total protein, essential amino acids, total lipid, phospholipids, phosphorus, and iron. Other components, such as fatty acid composition, mineral contents, vitamins, carotenoids, antioxidants, and cholesterol content, are influenced by the diet of hens and are more variable. These component percentage differences may be caused by chicken strain, age, and environmental conditions [12]. Eggs are not detrimental to human health especially for those who are in below poverty line. Eggs are very important for their good health and well-being, and the consumption should be encouraged if possible. Daily consumption of one egg will have no effect of cholesterol, and researchers also suggested that two eggs per day will also have no significant effect for most people. The vexed question of the cholesterol content of eggs and human health seems to have been exaggerated. Australian, Canadian and Irish heart foundations and the British Nutrition Foundation have raised their guideline with recent findings that there is no conclusive evidence from egg consumption with an increased risk of heart disease.

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