

Enhancing Egg Quality by Dietary Vitamin E and Selenium Supplementation

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Editorial

Vitamin E and selenium (Se) are key components of the antioxidant system, reducing lipid peroxidation [1-2]. Vitamin E is a natural lipid-soluble antioxidant, which, when incorporated into poultry diets, tends to bring about the eggs oxidative stability [3]. Further, vitamin E is the most active natural antioxidant used in animal diets exhibiting an antioxidant activity at low concentration and prooxidant activity at high concentration [4]. It was reported that dietary α -tocopherol increases the content of vitamin E in the egg yolk in a dose-dependent manner [1]. It was found that hens supplemented with dietary α -tocopherol had a significant reduction in thiobarbituric acid reactive substances values, as an indicator of lipid peroxidation in eggs. It was indicated that an increased vitamin E supplementation of the maternal diet can substantially increase vitamin E concentration in the developing tissues of the chick and significantly decreased their susceptibility to lipid peroxidation [5-6]. Selenium is an essential part of a variety of selenoproteins, the best known of which is Glutathione Peroxidase (GSH-Px). In particular, GSHPx is involved in cellular antioxidant protection, and it has been suggested that GSH-Px works in synergy with vitamin E, because GSH-Px continues the work of vitamin E by detoxifying hydroperoxides [2]. Selenium can be added to the diet as selenite or selenate (inorganic) and as organic selenium compounds (selenoamino acids, mainly selenomethionine). Organic Se supplements have been reported to increase egg Se more than inorganic Se [2]. In addition, it was shown that addition of organic Se to laying hens' diets can improve the quality of stored eggs [7]. Storage of hens' eggs is a common practice in modern commercial poultry production. However, storage can alter some characteristics of the egg, including loss of water and carbon dioxide, and a subsequent increase in the pH of the albumen [8]. Furthermore, eggs contain a high proportion of polyunsaturated fatty acids, mainly linoleic acid (C18:2n-6), making them very susceptible to peroxidation and thus increasing the requirement for antioxidants. The egg nutrients are an important characteristic of the diet. It is possible to improve the vitamin E and Se levels in eggs by manipulating the rations of laying hens [9]. The effect of dietary α -tocopheryl acetate supplementation on enhancing lipid stability in egg-yolk has been already reported [9]. On

the other hand, the effect of α -tocopheryl acetate supplementation on the fatty acid composition of eggs has been studied less [1, 9].

Because of the key-role of vitamin E and Se, the choice of improving Se reception in both humans and animals are investigated. Apart from direct vitamin E and Se supplementation, attention has also been devoted to the option of increasing the nutrition value of food and feed by increasing the inclusion rate of trace elements. However, questions still remain on the benefit as well as the optimum dietary inclusion level of vitamin E and Se supplementation in laying hens on egg quality.

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