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Special Feed Technology to Produce Super High Omega Chickens and Eggs

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An Overview

Omega-3 and omega-6 fatty acids are polyunsaturated fats that have a number of health benefits for human. While omega-3 fatty acids have important benefits for your heart, brain and metabolism, omega-6 fatty acids help to maintain bone health and the reproductive system. For general well-being, there should be a balance between omega-6 and omega-3 fatty acids. The recommended ratio for omega-6 to omega-3 fatty acids should be a maximum of 4:1. If it exceeds 4:1, the risk of many chronic diseases will increase.

These fats are referred to as "essential fats", meaning that it must be obtained from our diet. Omega-6 fatty acids can be found in large amounts in refined vegetable oils, and nuts such as almonds, walnuts and cashew nuts. On the other hand, Omega-3 fatty acids are found mainly in cold-water fish such as salmon, mackerel, and sardines, or in nut oils such as flaxseed oil, canola oil, and soybean oil. As you can see, it is easier to get more than enough omega-6 fatty acids through our diet as compared to omega-3 fatty acids. Thus, it is important to find a way to enrich the omega-3 fatty acids content in commonly consumed foods.

Omega-3 fortification of chicken meat

Chicken is a good candidate for omega-3 fortifications as it has the ability to convert ALA to EPA and DHA, and the lipid profile in chicken meat can be modified within a week. In addition, it is also the fastest growing component of global meat demand. In order to produce chicken meat with super high omega-3 content similar to deep ocean fish, we used a special diet developed through our own in-house technology. A feeding trial was conducted at Bangkok Animal Research Centre (BARC) with the aim to produce chicken meat fortified with omega-3 level similar to those of deep ocean fish, and an omega 6:3 ratio of about 1:1. Results of this trial are shown in Table 1.

Table 1: Omega-3 and Omega-6 concentration in whole chicken (with skin)

Whole chicken, 100 g	Omega 6 (mg)	Omega 3 (mg)	Omega 6:3 ratio
Normal feed	2,595	185	14.00 : 1.00
Special-formulated feed	2,396	2,263	1.10 : 1.00

Through this trial, we are able to conclude that:

1. The amount of omega-3 fatty acids in chicken fed with a **Specially-formulated feed** was at least 12 times higher than those fed with normal chicken diet (2,263 mg/100g and 185 mg/100 g, respectively).
2. The amount of omega-3 fatty acids in chicken fed with a **Specially-formulated feed** was comparable to those of farmed salmon fish (2,263 mg/100g and 2,506 mg/100g, respectively).
3. The ratio of omega 6:3 in chicken meat fed with **Specially-formulated feed** was 1.1:1, as compared to a ratio of 14:1 in a normal serving of chicken.

Omega-3 fortification of chicken eggs

Hen's eggs are consumed worldwide, and their omega-3 profile can be modified through dietary supplementation making them a suitable candidate for enrichment. A typical omega-3 eggs will contains about 250 mg omega-3 per 100g of eggs, and eating an omega-3 egg each day will deliver only a fraction of the daily recommended amount of 1.6 g for adult men and 1.1 g for adult women over the age of 19. Meaning to say, in order for adult men to obtain the recommended level of omega-3 fatty acids through eggs, he will need to consume at least 12 eggs per day. However, if a hen's egg can be fortified with 1,000 mg omega-3 per 100g of eggs, an adult men will be able to obtain at least a quarter of the daily recommended omega-3 from one egg. In order to achieve this, we have conducted a farm trial using a **Specially-formulated feed.** However, there were constraints in that the farmer wanted a guarantee that the performance of the layer will not be impacted in anyway by the new feed, which required us to be more conservative while formulating the feed. The results are presented in Figure 1.

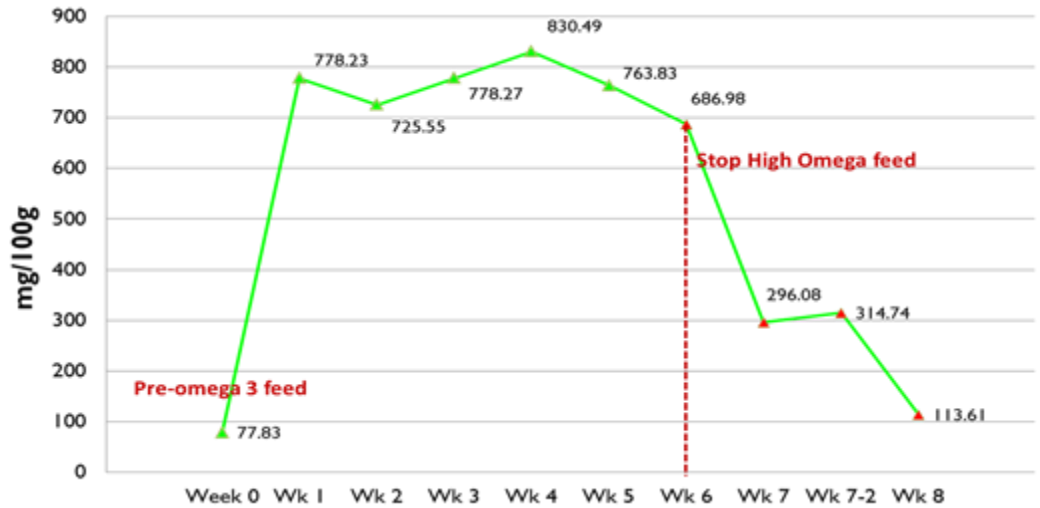

Figure 1. Egg total omega-3 fatty acid content from hens fed a Specially-formulated feed.

Layers fed on our **Specially-formulated feed** show 10 times increment in omega-3 fats deposition in their eggs one week after switching from self-mix mash feed. Throughout the 6 weeks feeding period, we were able to achieve an average of 755 mg omega-3 per 100 g of eggs. However, amount of omega-3 fatty acids start to decline gradually after the withdrawal of the **Specially-formulated feed**. Furthermore the Omega 6:3 ratio was about 3:1 compared to 23:1 for normal egg.

Summary

Based on these results it can be concluded that the amount of omega-3 fatty acids in chicken meats and eggs can be dramatically enriched through modification of their diets using our in-house developed feed technology. More critically, the omega 6:3 ratio can be reduced from 14:1 to 1:1 for super omega chicken and from 23:1 to 3:1 for the super omega egg.