There are two main conventional sources of omega-3 polyunsaturated fatty acid (n3PUFA) enrichment in egg yolk; one is using short chain n3 PUFA (alpha-linolenic acid, ALA) (18:3n3) present in seeds such as flaxseed, the other is long chain n3 PUFA (LCn3PUFA) EPA (20:5n3), DPA (22:5n3), DHA (22:6n3) present in fish meal and marine oil. Chicken have developed enzymes for elongation and desaturation of ALA to DHA. The supplementation of chicken basal diet with flaxseed can produce an appreciable amount of LCn3FA in egg yolk. However the there is a limitation for using flaxseed in the chicken feed, due to sensory quality.

Therefore the aim of this study was to find if concentration of LCn3 PUFA in chicken fed 15% flaxseed could be enhanced by feeding additional 1% LCn3PUFA. The results revealed that 15% flax diet lead to an appreciable amount of LCn3PUFA which was the same range as those diet fed to chicken with 1% LCn3PUFA. Feeding flaxseed resulted in 18 fold increased in 18:3n3, too, which was in expense of the saturated palmitic acid (16:0) and this is of nutritional value to human health. Furthermore, feeding additional 1%LCn3FA to 15% flax diet did not result in promote the accumulation of LCn3PUFA in egg yolk.

In conclusion: Feeding chicken with additional 1%LCn3PUFA with 15% flax did not result in accumulation of LCn3PUFA in egg yolk lipid. And flax diet per se not only could provide substantial amount of 18:3n3, but could also deposited the same amount of LCn3PUFA as 1% LCn3PUFA in egg yolk lipid. It seems flax diet is more useful tool for enhancement of n3FA in egg yolk; by providing the long chain n3 as well as short chain n3 fatty acids, also avoid risk of possible oxidation involves in oil. Therefore two eggs can meet most of daily recommendation of both long and short chain w3 fatty acids.