

# Use of Empyreal<sup>®</sup> 75 as an Ingredient to Improve Poultry Flesh Color

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**Background:** Empyreal 75 is a highly digestible protein concentrate, with a minimum of 75% crude protein, 2% crude fat, and a maximum of 2.5% crude fiber and 1% starch. As Empyreal 75 is a concentrate protein derived from corn, which naturally has xanthophylls not found in other grains, it has additional value that is not found in other proteins. Corn has 20 mg/kg (Table 1) of xanthophyll. However, in corn wet-milling, in which nutrients are fractionated, the xanthophyll content is concentrated with the protein in Empyreal 75 has even higher levels of xanthophylls at 287 mg/kg.

**Table 1:** Xanthophyll of corn ingredient

Ingredient	Xanthophyll (mg/kg)
Corn	20*
Empyreal 75	287

*\*Leeson and Summers, 2008.*

**Research-Impact of Xanthophylls:** Poultry do not have the capability to synthesize their own carotenoids, which provides the coloration for egg yolk, flesh and skin. Thus, it is imperative that poultry consume sufficient quantities in their diet, especially in regions where a strong coloration

is a desired trait.

Ingredients such as Empyreal 75, which are naturally high in xanthophylls, can provide both high-quality protein and the carotenoid content to enhance flesh coloration. Leeson and Summers (2008) indicated that greater than 10% inclusion of corn gluten meal should be fed to capture the value of xanthophylls found in that product, with maximum inclusion in the diet of 15% for up to four weeks old, 20% inclusion for four to eight weeks old and 20% inclusion for birds older than eight weeks.

Because Empyreal 75 has a slightly higher xanthophyll content than corn gluten meal, additional flexibility is possible in formulating the diet, but should still be greater than 10% of the diet to capture the value provided in the natural carotenoid.

Although there are alternative “synthetic” carotenoids that can be supplemented into the diet, research has shown that natural pigments provide for enriched skin color despite the higher blood-circulating levels of synthetic pigments (Castaneda, et. al. 2005). This may be due to different configuration of the molecule and enzymatic capabilities of the host to better metabolize the natural form.

**Conclusion:** Application of Empyreal 75 into poultry rations provides for a highly digestible protein that not only provides nutritional benefits and functional processing improvements, but also provides a good source of carotenoids to maximize flesh coloration.

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## References:

Castanada, M.P., Hirschler, E.M., Sams, A.R. 2005. Skin pigmentation evaluation in broilers fed natural and synthetic pigments. *Poultry Sci.* 84:143-147. Leeson, S. and Summers, J.D. 2008. *Commercial Poultry Nutrition*, 3rd Edition. Nottingham University Press. Thrumpton, Nottingham.

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