Pollos amarillos: los factores que influyen la calidad de la canal

CATHERINE HAMELIN
CCPA Group

Different types of chickens can be yellow, from standard production to label rouge, roosters or organic production. The aspect of the carcass of yellow chickens not only depends on the yellow skin but also on the yellow fat content. The fat content in the carcass and the deposition of abdominal fat and subcutaneous fat can be different according to the breed. The most important factor is the age of slaughtering. Nevertheless some difference can be found between breeds at same age. Females are slightly fattier and this could explain a slightly higher potential for pigmentation. Carotenoids are natural compounds present in animals and plants; they are responsible of the yellow, orange and red colours. It is well known that chickens are not able to synthesize carotenoids, they must be added to their diet. Digestion of the lipids of the diet should be optimized by looking at the feed quality: minimum level of fat, good quality of fat, promoter of gut mucosa development and integrity, emulsifier can influence.

In practice, the quality of the carcass can be influenced by various diseases. Diseases affecting intestinal health like necrotic enteritis, coccidiosis or colibacillosis are of importance for current chicken producers. Coccidiosis reduce digestion of carotenoids, even before first signs of the disease can appear. After an infection with Eimeria, the color is lost but it is possible to recover it by having high levels of supplementation for some time (2-3 weeks). This is the time necessary to accumulate carotenoids in skin and fat tissues. Nevertheless, in practice, it is always a difficult and expensive task to produce yellow chickens in the context of coccidiosis.

Carotenoids have antioxidants properties and may have immunomodulation influence. This is evidenced by their high disappearance rate from the blood stream during immune stress periods, and reduced pigmentation throughout the body. Each molecule can be metabolized as vitamin A, the efficiency depends on its chemical form. This metabolic change is increased when a disease challenge occurs.

Amongst stresses, thermic stress especially affects yellowness. This is because heat decreases stability of carotenoids in the feed chain and chicken feed digestibility. Fat quality can be as well an issue. The effect of any stress should be minimized at all levels including at transport and slaughter house.

Today in the EU, the most important carotenoids in poultry production include lutein, zeaxanthin, canthaxanthin, apo-carotene-ester and capsanthin. Under commercial conditions, carotenoids are provided by the ingredients as yellow corn and derivates such as gluten and distillers grains; alfalfa and its concentrate; nature-identical or nature-extracted carotenoids (marigold/tagetes or paprika extracts). Yellow carotenoids mainly originate from vegetable sources. Lutein and zeaxanthin are found in corn and its derivatives. Lutein is the main carotenoid in alfalfa and tagetes extracts. Paprika extracts provide red carotenoids, mainly capsanthin and capsorubin, but they also contain lutein and zeaxanthin. Apo–ester, canthaxanthin are commercially available sources. Under organic production rules, the supply of products is more restricted and as a consequence, more expensive.

Processes of production can influence stability and efficiency of carotenoids. Esterification and saponification usually help to produce better stable products; the same as spray-drying protection, but there is a wide variation in the quality of the coating. Carotenoids are very unstable on their isomeric forms; the trans-configuration is the most common, but the cis-configuration (less efficient for pigmentation) can be produced when heat, light, or oxygen damage occurs. It is important to control the content in the main feed ingredients like corn because it is decreasing with the time of storage.

Very few papers looking at efficiency for carcass pigmentation were published. Zeaxanthin influences the yellow value in all tissues, more noticeably in the abdominal fat. Corn with higher content of zeaxanthin deserve a higher efficiency than alfalfa mainly composed of lutein. It has been determined that 1 ppm of apo-carotene-ester was equivalent to about 2 ppm of lutein-zeaxanthin (from tagetes 90/10) for carcass pigmentation. Some work suggested that the high content in zeaxanthin (from tagetes) did not achieve higher efficiency, it depends on the isomer form of zeaxanthin. For skin pigmentation (shanks),1 ppm canthaxanthin was equivalent to 3 ppm from capsanthin/capsorubin of paprika in one paper. It is recommended to use a specific yellow chicken system of efficacy for feed formulation (the one for yolk is not applicable).

There are two components of the pigmentation process. The first refers to the saturation phase and involves the deposition of yellow carotenoids to create the yellow base. Then the addition of red carotenoids is called colour phase and changes the hue in a more orange colour. In practice two systems of pigmentation can be used. One system is based on available yellow and available red xanthophyll (xanthophyll=carotenoid with oxygen, excluding beta-carotene) for chicken. The second one is based on available xanthophyll and ratio %Red /available xanthophyll for chicken.

Feed supplementation should be done for three weeks minimum with no withdrawal before slaughter. The EU legislation limits the xanthophylls content of the diet to 80 ppm. In order to achieve high level of pigmented carcass, longer supplementation period should be used like five to eight weeks. High pigmented carcass might not be achieved when time to market is too short like 30 days. The way of measuring the yellow color is important. Ensure you speak the same language than the slaughter house!

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