

Improving the quality of poultry meat via selected plant extracts

In a context of the poultry meat market, which offers consumers more and more cut or processed products, technological quality is becoming a priority, as well as the fight against structural defects in meat. However, these defects can increase in the field due to the genetic evolution towards increasingly heavy poultry strains.

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Mega Tender is an innovation of the CCPA Group which makes it possible to reduce these defects and meet the expectations of everyone in the production chain: producers, feed manufacturers, slaughterhouses, distributors, and the final consumers.

Three main issues dominate in a survey conducted in 2017 by the CCPA Group among 22 key players in the pork and poultry meat sectors, questioned about the quality problems they meet: carcase and meat visual aspect (64%), health quality (50%) and fillets defects (50%).

Quality is a complex concept, as every link in the industry – slaughterers, processors, distributors, consumers – has indeed a different vision of this issue: product appearance and nutritional value for the consumer, carcase yield and meat for the slaughterer, functional properties and technological efficiencies for the

Defect	Symptoms	Consequences
White striping	Appearance of white streaks developing parallel to the axis of muscle fibres	<ul style="list-style-type: none"> Degraded visual appearance. Bad image. Risk of refusal of purchase by the consumer and dereferencing of the distributor. Media risk.
Spaghetti meat	Loss of cohesion of muscle fibres, destructuring	<ul style="list-style-type: none"> Decrease in processing capacity. Downgrading of fillets. Economic loss for slaughterhouse/processor.
Wooden breast	Very hard fillets, convex meat, pale with viscous surface and presence of petechia	

Table 1. The three main quality defects of poultry meat and their consequences.

processors, visual aspect and conservation for the distributors.

Prevalence of meat defects

Specifically, there are three main structural defects of the processed meat: 'white striping', 'spaghetti meat' and 'wooden breast' (see Table 1). If the causes of structural defects in meat are multifactorial (nutritional factors, growth factors, blood factors, living conditions), there is an increase in their prevalence with the weight of the fillets.

For the last 50 years, genetic evolution has been towards heavier, faster-growing and better-yielding poultry strains: from 1957-2014, the average weight of the fillet

increased from 280g to 473g, and fillet yield from 13.5 to 21.5%. In trials conducted by the CCPA Group in 2017 and 2018 (Ross 308 and Cobb500 strain, males, 3.5kg), the prevalence of fillets with white striping and wooden breast defects increases steadily with the weight of the fillets, from 17% for fillets lower than 380g to 65.9% for fillets heavier than 450g (see Fig. 1).

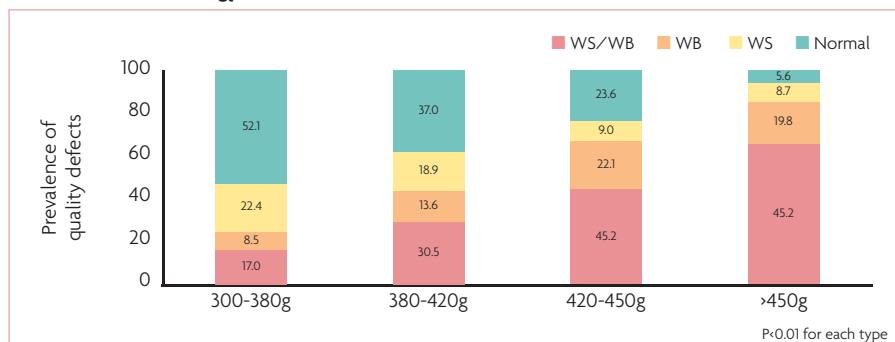
In a presentation made during the 12th JRA (French National Poultry Research Days), Cécile Berri of INRA, Nouzilly, France, presented the preliminary results of a survey started in 2016 in French slaughterhouses which showed from the study of 40 batches that the fillets of standard and semi-heavy chicken strains (1.9-2.3kg) were affected by muscle defects.

The white striping reached the totality of the studied batches and the proportion of fillets affected by this defect is between 33-90%. Wooden breast is detected in 98% of batches and affects 10-70% of the fillets. The proportion of spaghetti fillets is far from negligible, with 65% of affected lots in which the share of affected fillets can reach 20%.

The observations of the Italian Petracci go in the same direction, the proportion of fillets with associated symptoms of white striping and wooden breast rising from 20% with poultry of average weight (live weight lower than 3kg, and mainly females) to 49% for the heavier chickens (males over 3kg).

In a presentation made in 2018, American researcher Casey M. Owens from the

Fig. 1. Prevalence of fillets with white striping (WS) and wooden breast (WB) defects depending on the fillet weights (CCPA Group trials, 2017-2018, Ross 308 and Cobb 500 strains, males of 3.5kg).



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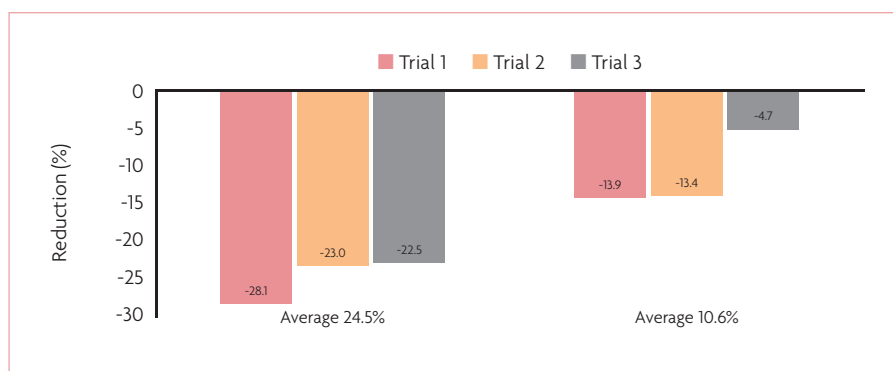


Fig. 2. Percentage reduction of white striping and wooden breast defects with the use of Mega Tender on broilers (CCPA Group trials, 2017-2018, Ross 308 and Cobb 500 strains, males of 3.5kg).

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University of Arkansas estimates that white striping affects 35-40% of heavy US chickens (about 3.8kg) and 10-20% of 3kg chickens. According to this same researcher, the wooden breast would affect 20-35% of US chickens over 3.8kg, and 5-10% of 3kg chickens.

These defects in the quality of meat have multiple consequences: a visual degradation leading to a bad image for the consumer, a decrease in nutritional values, a reduction in processing capacity and, therefore, economic losses for industrial processors.

Protecting muscle cells

The levers of action to control these defects in meat quality are on the farms, even if the consequences are only visible at the slaughterhouse, once the animals are plucked, eviscerated or even cut.

A temporary feed restriction of poultry is a way to limit the quality defects of meat. There is indeed a positive effect at 21 and 28 days of a feed restriction over the 13-21 day period, but there is no residual effect beyond 28 days on structural defects.

These defects of degeneration of the muscle appear very early from 15-20 days.

There are different strategies (nutritional levels, feed presentation, feed programme) to limit growth at the critical period, to limit these defects but these are often related to a decrease in performance.

Innovative nutritional solution

Research conducted over the last 10 years by the CCPA Group has made it possible to highlight the effects of selected plant extracts on the vascularisation and on the protection of muscle cells.

They have resulted in the development of Mega Tender, an innovative nutritional solution based on specific plant extracts with multiple properties (vascularising, protective and anti-oxidant) acting in synergy and improving the visual and technological quality of the meat.

The trials conducted by CCPA in its experimental farm on Ross males at 42 days showed an effectiveness of Mega Tender which reduced both the defects of white striping and wooden breast (see Fig. 2).

The combination of plant extracts and anti-oxidants has reduced the prevalence of white striping by nearly 25% and wooden breast by almost 11%, taking into account that these trials were carried out in a risky context.

With proven benefits and an average return on investment of 4:1, Mega Tender significantly reduces the downgraded fillets, encountered especially on fast-growing birds. Indeed, for 20,000 broilers, using Mega Tender would mean a gain of 1.3 ton of breast meat, without severe white striping and wooden breast. ■