

difference in gain or feed intake of broilers fed various concentrations (0 to 0.5 ppm) of Se from sodium selenite or selenomethionine, whereas Edens *et al.* (2001) and Payne and Southern (2005) reported no differences in BW or feed efficiency when broilers were fed diets containing Se from sodium selenite or selenium yeast. However, in several trials FCR is numerically lower with Sel-Plex compared to selenite and this needs further evaluation in trials with high experimental power regarding bird performance.

Table 3. Influence of sodium selenite or organic selenium (Sel-Plex) on breast meat drip loss of broiler chickens

GROUP	Drip loss after 24 h		Drip loss after 48 h	
	g	%	g	%
A (control/control)	1.1 ± 0.07	0.56 ± 0.05 B	1.72 ± 0.08	0.91 ± 0.06B
B (control/Sel-Plex)	0.81 ± 0.05	0.46 ± 0.04b	1.31 ± 0.04	0.77 ± 0.04b
C (Sel-Plex/Sel-Plex)	0.54 ± 0.09	0.31 ± 0.05A	1.02 ± 0.06	0.64 ± 0.04A
D (Sel-Plex/control)	1.04 ± 0.04	0.56 ± 0.05 B	1.60 ± 0.08	0.90 ± 0.05B

<sup>a,b</sup>Means within column with no common superscript differ significantly. Small letter means (P<0.05), capital letter (P<0.01)

The results of breast moisture loss showed that average values (after 24 or 48 hours) were lower in Sel-Plex fed groups compared to the control groups regardless of the breeder diets (table 3). In the case of the Sel-Plex/Sel-Plex group (treatment C) the differences were highly significant (P < 0.01). Edens (2001), Naylor *et al.* (2000) and Mahan and Kim (1999) also reported that 0.3 ppm organic Se introduced to chicken feed, decreased the drip loss in breast meat of chickens. This indicates that meat quality traits can be improved by replacing inorganic Se with organic Se in feed.

#### CONCLUSION

These results indicate that organic selenium introduced to broiler feed had no significant influence on broiler performances, however, reduced drip loss of breast meat. Meat quality can be improved by replacing dietary inorganic Se with this organic selenium source.

## P-074

# Characterisation of broiler breast and leg meat for further processing

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#### INTRODUCTION

The consumption of poultry furthered processed products has increased dramatically over the last several decades. Today, products such as nuggets and patties are some of the most popular convenience poultry items available. Such type of products can be made from a variety of meat of meat sources. The most common formulation of chicken nuggets and patties is breast, thigh and drum meat together skin, however other meat sources can also be incorporated. The quality characteristics of raw meat, mainly represented by the chemical composition and functional properties, play a key-role in the final quality of the products. Breast meat is often chosen because of its uniformity soft texture and its light colour. Meat from leg are used to help reduced production costs and also to improve flavour due to the higher fat content. When leg meat is used in combination with breast meat, the ratio of breast to leg meat is typically 70:30. The problem with the use of dark meat in formulations is their susceptibility to oxidative rancidity due to the high fat and iron content. Dark meat can also produce softer texture. Use of dark meat also tends to darken the colour of the products (Sams, 2001; Barbut, 2002; Fletcher, 2002).

A further factor variability in quality characteristics of raw meat used for further processed products, is the lipid dietary source of the feed offered to the birds. After the ban of meat-bone meal use in feedstuffs for farmed animals in UE (Commission Decision 2001/25/EC), there has been observed an increase of marketing of products

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from birds fed with only vegetable feedstuffs. In those production lines, animal fats (e.g. tallow and lard) are replaced by vegetable oils (e.g. soybean, rapeseed, palm and coconut). It is well-known that the nutritional composition in poultry meat is highly related to the lipid source in the diet, but also functional properties of the meat may be also influenced by the type of lipid included in the diet of the birds. This study was aimed at evaluating the influence of quality characteristics of different types of raw meat used for the commercial preparation of breaded patties.

#### MATERIAL AND METHODS

A study was conducted in order to evaluate the quality characteristics of different types of raw meat used for the commercial preparation of breaded patties: ground breast and leg meat as well as a mix of ground breast/leg meat (breast:leg 2:1) which is commercially used for the preparation of the meat batters (by mixing the ground breast/leg meat with additives and water) and subsequently for breaded products manufacturing. Furthermore, the meat was obtained from broiler chickens fed on two diets containing animal fat (AF) or vegetable oil (VO) as lipid source.

The experiment was replicated two times in a single major Italian processing plant considering during each trial two homogeneous flocks of male broiler chickens (Ross 508, 54 days old) differing only by lipid source of the diet which consisted in animal fats (cattle tallow and pork lard, AF) or vegetable oils (sunflower and soybean oils,

VO). Breast and leg meat were roughly ground and subsequently mixed (breast:leg 2:1) for the preparation of a mix used for further processing. Ground breast, leg and mix products were sampled and used to prepare meat patties of about 70g which were analysed for colour (L\*a\*b\*), pH (Jeacocke, 1977), cooking loss (by cooking the samples on convection oven at 180°C until 80°C at core sample), AK-shear values after cooking (Papinaho & Fletcher, 1996), moisture (AOAC, 1990), protein (AOAC, 1990), lipid (Folch method) and collagen contents (Kolar, 1990) as well as induced TBARS (Kornburst & Mavis, 1980; Lowry *et al.*, 1951). The data were analysed by two-ways ANOVA (GLM/SAS procedure) by testing both meat source (breast, leg and mix product) and lipid source of the diet (AF and VO) as main factors and their interactions.

**RESULTS AND CONCLUSIONS**

The influence of type of meat and dietary lipid source on meat quality traits are presented in Table 1.

With regard to the influence of type of meat, all considered parameters were significantly different among groups with the exception of moisture content. In comparison with leg meat, breast meat presented lower L\* (53.25 vs. 56.25; P<0.001), a\* (3.56 vs. 9.34; P<0.001) and b\* (6.58 vs. 10.36; P<0.001) values, lower pH values (5.92 vs. 6.35; P<0.001), lower cooking loss (24.42 vs. 28.29%; P<0.001) and higher shear force (1.63 vs. 1.84kg/g; P<0.01). About chemical composition, breast meat presented higher protein content (24.28 vs. 20.00%; P<0.001), while lower lipid (1.55 vs. 5.80%; P<0.001) and collagen (1.14 vs. 1.95%; P<0.001) contents. Finally leg meat showed higher susceptibility to oxidation (Fig. 1). As expected, mix product presented intermediate values. The obtained results confirm that breast and leg meat are characterized by dramatic differences in their meat quality traits with regard to appearance (colour), protein functionality (pH and water holding capacity), tenderness and composition. The different compositional data are in general agreement with those reported by Barbut (2002). The higher yellowness found in VO meat can be attributed by the higher contents of pigments

VO diets which influences not only skin appearance, but also meat colour as evidenced by Bianchi *et al.* (2007).

Concerning the effect of dietary lipid source, the results indicate that the dietary use of VO determined higher cooking losses (25.13 vs. 27.26%; P<0.001) and shear values (1.66 vs. 1.49kg/g; P<0.05) in meat products with respect to the AF diet. Moreover meat from birds fed VO diet were darker (L\*, 54.37 vs. 55.87; P<0.001), more yellow (b\*, 6.80 vs. 6.47; P<0.05) and red (a\*, 9.36 vs. 8.33; P<0.001). Finally, ultimate pH and chemical composition did not vary significantly. These results also evidenced that dietary lipid source can strongly influence product appearance, texture and protein functionality.

In conclusion, it was found that differences in dietary lipid source as well as the type of meat can strongly affect the final characteristics of meat products for further processing.

Figure 1. The influence of type of meat on lipid susceptibility to oxidation (<sup>a-c</sup> = P < 0.05).

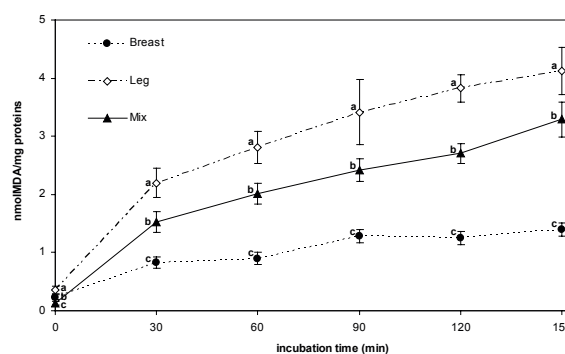


Table 1. Influence of type of meat (Breast, B; Leg, L; and Mix, M) and dietary lipid source (Animal Fat, AF; Vegetable Oil, VO) on meat quality traits.

Variable	n.	Breast (B)		Leg (L)		Mix (M)		Type of meat (TM)			Dietary Lipid source (D)		SEM	Probability		
		AF	VO	AF	VO	AF	VO	B	L	M	AF	VO		TM	D	TM × D
pH	16	5.93	5.91	6.34	6.36	6.12	6.10	5.92c	6.35a	6.11b	6.13	6.12	0.01	***	ns	ns
Lightness (L*)	72	54.70	51.80	55.75	56.75	57.15	54.56	53.25b	56.25a	55.86a	55.87a	54.37b	0.36	***	***	***
Redness (a*)	72	3.47	3.65	9.37	9.31	6.57	7.43	3.56c	9.34a	7.00b	6.47b	6.80a	0.07	***	*	**
Yellowness (b*)	72	5.99	7.17	10.01	10.71	8.99	10.21	6.58c	10.36a	9.60b	8.33b	9.36a	0.15	***	***	ns
Cooking loss (%)	144	23.39	25.45	27.22	29.36	24.78	26.97	24.42c	28.29a	25.88b	25.13b	27.26a	0.32	***	***	ns
AK-shear force (kg/g)	54	1.63	1.84	1.37	1.56	1.45	1.57	1.74a	1.47b	1.51b	1.49b	1.66a	0.08	**	*	ns
Moisture (%)	36	73.64	73.68	73.12	73.40	73.37	73.47	73.66a	73.26b	73.42ab	73.38	73.51	0.12	ns	ns	ns
Protein (%)	36	24.26	24.29	19.97	20.02	21.72	22.13	24.28a	20.00c	21.93b	21.98	22.15	0.09	***	ns	ns
Lipid (%)	18	1.61	1.49	6.07	5.53	4.08	3.55	1.55c	5.80a	3.81b	3.92	3.52	0.06	***	ns	ns
Collagen (%)	30	1.16	1.12	2.03	1.87	1.62	1.62	1.14c	1.95a	1.62b	1.60	1.54	0.03	***	ns	ns

\* = P<0.05; \*\* = P<0.01; \*\*\* = P<0.001; ns = not significant;

<sup>a-c</sup> Means followed by different superscript letters differ significantly (P < 0.05) among breast (B), leg (L) and mix (M) groups or between animal fat (AF) and vegetable oil (VO) groups.

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