

# FRA<sup>®</sup> BUTYRIN HYBRID DRY TRIAL

Stimulate intestinal health and effective pathogen control

## TRIAL REPORT

- » Broiler performance
- » Fillet yield
- » Meat quality

» Poland, 2019

» Trial code: SN190001



INTESTINAL INTEGRITY

FRA<sup>®</sup>MELCO

# 1 INTRODUCTION

**Different strategies have been applied to grow broilers as efficient as possible.**

As a result, today broilers gain a lot of weight in a relative short amount of time. One should find a balance between high meat production, meat and carcass quality. It is known that fast growing and heavy broilers suffer more from myopathies like woody breast and white striping. These conditions seem not to harm the broiler, but it negatively affects the consumer meat acceptance. Annually these myopathies are responsible for major economic losses, as the meat must be sold at lower prices. Factors that can impact the carcass and meat quality of broilers include genotype, age, sex, density, environment, exercise, and diet composition.

**Tributylin, a triglyceride of butyric acid**, is known to have anti-inflammatory, anti-oxidative, gut development promoting and microbiota improving properties. Interestingly, in multiple scientific papers it has been demonstrated that supplementation of tributyrin to the diet could increase breast muscle weight in broilers. Furthermore, dietary tributyrin has been related to a reduction in abdominal fat deposition in broilers. These effects were also observed when a combination of tributyrin and alpha-monobutylin were applied to broiler diets. Alpha-monobutylin is obtained by esterifying butyric acid to the first position of glycerol molecule and is known for its effect against Gram-negative bacteria.

**FRA®melco is specialized in** the production of tributyrin and alpha-monobutylin by esterification of butyric acid with glycerol. FRA®melco B.V. combines the positive effects of tributyrin and alpha-monobutylin in a dry powder called FRA® Butyrin Hybrid Dry. The aim of this trial was to test the effect of FRA® Butyrin Hybrid Dry on general performance, carcass, and meat quality of broilers under commercial circumstances.

- ↑ EPEF
- ↑ Health
- ↑ Fillet yield
- ↑ Meat quality
- ↓ Mortality
- ↓ FCR



## 2 MATERIALS & METHODS

**This trial was performed at a commercial broiler farm in Poland** under supervision of the University of Life Sciences of Poznan. Two poultry houses of approximately 50000 and 60000 broilers (Ross) were used for the trial which lasted for two consecutive production cycles. The density of broilers per square meter was similar between the two houses with approximately 20 broilers/m<sup>2</sup>. During the first production cycle house number 1 was used as a control group and broilers in house number 2 received FRA® Butyrin Hybrid Dry at a dose level of 1 kg/ton feed during the entire production period. In the second production cycle house number 2 served as a control group and the broilers in house number 1 received FRA® Butyrin Hybrid Dry at 1 kg/ton feed.

**Body weight** was recorded at the beginning of the trial and at slaughter to calculate the average daily weight gain (ADWG). Feed conversion ratio (FCR), mortality and the European Production Efficiency Factor (EPEF) were determined for the whole production period. The broilers were mechanically slaughtered by a commercial slaughterhouse.

**Carcass weight**, the weight and percentage of fillet were determined by the slaughterhouse. The quality of the breast muscle was determined by the amount of fat, saturated fatty acids (SFA), protein, collagen, connective tissue, water, ash, and shear force. Twenty-five samples were tested in triplicate for these parameters. Statistical analyses were performed on the data of meat quality, but not on performance parameters and carcass quantity.

## 3 RESULTS 1/2

**Results on performance** data are shown in Table 1. In both production cycles body weight at the start of the trial was similar between the control and treatment group.

**During production cycle 1**, clear positive effects were seen on FCR and mortality. Feed conversion ratio was improved by 3 points. Mortality was reduced from 4.84% to 3.76%, which is a reduction of 22%. The EPEF was increased with 8.32 points (approximately 2.1%). The EPEF is determined by the ADWG, FCR and livability and gives insight in the general performance of the farm. An EPEF score of 400 is considered as an excellent achievement in broiler production and therefore it can be said that broilers in the control group were performing very well. Despite the slightly lower ADWG in the treatment group during production cycle 1, EPEF was improved as a result of the improved FCR and reduced mortality. Hence, the addition of FRA® Butyrin Hybrid Dry made it possible to obtain an EPEF above 400.

**In cycle 2** positive effects were seen on body weight, ADWG, FCR and mortality. Average daily weight gain was increased with 4.7 gram per day, which is an improvement of 7.3%. Also, a positive effect was seen on FCR with an improvement of 6 points. Mortality was reduced from 7.37% to 3.77%, which is a reduction of 48.8%. Interestingly, mortality rate was very similar in both cycles when FRA® Butyrin Hybrid Dry was administered via the feed. The positive effects on ADWG, FCR and mortality resulted in an increase in EPEF of 57.95 points, which equals an improvement of 15.5%.

### T1 Effect of FRA® Butyrin Hybrid Dry on general broiler performance

Table 1

	Cycle 1		Cycle 2	
	Control	FRA® Butyrin Hybrid Dry	Control	FRA® Butyrin Hybrid Dry
Body weight day 0 (g/broiler)	41	41	45	45
Body weight slaughter (g/broiler)	2530	2440	2510	2760
Average daily weight gain (g/day/broiler)	64.65	63.97	64.56	69.26
Production length (days)	38.50	37.50	38.18	39.20
FCR	1.57	1.54	1.63	1.57
Mortality (%)	4.84	3.76	7.37	3.77
EPEF	398.30	406.62	373.60	431.55

The broilers were mechanically slaughtered by a commercial slaughterhouse. **The results on carcass weight and total fillet yield** are summarized in Table 2. In both production cycles carcass weight was higher in the treatment group, despite the slightly lower final body weight of the broilers receiving FRA® Butyrin Hybrid Dry in the first cycle. This might be explained by a higher meat (protein) deposition and lower abdominal fat content when the product was given. Furthermore, the total fillet yield (kg) was higher when FRA® Butyrin Hybrid Dry was supplemented via the feed in both cycles. Also expressed as percentage, fillet yield was increased with 0.8 percent points in production cycle 1 and with 0.5 percent points in production cycle 2 by FRA® Butyrin Hybrid Dry.

Our results are in line with different scientific publications where blends of tributyrin and alpha-monobutyryn increase live weight and breast meat yield. Butyrate glycerides have demonstrated to modulate muscle and lipid deposition. For example, in broilers glycerides of butyric acid reduce body fat deposition via regulation of gene expression, which is involved in the biological events relating to the reduction of synthesis, storage, transport, secretion, and improvement of oxidation of lipids and fatty acids. Indeed, the increase in carcass weight and breast meat yield in this study might be explained by the higher meat (protein) deposition and the possible lower abdominal fat content when FRA® Butyrin Hybrid Dry was given.

### T2 Effect of FRA® Butyrin Hybrid Dry on carcass weight and fillet yield per slaughter batch

Table 2

	Cycle 1		Cycle 2	
	Control	FRA® Butyrin Hybrid Dry	Control	FRA® Butyrin Hybrid Dry
Total carcass weight (kg)	10521	10568	10671	11130
Total fillet yield (kg)	3262	3364	3298	3499
Total fillet yield (%)	31.0	31.8	30.9	31.4

## 3 RESULTS 2/2

Table 3 presents **the effect of FRA® Butyrin Hybrid Dry on breast muscle quality**. One of the most important quality parameters is meat tenderness. Breast muscles with a high amount of connective tissue are generally less tender due to a considerable collagen content. Hence, when lower levels of connective tissue and collagen are found, the breast muscle can be considered more tender. In both production cycles the percentage of connective tissue and collagen content were decreased when FRA® Butyrin Hybrid Dry was fed. During cycle 1 this difference was found significant.

Greater shear forces are normally found in broilers with myopathies like woody breast. Greater shear forces indicate that the meat is less tender. During production cycle 1 the shear force was significantly smaller compared to the control group, indicating the meat was more tender when FRA® Butyrin Hybrid Dry was fed. This is in line with the lower levels of connective tissue and collagen found in broilers fed FRA® Butyrin Hybrid Dry. In production cycle 2 no effect was found on shear force, despite the numeric improvement on connective tissue and collagen.

### T3 Effect of FRA® Butyrin Hybrid Dry on breast muscle quality

Table 3

	Cycle 1		Cycle 2	
	Control	FRA® Butyrin Hybrid Dry	Control	FRA® Butyrin Hybrid Dry
Connective tissue (%)	2.39 <sup>b</sup>	2.07 <sup>a</sup>	3.28	3.13
Collagen (%)	0.54 <sup>b</sup>	0.47 <sup>a</sup>	0.72	0.70
Water (%)	74.60 <sup>b</sup>	74.38 <sup>a</sup>	74.46 <sup>b</sup>	74.16 <sup>a</sup>
Protein (%)	22.49 <sup>b</sup>	22.96 <sup>a</sup>	21.96 <sup>b</sup>	22.71 <sup>a</sup>
Fat (%)	2.40 <sup>b</sup>	2.15 <sup>a</sup>	2.26 <sup>b</sup>	1.98 <sup>a</sup>
Saturated fatty acids (%)	0.99 <sup>b</sup>	0.80 <sup>a</sup>	0.42 <sup>b</sup>	0.24 <sup>a</sup>
Ash (%)	1.88	1.88	1.99	2.05
Shear Force (N)	67.86 <sup>b</sup>	60.99 <sup>a</sup>	51.18	52.45

<sup>a,b</sup>: Per cycle: data in the same row with different superscripts are significantly different ( $p < 0.05$ )

Poultry meat consist of approximately 60 to 80% water, 15 to 25% protein, and 1.5 to 5.3% lipids. FRA® Butyrin Hybrid Dry was able to decrease fat and saturated fatty acids (SFA) concentrations significantly. This effect might be explained by the earlier mentioned effect of butyrate glycerides on fat metabolism. The consumption of SFA by human are often associated with the risk of cardiovascular diseases (CVD). In this respect, a decrease in fat and SFA is preferred. In contrast, protein levels were elevated in both production cycles when FRA® Butyrin Hybrid Dry was supplemented to the diet. Proteins are imported for human growth and cell maintenance. A higher level of protein in breast muscle is therefore favored. No difference was found in the amount of ash between the control and treatment group.

## 4 CONCLUSIONS

The aim of this trial was to test the effect of FRA® Butyrin Hybrid Dry on general performance, carcass, and meat quality of broilers under commercial circumstances. It can be concluded that adding 1 kg of FRA® Butyrin Hybrid Dry per ton of feed improves FCR and EPEF. Furthermore, mortality was clearly reduced when FRA® Butyrin Hybrid Dry was fed, suggesting a better health status of the broilers. FRA® Butyrin Hybrid Dry also proved to increase fillet yield. Moreover, breast muscle quality was improved as indicated by lower levels of connective tissue, collagen, shear force, fat, saturated fatty acids, and by a higher protein level.

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- ↑ Health
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# 5 TRIAL SUMMARY **FRA** BUTYRIN HYBRID DRY



Stimulate intestinal health and effective pathogen control

## TRIAL

Animals »	<b>Broilers</b>
Product »	<b>FRA® Butyrin Hybrid Dry</b>
Dosage »	<b>1 kg / ton</b>

## POLAND

Farm »	<b>Commercial farm</b>
Period »	<b>October - November 2019</b>

## EXPERIMENTAL SET-UP

Animals »	<b>220 000 one-day-old broilers (Ross)</b>
Flock density »	<b>20 broilers / m<sup>2</sup></b>
Treatments »	<b>Control</b> <b>FRA® Butyrin Hybrid Dry @ 1 kg / ton</b>
Set-up »	<b>2 repetitions per group</b> <b>Control (n=110 000), Treatment (n=110 000)</b>
Feed & Water »	<b>ad libitum</b>
Slaughter »	<b>38 days of age (on average)</b>
Results»	<b>Average of 2 cycles</b>



**INTESTINAL INTEGRITY**

### ADWG

Increased Average Daily Weight Gain

**+3.1%**



### MEAT

Increased fillet yield percentage

**+2.1%**



### EPEF

Improved European Production Efficiency Factor

**+33.1 pnts**



### FCR

Reduced Feed Conversion Ratio

**-4.5 pnts**



### MORTALITY

Reduced mortality

**-35.4%**



Trial code: SN190001 | Additional info: [R&D@framelco.com](mailto:R&D@framelco.com)

Data from this flyer is based on our current knowledge and experience. Since many factors can affect the performance of our product during and after application, processors are responsible for conducting their own tests and investigations. Certain statements may not apply in all geographic regions.

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