

# Tech UPDATE

METRIC



## Comparison of Tonistry Px with Milk Replacer

### INTRODUCTION

Milk replacer is used in the first 1-2 weeks of life to support growth in piglets, especially in larger litters. Tonistry Px is a product that is also administered in the first week of life. The two products differ considerably in their calorie content and mechanism of action. Milk replacer provides extra calories to the piglet, while Tonistry Px supports better efficiency of nutrient absorption.

Two studies were performed to compare the products.

### STUDY 1

#### Study Design

The study was conducted at Wageningen Livestock Research, Swine Innovation Centre Sterksel in the Netherlands. 80 sows and their litters ((Tempo x (York x Dutch Landrace), 1240 piglets)) were randomly assigned to one of 4 study groups, blocked by parity and expected farrowing date. Study groups were (**C**) negative control group, normal suckling only; (**Px**) litters receiving 3% Tonistry Px™ solution 500 mL/litter/day; (**Px+MR**) Tonistry Px + Milk replacer group; (**MR**) positive control group receiving only milk replacer. All study groups received their respective supplements from day 2-8 after birth. The volume of milk replacer was increased daily from 100 to 1200 mL in this time. Groups Px and Px+MR also received a combination of a 3% Px solution and gruel for 3 days before weaning and 3 days after weaning.

Piglets were ear-tagged and weighed on the day of farrowing. Cross fostering was allowed within the first 24 hours within study groups, resulting in a standardized litter size of 15 piglets. Tonistry Px or milk replacer were each offered in separate pans. The amount of Tonistry Px or milk replacer consumed by each litter was measured daily. Creep feed was provided to all groups after day 9. Piglets were subsequently weighed at day 9, weaning, and days 7, 14 and 35 post-weaning. Dry matter feed intake, mortality, culls, diarrhea scores and medications were also recorded for each litter or pig as appropriate.

### KEY TAKEAWAYS

Two independent studies compared Tonistry Px to commonly used milk replacers. Weight gain was the major parameter measured.

- Piglets given Tonistry Px during the suckling period had weight gains that were equal or greater than that of piglets receiving milk replacer alone or in combination with Tonistry Px.
- Tonistry Px resulted in a higher number of heavier piglets at weaning compared to all other study groups
- Tonistry Px increased weight at 35 days post-weaning
- These gains are most likely due to the enterotrophic effects of Tonistry Px, since Px contains only 1/10 the calories of milk replacer.

Feed intake, backfat thickness and weight loss of sows during lactation was also measured.

Piglets were weaned at 27 days of age. 192 piglets from each group were then sorted by weight and sex into 16 pens of 12 piglets each. These pens were then followed until 35 days after weaning. Collected data regarding product consumption, weights and ADG were statistically analyzed by appropriate standard methods using litter or pen as the experimental unit. Significance between treatments was declared at  $P \leq 0.05$ .

## RESULTS

### Intake of Tonisity Px and Milk Replacer

The average daily intake of supplements (Px, milk replacer, or the combination) is shown in Table 1. Total intake volume of supplements was highest in the Px+MR group. Px piglets received an average of 2.5 extra kcal/day, compared to 40 kcal/day in the Px+MR group and 45 kcal/day in the MR group.

Table 1. Volumes of supplement consumed

	Px	Px+MR	MR
Cumulative intake volume (mL/litter)	3119	7441	5602
Average intake volume (mL/litter/day)	445	1063 (395 Px +668 milk replacer)	800
Average intake volume (mL/piglet/day)	32	76 (28 Px + 48 milk replacer)	57
Supplemental calories delivered (kcal/piglet/day)	2.5	40	45

### Pre-Weaning Performance

After correction for any differences in birth weight, the Control pigs had an average weaning weight of 7.09 kg, compared to 7.60 kg for Px, 7.33 kg for Px+MR and 7.31 kg for MR groups. The Px piglets were 0.51 kg heavier than piglets in the Control group and 0.3 kg heavier than either of the MR groups, though these differences did not quite reach statistical significance ( $P = 0.16$ ). The ADG from birth till weaning tended to be higher ( $P = 0.11$ ) in all 3 supplement groups compared to the C group. Both the Px and Px+MR groups had a lower percentage of pigs weaned at less than 5 kg. Similarly, 12.4% of the Px pigs were weaned at  $> 10$  kg, which was a significantly higher percentage than in any other group. See Figure 1.

Figure 1. Percentage of pigs in each weight class at weaning



## **Post-weaning performance**

Px-group pigs had a significantly higher feed intake in the first 7 days post-weaning. From 7-35 days post-weaning, daily gain and feed intake in the Px and MR pigs were equal, and significantly higher than in the other study groups. At 35 days post-weaning, Px pigs were 1.5 kg heavier than Control pigs and 0.7 – 1.7 kg heavier than pigs in either of the MR groups ( $P < 0.001$ ). Px pigs with a weaning weight  $> 8.5$  kg also performed better in the first 2 weeks after weaning.

## **SUMMARY - STUDY 1**

Even though much smaller volumes of Tonistry Px were consumed compared to milk replacer, the Px pigs performed equally well as the milk replacer pigs.

This is remarkable especially considering that the Tonistry Px intake was lower than the milk replacer intake and the fact that the energy contribution of Tonistry Px is markedly lower than the energy contribution of a milk replacer. This data supports the enterotrophic function of Tonistry Px that leads to better absorption of available nutrients.

The Px+MR group might have been expected to out-perform the other study groups, but did not. One possible explanation for this is simple volume overload of the piglets stomach. Further studies are required to find the right balance of Px and milk replacer when used together.

## **STUDY 2**

### **Study Design**

This study was performed on a commercial farm in the Netherlands with the cooperation of HAS University of Applied Sciences, Netherlands and PanAgro Health and Nutrition. 72 Danbred sows and their litters (PIC 408 x Danbred) were assigned to receive either Tonistry Px (562 piglets) or milk replacer (521 piglets). Px litters received 500 mL/litter/day of a 3% solution from days 2-8 of age and for the 3 days before weaning. Milk replacer (MR) litters received milk replacer ad lib from day 1-8 of age. All litters received a weaner diet from day 18 until 1 week post-weaning.

Litters were weighed on the day of farrowing. Cross fostering within study groups was allowed within the first 24 hours. Litters were subsequently weighed at day 9, 1 day pre-weaning, weaning, and 1 week post-weaning. Mortality, diarrhea scores and medications were also recorded for each litter or pig as appropriate.

Piglets were weaned at 26 days of age and then moved into pens of 26 pigs each. On day 0, 1 and 2 of weaning, Px group pens received gruel made with 1.5 L of 3% Tonistry Px solution and 1 kg of weaner diet, at the rate of 2.5 kg gruel/10 pigs. Pigs were followed until 1 week after weaning. Statistical analysis was performed using SPSS software (v22). Collected data regarding weight, ADG and mortality were statistically analysed by appropriate standard methods using litter or pen as the experimental unit. Significance between treatments was declared at  $P \leq 0.05$ .

## RESULTS

There were no significant differences between treatment groups in mortality or average pig weight at any time point. See Table 2.

Table 2. Mortality and weight data

	MR group	Px group
<b>Number of sows</b>	<b>36</b>	<b>36</b>
Number of piglets born	521	562
Average litter size	14.5	15.6
Number of piglets weaned	445	480
Average piglets weaned per litter	12.4	13.3
Pre-weaning mortality (%)	14.6	14.6
Number of piglets at weaning	363	360
Number of losses one week post-weaning	4	4
Mortality rate during one week post-weaning (%)	1.1	1.1
<b>Average piglet weight (kg)</b>		
Day of birth	1.37	1.32
Day 8 of age	2.48	2.39
Day 1 pre-weaning	7.14	7.12
Weaning	7.48	7.45
One week post-weaning	8.52	8.54

## SUMMARY - STUDY 2

This was a like-to-like comparison of Tonisity Px and a well-known milk replacer under commercial conditions. Pigs in the Tonisity Px group performed equally well when compared to the milk replacer pigs. Given that Tonisity Px has on average only 1/10 of the energy value of milk replacers, the results clearly support its enterotrophic effect on the small intestine, which leads to better nutrient absorption.

## CONCLUSIONS

In 2 studies, supplementation of piglets with Tonisity Px gave results that were either equal to or better than results seen with piglets given milk replacer. Weight comparisons through weaning showed similar results, but at 9 weeks of age, Px pigs were up to 1.7 kg heavier than their milk replacer counterparts. These benefits seen across both studies were likely due to several factors, such as improved absorption of nutrients and improved hydration. These benefits are highly relevant to all producers that are looking for improved growth. Tonisity Px supplementation presents a non-antibiotic option with a unique mode of action that helps animals move through the pre-weaning and weaning stages, resulting in increased productivity.

## REFERENCES

1. Firth AM, Cano GL, Alujas AM. Effect of Tonisity Px™ administration on intestinal morphology. *Am Assoc Swine Vet* 2017; poster presentation.
2. Data on file, Study Report T42, Tonisity Int. Ltd.
3. Data on file, Study Report 17-003, Tonisity Int. Ltd.

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