

BORREGAARD

PELLTECH EVALUATION

PURPOSE

To determine the level of improvement in the production rate that could be achieved by the addition of PellTech, for a 2 mm shrimp pellet.

RESULT

- Production rate improved by 34% with the addition of 0.4% PellTech. The additional tonnage was produced virtually free of energy costs.
- The production rate was increased by 25% when 0.2% of PellTech was applied. There was a corresponding decrease in power required by the pellet mill of 12%. However, pellet mill amperage did increase somewhat.

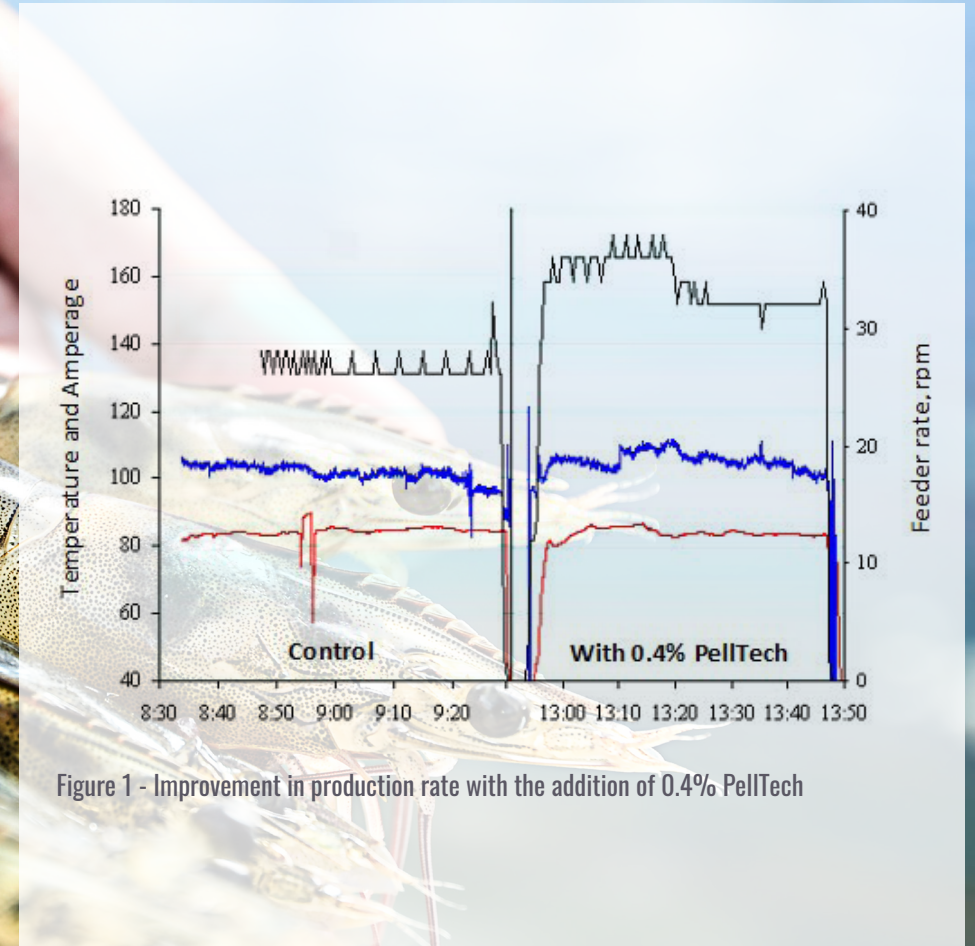


Figure 1 - Improvement in production rate with the addition of 0.4% PellTech

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PROCEDURE

This trial was run on a 150 HP pellet mill combined with a triple-stack of conditioners. Pellet diameter was 2 mm and knives were set to cut pellets to about 4 mm in length. Feed was conditioned by the direct addition of steam to a temperature of about 85°C.

Production started in the normal manner with 2 tonnes of the standard shrimp formulation with no PellTech (Control). The pellet mill operator determined process settings throughout the test period. The initial Control run was followed by 2 tonnes containing 0.2% PellTech, then 2 tonnes containing 0.4% PellTech. All three treatments had the same level of aquaculture binder.

Throughout the trial data was collected regarding the process conditions. At five minute intervals, the conditioning temperature, mill amperage, feeder setting, and feeder speed were observed and recorded manually. Additional measurements of mill amperage, conditioning temperature, and feeder speed were recorded continuously by data loggers.

Samples of pellets were collected after the cooler for evaluation by standard QC methods. Pellets were examined for physical appearance and then placed in water and allowed to stand for four hours. They were then examined for appearance and hardness.

Table 1 - Comparison of Control to results with 0.4% PellTech

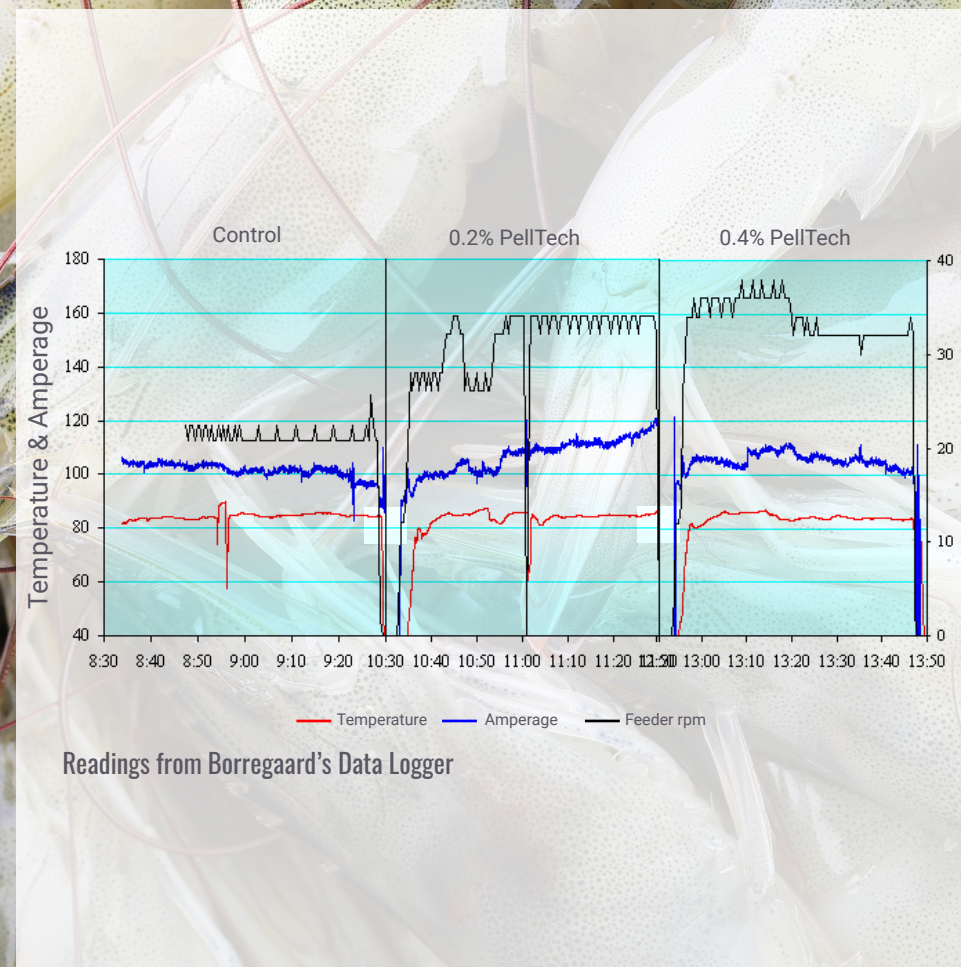
Time		Temp. °C	Amps	Speed, r.p.m		TPH	kWh/ton
Begin	End			Setting	Actual		
08:50	09:20	85,3	101	800	26,5	1,86	32,3
13:05	13:20	85,2	107	1080	35,6	2,50	25,4
13:25	13:45	84,0	105	952	32,1	2,25	27,5

BORREGAARD DISCUSSION

The production rate increased up to 34%, from 1.86 to 2.50 tonnes per hour, when using PellTech at 0.4% in the formulation. At this production rate, amperage increased slightly from 101 to 107, but power per tonne declined by 24%, from 32.3 to 25.4 kWh/tonne (Table 1). This 21% power savings was only at the pellet mill. All of the auxiliary equipment, the conditioners, conveyors, cooler, sieve, etc., would not require any additional energy to produce this extra feed. Except for extra steam, this added production was accomplished free of energy charge.

Uniformity of length is an essential factor for customer satisfaction. These pellets were made for 12–16 g shrimp and expected to be 2–4 mm in length. At the higher extrusion rate, it was difficult to adjust the knives to achieve the desired uniform length. The production rate was decreased after 13:20 to achieve uniform pellet length. Since it was not possible to take full advantage of the rate that was allowed by 0.4% PellTech, it would probably be more appropriate to use a lower dosage.

Application of 0.2% PellTech allowed a 27% increase in production rate, from 1.86 tonnes per hour for the average control to 2.36 tonnes per hour for the maximum with 0.2% PellTech. Under these conditions, amperage increased from 101 to 111. This was a very strong response for PellTech, but the amperage increase makes it appear that the dosage was at the lower limit. It might be optimal to use 2.5 or 3 kg of PellTech per tonne. Visual inspection of the pellets showed that PellTech improved smoothness and reduced cracks. PellTech did not interfere with the function of the aquaculture binder, and water stability remained excellent. The use of PellTech improved pellet quality from a rating of A to one of A+.



CONCLUSIONS AND RECOMMENDATIONS

PellTech was effective at increasing production rate, reducing energy requirement, and improving pellet quality. It should be applied at 0.25 to 0.3%.

THIS WORK WAS PERFORMED AND REPORTED BY BORREGAARD

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Grade	A	A+	A+
Hardness	Hard	Hard	Hard
Productivity	2130	2300	2400
Apparent	Uniform, rough surface, rough bottom	Uniform, smooth surface, smooth bottom	Uniform, Smooth surface, smoothest bottom
Stability	Number of cracks in pellets are more than products that use PellTech. Rough surface. Oil film is thick.	Slight crack. Surface is smoother than (1) and (4). Oil film is less than that of (1) and (4).	Slight crack. Surface is smoother than (1) and (4). Oil film is less than (1) and (4).

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TABLE

Table 2A - Control pellets with standard formulation

Time	Temp. °C	Amperage	Feeder rpm	Tons/hour	kWh/ton
8:50	83.4	103	27.2	1.91	31.9
8:55	89.1	103	27.2	1.91	32.0
9:00	85.2	102	26.0	1.83	33.1
9:05	84.3	101	26.0	1.83	32.6
9:10	84.6	101	26.4	1.85	32.4
9:15	85.5	102	26.4	1.85	32.7
9:20	84.8	97	26.0	1.83	31.4
Average	85.3	101	26.5	1.86	32.3

Table 2B - Standard formulation plus 8.2% PellTech

Time	Temp. °C	Amperage	Feeder rpm	Tons/hour	kWh/ton
10:40	82.0	99	27.2	1.91	30.7
10:45	84.6	101	32.8	2.30	26.0
10:50	86.4	100	26.4	1.85	31.9
10:55	81.6	103	32.4	2.27	26.7
11:00	85.7	109	32.5	2.28	28.2
11:05	82.8	109	33.6	2.36	27.3
11:10	84.2	111	33.6	2.36	27.9
11:15	84.3	112	33.6	2.36	28.0
11:20	84.6	112	33.2	2.33	28.4
11:25	84.5	115	33.6	2.36	28.7
Average	84.8	107	31.9	2.24	28.4

Table 2C - Standard formulation plus 0.4% Pelltech

Time	Temp. °C	Amperage	Feeder rpm	Tons/hour	kWh/ton
13:00	81.1	106	35.6	2.50	25.0
13:05	86.3	104	35.6	2.50	24.7
13:10	86.0	104	36.4	2.56	24.0
13:15	85.6	110	36.4	2.56	25.4
13:20	82.9	111	34.0	2.39	27.4
13:25	84.3	107	32.4	2.27	27.9
13:30	84.8	105	32.0	2.25	27.7
13:35	83.4	106	31.6	2.22	28.3
13:40	84.0	105	32.0	2.25	27.5
13:45	83.4	101	32.4	2.27	26.1
Average	84.2	106	33.8	2.38	26.4