Optimizing feed pelleting

using Myvatex™ AF-11

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Optimizing feed pelleting using Myvatex AF-11:

Analysis of a cross-continental longitudinal study based on field evaluations

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Pelleting is the most common thermal processing method in the animal feed industry. It consists of agglomerating ingredient particles using mechanical action, in combination with moisture, pressure and temperature. As feed costs account for 80% of the total cost of animal production, it is important to ensure optimal pelleting processing efficiency. This involves utilizing cost effective raw materials, mechanical and thermal energy optimization and minimising production downtime.

Steam conditioning supports the fluidification of mash feed and aids pellet particle binding. During steam conditioning, the water capillarity properties and surface tension of steam lead to starch gelatinization and protein plasticization. Myvatex™ AF-11 is a blend of salts of fatty acids, distilled succinylated monoglycerides and mono- and diglycerides, which optimizes these physico-chemical interactions during conditioning and pelleting of feed, leading to concomitant decreases in energy consumption and increases in pellet mill throughput.

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Myvatex™ AF-11 has been successfully tested in multiple feed formulations and commercial pellet mills in Asia (Figure 1A & 1B). Data from 37 individual Myvatex™ AF-11 field evaluation trials at pellet mills, with capacities ranging from 2.2 to 19.1 MT/h, were analysed using appropriate statistical analysis (Figure 1C). Each of these trials included a control run, in which the normal throughput conditions (in MT/h) and use of electrical current (in Amp) were established for the test feed formulation. Subsequently, Myvatex™ AF-11 was included in the mix of dry ingredients at a dose ranging from 0.5-1.0 kg/MT, and the same parameters were recorded. Energy consumption (in kWh/MT) was calculated based on use of electrical current, motor specifications and throughput. All results are reported as percentage improvement relative to the control.

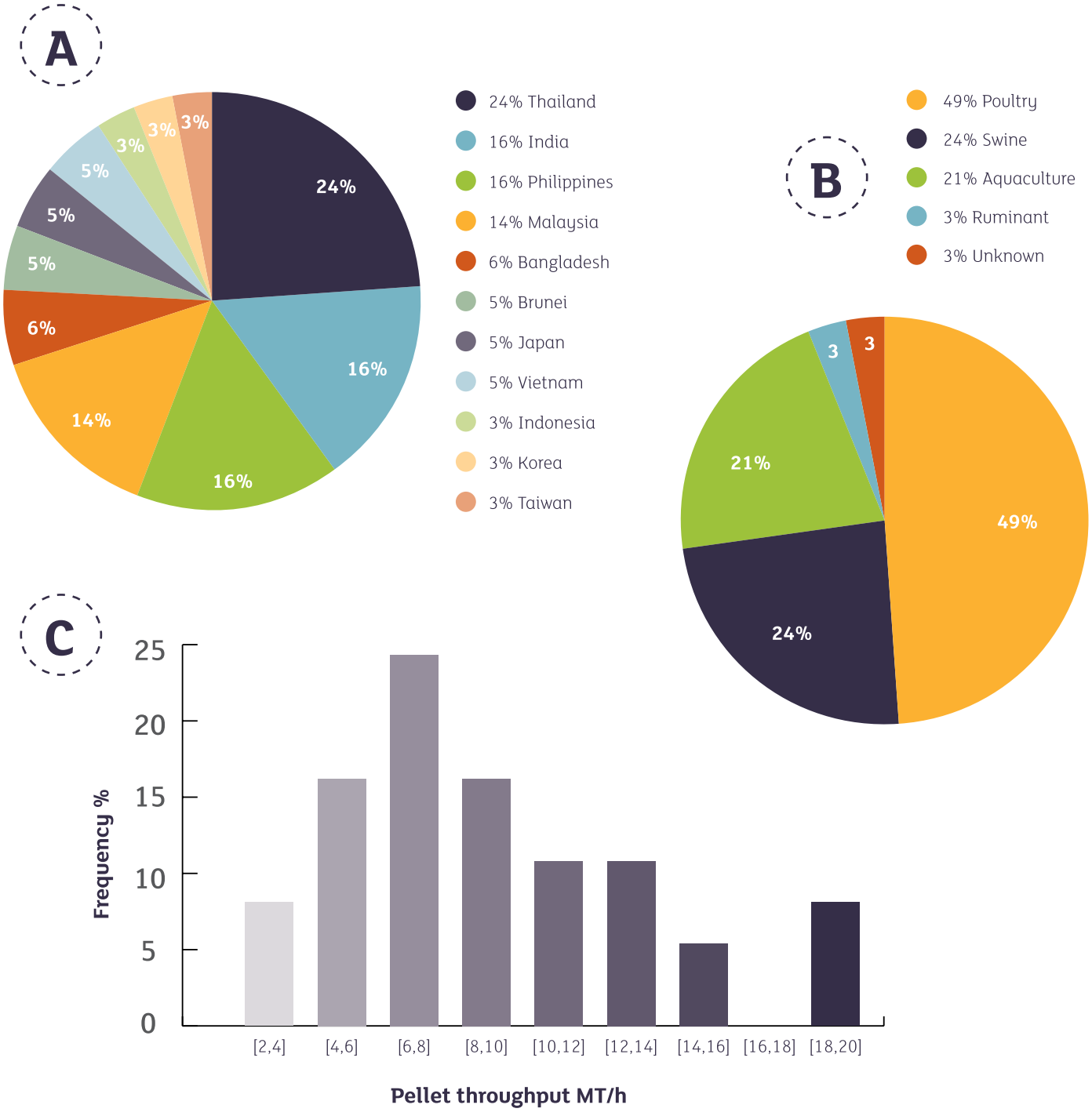


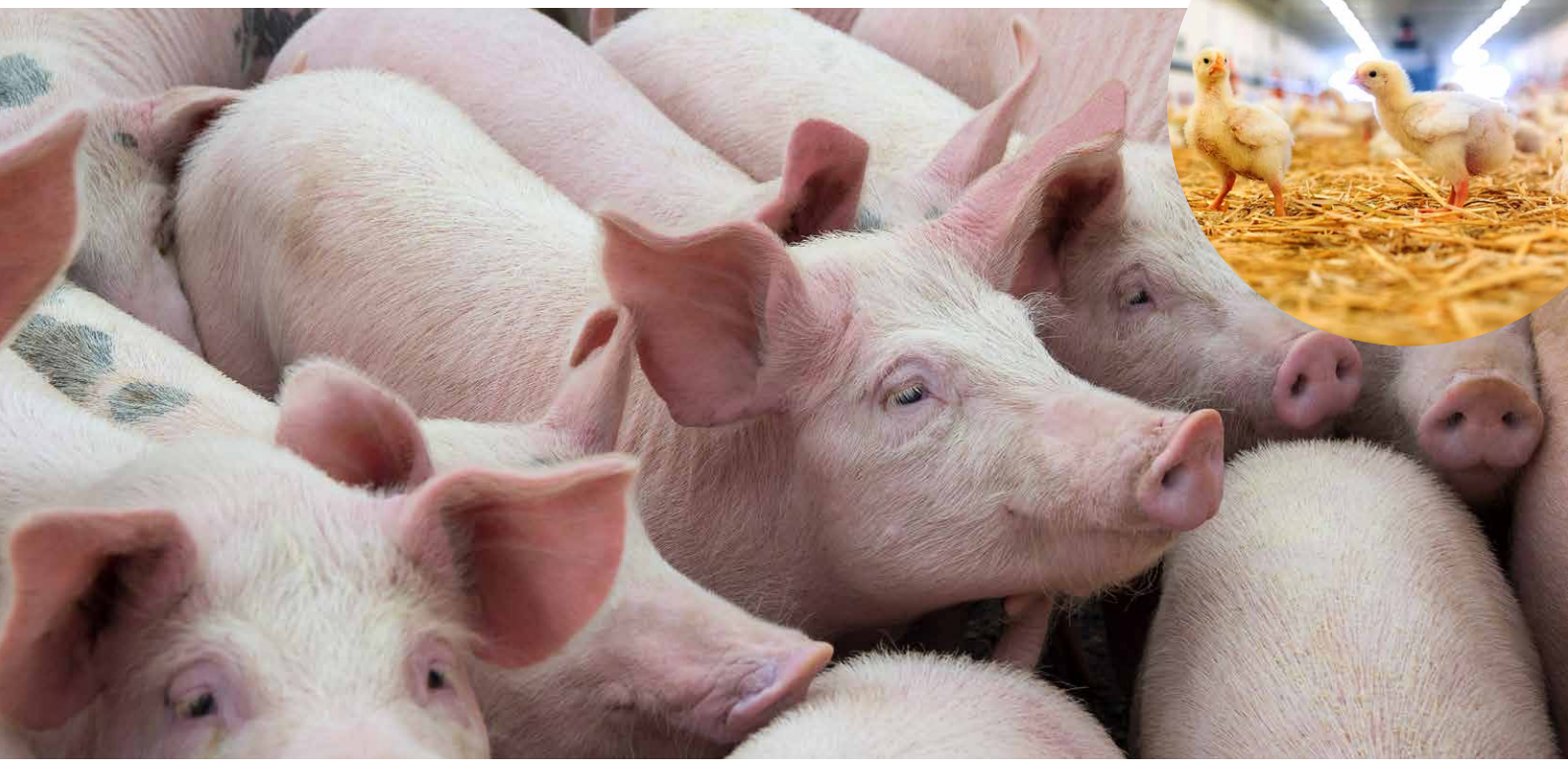
Figure 1. Frequency distribution of Myvatex™ AF-11 trial location by country (A), Type of feed formulation tested by animal species (B), and (C) Pellet mill throughput range (MT/h)

Initially, the data evaluation considered two distinct Myvatex™ AF-11 dose ranges of, 0.5-0.75 kg/MT and 0.75-1.0 kg/MT. Mean throughput improvements were quantified as 16.8% and 20.4% relative to the control, with concomitant reductions in energy demand of 15.9% (Table 1). Mann-Whitney *U* tests for comparison between the 2 dose ranges was not statistically significant for either throughput ($p = 0.5716$) or energy consumption ($p = 0.5349$). This suggests that dose had no impact on the magnitude of the difference observed relative to the control group.

Table 1. Effect of the dose of Myvatex™ AF-11 on the percentage improvement in pellet mill throughput (in MT/h) and energy consumption (kWh/MT), relative to a control un-supplemented feed manufacturing run.

	Throughput, MT/h		Energy, kWh/MT	
Dose, kg/MT feed	0.5≤D<0.75	0.75≤D≤1.0	0.5≤D<0.75	0.75≤D≤1.0
Sample size	14	23	13	18
Mean ± SD	16.8 ± 22.50	20.4 ± 21.96	-15.9 ± 15.44	-15.9 ± 11.62
95% CI	[3.9, 29.7]	[10.9, 29.9]	[-25.2, -6.6]	[-21.7,-10.1]

SD: standard deviation; CI: confidence interval



Since the magnitude of the improvement was equivalent and independent of the Myvatex™ AF-11 dose, data was analysed irrespective of dose in order to quantify the average impact on pellet processing efficiency. Wilcoxon tests were used to compare the average percentage change in measurements relative to control to a 0% change and 10% change, respectively (Table 2). For both throughput and energy consumption, it was proven that the percentage change due to Myvatex™ AF-11 relative to control was statistically significant from a 0% change and quantified in 19.1% greater throughputs and -15.9% lower energy demands ($p < 0.0005$). Furthermore, it was determined that improvements of 10% or greater magnitudes were to be gained with Myvatex AF-11 in regards energy consumption ($p = 0.0369$) and throughput ($p = 0.0591$), although the latter was at tendency level.

Table 2. Effect of Myvatex™ AF-11 on the percentage improvement in pellet mill throughput (in MT/h) and energy consumption (kWh/MT) relative to a control, un-supplemented feed manufacturing run.

		Throughput, MT/h	Energy, kWh/MT
Sample size		37	31
Mean ± SD		19.1 ± 21.92	-15.9 ± 13.11
95% CI		[11.8, 26.4]	[-20.7, -11.1]
		p-value	
Difference from	0% change*	<0.0005	<0.0005
	10% change*	0.0591	0.0369

* relative change from control;
SD: standard deviation; CI: confidence interval

In conclusion,

It has been demonstrated that Myvatex™ AF-11 is an efficacious solution for optimizing animal feed pellet production. Quantifiable increases in pellet mill throughput (19.1%) were concomitant with significant reductions in energy demand (-15.9%). For feed manufacturers, Myvatex™ AF-11 represents a unique opportunity, to reduce pellet production costs through lower energy consumption, increased throughput and the ability to utilize lower cost raw materials.

Significant increase to pellet mill throughput:

19.1%

Significant decreases in energy demand:

15.9%

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