The effects of technological feed emulsifier on feed mill productivity

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Feed milling industry is one of the most organized support industries in the Philippine Agriculture; and is considered as the "center of the farm-to-food supply chain" (Esplana and Soliaban, 2005).

The productivity of a feed mill is dictated by several factors. Dr. Stark (2007) reported that feed manufacturing practices that were effective in the past may no longer be beneficial when faced with rising (a) ingredient, (b) transportation and (c) energy costs. Energy cost is considered as the most critical input (Fadare, 2003). According to Research Institute of Feed Technology (IFF), the most electric power in feed production goes to pelleting (60%) followed by milling (16%), conveying (14%), receiving (7%), mixing (2%) and delivery (1%). Nowadays, more feed manufacturing companies all over the world are engaging into pelleting feeds and the effectiveness of the pelleting process is measured by pellet quality and percent fines at the mill (Stark, C., 2007).

Today, the usage of emulsifiers has gained demands to promote good pellet quality. As defined by European Food Emulsifiers Manufacturers Association (EFEMA), emulsifier reduces the surface tension between liquids, such as water and oils, and promotes emulsion. Numerous trials have been conducted outside the Philippines showing improvement in the optimization of distribution of fat and oil phases in feeds to produce good quality pellets. However, there is no known compilation of reports of local trials in the effect of emulsifier in feed mill productivity.

The purpose of this study was to determine the effect of adding 0.5 kg/ton of technological feed emulsifier (TFE), consisting of vegetal bi-distilled oleic acid emulsified with glyceryl polyethylenegylcol ricinoleate, on feed mill productivity. Results from 38 trials conducted in the Philippines (2015-2019) were identified. Nineteen separate trials met the criteria for inclusion. Measurements were actual systems capacity (ASC), power used per ton of feeds produced (kWh), pellet durability index (PDI), and moisture gain from post mixer (MG).

The results indicated that ASC (12.12 vs 9.79 tph; p=0.03) was increased. This is in agreement with the report of Nazarro (2011) that the use of emulsifier glyceryl polyethyleneglycol ricinoleate in admixture with vegetal bi-distilled oleic acid increases hourly output (tph) in a feed mill. In addition, the pellet durability index tended to be higher by 0.89 % (97.72 vs 96.83 %; p=0.09). Recent studies have also indicated that addition of emulsifier can enhance the overall conditioning of the feed to produce good quality pellets (Kenny and Rollins, 2007). Conditioning contributes to 33% of the pellet quality (Behnke, 1996). There were no differences detected in power used to produce a ton of feeds (11.74 vs 15.18 kWh; p=0.29) and moisture gain from post-mixer (-0.24 vs -0.57 %; p=0.30).

Overall, TFE was found to improve feed mill productivity. In future studies, it is recommended to evaluate the effect of TFE on manufacturing of mashed feeds.

Parameters	Without TFE	With TFE	SEM	p-value
Actual system capacity, tonnes per hour	9.79	12.12		
Power used/ton, kilowatt-hour	15.18	11.74		
Pellet durability index, %	96.83	97.72		
Moisture gain from post mixer, %	(0.57)	(0.24)		

Table 1. Feed mill productivity and pellet feeds quality with and without technological feed emulsifier (TFE)

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