MPOB-HIE AS A HIGH ENERGY FAT SUPPLEMENT FOR LACTATING DAIRY COWS

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POB-HIE is formulated from refined palm product together with a food-grade additive derived from palm oil. MPOB-HIE can be considered as supplemental fat which can play an effective role as an integral part of dairy rations, especially during the early stages of lactation when the cow is in an energydeficit situation (Table 1). The benefits of adding MPOB-HIE to the early lactation ration are many, most importantly: 1) To decrease the heat load in the body during hot, humid weather, thereby allowing for higher intake of dry matter, 2) To increase the energy density of the diet while maintaining the proper balance of forage to concentrate, and 3) To reduce the rate and extent of body energy loss which, if excessive, results in a lowered milk yield, reproductive problems (delayed conception) and potential metabolic problems (fatty liver and ketosis).

The chemical properties and melting point of MPOB-HIE may qualify it to be classified as a rumen-inert fat supplement. Rumen inertness means that the interaction between the fat supplement and the rumen microbes is at a low enough level not to interfere with microbial metabolism. Feeding oil with high iodine value (IV) to ruminants tends to depress fibre digestion due to the physical encapsulation or covering of the fibre with oil, thus preventing direct contact of the microbes to enable them to digest the feed fibre.

COMMERCIAL BENEFITS OF MPOB-HIE

MPOB-HIE has several advantages and commercial benefits when used in feeding dairy cows:

- it is inert in the rumen, and does not interfere with rumen function, hence ensuring good fibre digestion;
- it is palatable, not oily and readily consumed by the cow;

- it is highly digestible;
- it is high in net energy;
- it is economical;
- it has a high content of tocos, especially tocotrienol (1322 ppm), which enhance fertility and the immune system; and
- it is available throughout the year and can be delivered on a just in time (JIT) basis within Malaysia.

From *Table 2*, it may be seen that:

- Jersey cows fed on feed formulated with improved MPOB-HIE produced the highest quantity of milk, averaging at 15.14 litres day⁻¹, and significantly higher (P<0.05) than cows fed on the ration formulated with calcium soap of palm fatty acids distillate (PFAD) (T3 in *Table 1*).
- Total milk fat percent of T3 was the highest among the treatments, and was significantly different from the control (T1), but was not significantly different (P>0.05) from the feed formulated with improved MPOB-HIE (T2).
- Total solid and total solid non-fat contents of the milk from Jersey cows fed on feed formulated with improved MPOB-HIE were highest (P<0.05) among the three treatments, at 12.8% and 9.1%, respectively.
- Increments in milk yield were recorded after the feeding trial was initiated. The increment due to the feed formulated with improved MPOB-HIE was significantly higher than that due to the feed with calcium soap, but similar to that due to the control feed (*Table 3*).

CONCLUSION

- Improved MPOB-HIE was very effective as a high energy supplement for lactating dairy cows to increase daily milk yield.
- Improved MPOB-HIE was superior to calcium soap of PFAD in boosting milk yield in lactating dairy cows.



TABLE 1. PROXIMATE COMPOSITION OF ALL RATIONS

	T1	T2	Т3
	(Control)	(I- MPOB-HIE)	(Ca soap)
Moisture content %	7.82	7.90	8.28
Ether extract %	1.59	2.88	1.45
Ash %	4.25	5.83	5.38
Crude protein %	16.06	16.32	16.07
Energy Kcal kg ⁻¹	4 240	4 144	3 977
Crude fibre %	17.48	18.73	18.48

TABLE 2. MILK YIELD AND MILK COMPOSITION OF JERSEY COWS FED ON DIFFERENT FEED FORMULATIONS

Item	Feed formulation		
	T1	T2	T3
	(Control)	(I- MPOB-HIE)	(Ca Soap)
Yield (litre day ⁻¹)	$14.61^{a} \pm 1.01$	$\textbf{15.14}^{a}\pm0.64$	$13.73^{b} \pm 1.11$
Fat content (%)	$2.96^{b} \pm 0.38$	$3.77^{a} \pm 0.38$	$3.89^a \pm 0.19$
Total solids (%)	$11.77^{\circ} \pm 0.50$	$12.82^a \pm 0.57$	$12.38^b \pm 0.13$
Total solids, non-fat (%)	$8.72^{ab}\pm0.62$	$9.08^{\mathrm{a}} \pm 0.51$	$7.71^{b} \pm 2.62$

Note: Mean values within the same row with different superscripts are significantly different from one another (P<0.05).

TABLE 3. INCREMENT IN MILK YIELD FROM JERSEY COWS AFTER FEEDING ON DIFFERENT FEED FORMULATIONS

Average milk yield before MPOB feeding trial		10.21 litres day ⁻¹	
Item	T1 (Control)	T2 (I- MPOB-HIE)	T3 (Ca Soap)
Average milk yield (litre day-1)	$14.61^{a}\pm1.01$	$15.14^{a} \pm 0.64$	$13.73^{\text{b}} \pm 1.11$
Increment (%)	43.10	48.28	34.48

Note: Milk yields with a different superscript are significantly different from one another (P<0.05).

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