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LIST OF ABBREVIATIONS

%	Percentage
AIA	Acid insoluble ash
Al	Albumin
Al / GL	Albumin / Globulin
Alifet	Crystallized natural animal fat
AOAC	Association of Official Analytical Chemists
BW	Body weight
Ca	Calcium
Ca-LCFA	Calcium salt of long chine fatty acids
CF	Crude fiber
CFM	Concentrate feed mixture
CP	Crude protein
CSFA	Calcium soap of fatty acids
DCP	Digestible crude protein
DM	Dry matter
DMI	Dry matter intake
EE	Either extract
ELAC	Early lactation
ES	Energy status
FCM	Fat corrected milk
FHPFAD	Flaked hydrogenated palm fatty acid distillate
GCS	Groynd canola seed
Gl	Globulin

GOT=AST	Glutamic oxaloacitic transaminase =Activity of aspartate
GPT=ALT	Glutamic pyruvic transaminase =Alanin aminotransferase
HDL	High density lipoprotein
IU / L	International unit per litre
Kg	Kilogram (s)
LDL	Low density lipoprotein
LE	Egyptian pound
LH	Luteinizing hormone
Megalac	Commercial calcium salts of fatty acid
Meq	Mill equivalent (s)
MLAC	Mid lactation
NE	Net energy
NFE	Nitrogen free extract
NH3-N	Ammonia nitrogen
NRC	National Research Council
OM	Organic matter
PF	Protected fat
PFA	Prilled fatty acids
PHPFAD	Prilled hydrogenated palm fatty acid distillate
PHT	Partilly hydrogenated tallow
RR	Respiration rate
RT	Rectal temperature
S	Soya hulls
SE	Standard Error
T	Saturated tallow

TDN	Total digestibile nutrients
TMR	Total mixed ration
TMR	Total mixed ration
WCS	Whole cotton seed
WCSPT	Whole cotton seed plus prilled tallow fatty acid
WCSSO	Whole cotton seed plus sufflower oil

5-SUMMARY

The present study was carried out at Sakha Animal Production Research Station, Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture in cooperation with Animal Production Department Kafr El-Sheikh, Faculty of Agriculture, Tanta University during the period from July 2002 to January 2003.

Eighteen Friesian cows after one week postpartum weighing 588 kg body weight and a ranged from 3 to 4 stage of lactation (parity). Cows were randomly allotted into three similar groups (six in each) according to body weight, parity and daily milk yield.

The cows in the first group fed a basal ration consisted of concentrate mixture, berseem hay and rice straw and served as a control group. While, the other two groups, 3% of concentrate mixture was replaced by protected fat (Magnapac) for the second group or palm oil (Estiarin) for the third group.

The cows were fed individually the experimental ration to covered their requirements according to NRC (2001). The experimental period extended from first week to 14 weeks postpartum.

The experimental tested

Samples of rumen fluid were collected two times monthly to determine pH values, total volatile fatty acids and ammonia- nitrogen concentrations.

Blood samples were collected from the experimental animals at the 3rd week postpartum and then collected once every there weeks until, the

15 weeks after calving. Total protein, albumin,globulin, glucose, urea, total lipids, total cholesterol, HDL, LDL , tryglycerides, AST, ALT were determained in blood serum.

Samples of milk collected weekly to limited its yield and analyzed their component of fat, protein, lactose, total solid, solid not fat and ash.

Changes in body weight, respiration rate, rectal temperature and heart rate were determained from **2nd** week to 14 week postpartum (once /weekly).

Reproductive efficiency for the experimental Friesian cows was measured by first oestrus postpartum, first service, days open and numbur of service per conception.

The obtained results summarized as follows:

1. Nutrients digestibility and nutritive values:

Cows given protected fat had highest digestibility coefficients of DM, OM, CF, EE and NFE and subsequently TDN value compared with other two groups. However, cows fed supplemented oil had significantly ($P<0.05$) higher digestibility coefficient of CP and subsequently DCP value than other groups.

2. Feed intake:

The highest intake of concentrate mixture, berseem hay, rice straw, DM and DCP were recorded in cows fed control ration However, cows fed protected fat had only the highest TDN intake.

3. Ruminal activity:

Ruminal pH value and TVFA's concentrations were not affected by fat or oil supplementation. However, NH_3-N concentration decreased ($P<0.05$) significantly with fat and oil supplementation.

4. Blood constituents:

The concentrations of serum glucose, urea-N, total protein, albumin, globulin, albumin / globulin ratio, total lipids and HDL cholesterol were recorded the highest value in cows fed ration supplemented with oil. However, cows fed protected fat had the highest concentration of total cholesterol and LDL, GOT, GPT enzymes and triglyceride concentrations.

5. Body weight change:

Losses in body weight were increased rapidly in lactating cows during the first 8 week of lactation and cows in control group recorded ($P<0.05$) the highest losses in body weight followed by those fed supplemental oil, while cows fed protected fat recorded the lowest losses in body weight.

6. Respiration rate, Rectal temperature and Pulse rate :

Mean of respiration rate of cows fed supplemented fat was significantly ($P<0.05$) higher than cows fed control or oil rations. However, cows fed control ration had ($P<0.05$) highest mean of pulse rate followed by those fed protected fat while cows fed ration supplemented with oil had the lowest values. The differences in rectal temperature were not significantly among the different groups.

7. Milk production :

Milk production expressed as actual milk yield and fat corrected milk were significantly ($P<0.05$) higher for cows fed protected fat compared with those fed control ration. Moreover, milk yield was significantly ($P<0.05$) higher for cows fed protected fat than cows fed oil.

8. Milk composition:

There were no significant differences in fat, protein, lactose and ash contents among the different groups, while the differences in the contents of total solids and solids not fat were significant between different groups.

On the other hand, the yield of fat, protein, lactose, total solids and solids not fat were significantly higher for cows fed protected fat and oil than those of control group.

9. Feed and economic efficiency:

Protected fat and oil supplementation in ration of dairy cows improved their feed efficiency, which reduced the amounts of DM, TDN and DCP required to produce 1 kg FCM. Moreover, economic efficiency for cows fed protected fat and oil was significantly higher compared with those fed control ration.

10 . Reproductive performance:

There were no significant differences among groups in the period from calving to insemination, days open and number of insemination per service. However, days open tended to delay in cows fed supplemented fat and oil .Cows fed protected oil had ($P<0.05$) the short period from calving to the first estrus compared with those fed protected fat or control ration. Cows fed supplemental oil recorded significantly ($P<0.05$) the longest period from calving to the first estrus (40.67 day), followed by those fed protected fat (33.00 day), while those fed control ration had the shortest period (24.75 day). Cows fed control ration showed the highest conception rate from the second insemination (66.67%) followed by those fed supplemental oil (50.00%), while those fed protected fat had the lowest rate (40.00%). Data of the first, second and third insemination revealed that

cows fed supplemental oil recorded the highest conception rate (100%), while those fed protected fat or control ration showed the same rate (66.67%).

The yield of 4% fat corrected milk increased linearly with increasing body weight. The correlation between body weight and 4% fat corrected milk yield was significantly higher (r= 0.33). Moreover, there was a positive relationship between body weight and reproductive performance. The correlation between body weight and conception rate was 0.33.

Furthermore, there was a positive relationship between 4% fat corrected milk and reproductive performance of Friesian cows fed protected fat and oil (r= 0.15).

From these results it could be concluded that it can be utilized protected fat and oil to increase energy density in dairy cows to improve their milk yield as well as reproductive performance without any deleterious.