

**EFFECT OF PROBIOTIC SUPPLEMENTATION TO
LACTATING ANIMAL RATIONS ON ENERGY
AND PROTEIN UTILIZATION EFFICIENCY**

By

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ABSTRACT

AHMED MOSTAFA MOSTAFA MAKLED: Effect of Probiotics Supplementation to Lactating Animal Diet on Energy and protein Utilization Efficiency. Unpublished M.Sc. Thesis, Department of Animal production, Faculty of Agriculture, Ain Shams University, 2019.

Probiotics can play an important role to improve dairy animal's health and its productive performance through desirable manipulation of rumen fermentation. So that probiotics supplementation to dairy animals improves milk production, milk components and energy utilization.

The present study was carried out at labs of Animal Nutrition, Animal Production Department, Faculty of Agriculture, Ain Shams University, And Sanad dairy farm near Damietta, during the period from 1 January to 30 March 2017. Fifty lactating Holstein-Friesian cows (multiparous and primiparous) were distributed between the two groups 25 cows each, and the season of lactation was concerned. This experiment was started one week after calving time and extended for three months after parturition. The animals were fed total mixed ration the diets were formulated to cover NRC requirement for dairy cattle (NRC, 2001) without or with probiotic supplementation at dose 10^6 CFU/kg DM for control and treated group, respectively. Each group was placed in a shaded pen equipped with free stalls. the diets were offered daily adlib and the animals had free excess to clean fresh water.

In general, the results showed that probiotic supplementation, significantly, increased the DM and NDF digestibility compared to control group. While, OMD, CPD, CFD, EED, NFED were numerically increased than control group but the differences were not significant.

Probiotics are showing to improve nutrients digestibility, milk production and composition the results indicated that probiotic supplementation to lactating animals' diets has positive effects with slightly increase but not significant for 1) milk production, 2) milk yield, 3) 4% fat corrected milk, 4) energy corrected milk. Moreover milk total solid and fat content were significantly increased, but slightly positive change in milk protein, milk lactose, milk ash, milk solids not fat was shown but the differences were not significant.

Concerning the blood parameters: The obtained results showed that the supplementation of probiotics to lactating cows diets didn't has a significant effect compared to the control group excepted Alkaline phosphatase was significantly decreased by probiotics supplementation than control group, the alkaline phosphatase test is used to help detect liver disease or bone disorders, and this may explained the positive effect on animals health contributed by probiotics supplementation to animals diet.

Energy balance and nitrogen efficiency of utilization: The results declared that the maintenance energy requirements for control group were higher than the probiotic group. Milk energy output (Mcal/d) was increased by probiotic supplementation treatment than control but this increase was not significant.

Milk fatty acids and amino acids profiles effect of local isolated probiotic supplementation to lactating cows diets: The results indicated that there are no significant differences among fatty acids and amino acids profiles. expected some of unsaturated fatty acids were slightly enhanced for treated group than control.

Body condition score and body weight: The data showed effect of supplementing dairy animal rations with probiotics on body condition score and body weight up to the 3th month of lactation. The data showed normal

curve for both parameters and these may be due to the associated negative energy balance during the early lactation stage.

In conclusion, the use of probiotic for dairy cows rations with the dose of 10^6 CFU/kg DM feed have a positive effect on dairy cows and improve milk yield, milk components and enhance milk energy. The result indicated a positive effect on animal's health contributed by probiotics supplementation to animals diet.

Keywords: *probiotics, milk yield, growth and digestibility, ruminant, fermentation.*

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LIST ABBREVIATIONS

Abbreviations	Description
ADF	Acid Detergent Fiber
CF	Crude Fiber
CFD	Crude Fiber digestibility
CFM	Concentrate Feed Mixture
CP	Crude Protein
CPD	Crude Protein digestibility
DCP	Digestible crude Protein
DDM	degraded Dry Matter
DE	Digestible Energy
DM	Dry Matter
DMI	Dry Matter Intake
EE	Ether Extract
EED	Ether Extract digestibility
GE	Gross Energy
LAB	Lactic acid bacteria
TMR	Total mixed ration
ME	Metabolizable Energy
NDF	Natural Detergent Fiber
OM	Organic Matter
OMD	Organic Matter digestibility
NFE	Non fiber extract
NEED	Non fiber extract digestibility
TDN	Total Digestible Nutrient
TDNI	Total Digestible Nutrient Intake
NEL	Net energy for lactation
NELI	Net energy for lactation intake
MY	Milk yield

Abbreviations	Description
FCM	Fat corrected milk
ECM	Energy corrected milk
DFM	Direct fed microbial
FAME	Fatty acid methyl ether
AIA	Acid insoluble Ash
ALP	Alkaline phosphates
BW	Body weight
BCS	Body condition score