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## INTRODUCTION

With an increasing human population and declining food production per capita in most developing countries, sustainable production in arid and semi-arid zones should be improved. In dry environment, the camel has distinct biological advantages over the other species in terms of heat tolerance, water economy and sufficient nutrition from the scarce vegetation of its natural habitat.

There have been few investigations on nutrition and feeding of camel and assessment of its nutritional requirements remained very empirical and often extrapolated from cattle data.

To improve the overall productivity of the camel several research studies were developed to help in the establishment of the energy, proteins and minerals requirements of growing, pregnant, lactating and working camels. The present document is reporting research studies that were presented at the International Conference on Camel Nutrition organized by the Camel Applied Research and Development Network (CARDN) and the Institut Agronomique and Veterinaire Hassan II (IAV) in Rabat (Morocco), 7-8 December 2004.

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**Prof. Dr. Farouk Saleh Fares**  
**Director General**

# Maintenance Energy Requirements and Efficiency of Energy Utilization for Fattening Camels

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## ABSTRACT

Five female dromedary camels were used in the present study. They were fasted for four days to estimate the fasting heat production and then fed three different levels of feeding during three successive periods. The dromedaries received 1 kg of barley grains and 5 kg of wheat straw, in the first period (P1), twice and four times the amount consumed in P1 during the second (P2) and the third period (P3), respectively. Digestive trials were conducted and heat production of animals was estimated by indirect calorimetry during each period. All the feed offered was consumed except about 25% of the straw in P3. Energy digestibility of the ration averaged 61 % for the three periods and was slightly higher in the third period due to straw refusals. Fasting heat production averaged 52 kcal/kgW<sup>0.75</sup> and all the dromedaries showed an increase in heat production with respect to level of feeding. Retained energy was regressed against metabolizable energy (ME) intake and the energy requirements for maintenance (ME<sub>m</sub>, zero energy gain) was estimated to average 73 kcal/kgW<sup>0.75</sup>. However, different estimates of the efficiency of utilization of ME above (k<sub>f</sub>) and below (k<sub>m</sub>) maintenance were obtained, indicating that the dromedaries utilized ME below maintenance with an efficiency of 73%, comparable to sheep, and above ME<sub>m</sub> with an efficiency of 61%, better than sheep. When the data of FHP were considered in the regression, different values of k<sub>m</sub> were obtained suggesting that the linearity of response below ME<sub>m</sub> is not obvious and two different slopes at least could be obtained.

**Key Words:** Dromedary, Digestibility, Heat production, Maintenance, Efficiency.

## INTRODUCTION

The dromedary camel has a remarkable ability to exploit the scanty feed and water in its natural habitat. Long distances are covered in search of feed and water. In extreme cases of limited natural vegetation, the camel not only decreases its feed intake, but also reduces its metabolic rate (Dahlborn et al, 1992). In these circumstances, production is adjusted to energy intake which, in part, explains the supposed poor production of the camel. The worst effects are encountered when the high demanding physiological stages coincide with the dry season. To improve the overall camel productivity, it is necessary first to define the minimum nutritional requirements to keep the animal's body in stable energetic state. This basic data will help in the establishment of the energy requirements for growing, pregnant, lactating and working camel. There have been few investigations on feeding standards for camel and assesment of its nutritional requirements remains very empirical and often extrapolated from cattle data. The present study was designed to estimate the nutrient requirements of the the dromedary at maintenance when using the regression method. Coefficients for efficiency of utilization of ME for maintenance (k<sub>m</sub>) and fattening (k<sub>f</sub>) were also computed.

## MATERIALS AND METHODS

Five healthy, 8 to 10 year old female camels were used over four successive periods with different levels of feeding in each (Table 1). The diet consisted of 66% barley grains and 34% wheat straw and was fed at 0 (FHP), 0.5 (P1), 1 (P2) and 2 (P3) times maintenance energy requirements (ME<sub>m</sub>) recommended to sheep by INRA (1978), which is 95 kcal of ME intake per kgW<sup>0.75</sup>.