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Proximate composition of selected browses and common milk supplements for camel calves in Kenya

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Abstract
A study on nutritive values of selected browses fed to camel calves and commonly used local feed supplements to milk feeding was conducted in the southern rangelands of Marsabit County. Selected browses and common supplements were analyzed for their proximate composition. In addition, commonly used supplements were analyzed for their amino acid profiles, Ca, P and tannin levels. The samples were analyzed for their potential to formulate plant-based milk replacer or starter feeds for camel calves. The study used focused group discussions (FGDs) to identify available browses and commonly used supplements. Four focus group discussions (FGDs) comprising of 12 persons per study site: Karare, Kargi, Korr and Ngurunit wards were conducted in the main camel keeping areas among the Rendille camel keeping community. A total of 10 browses, 4 grass species and 6 commonly used supplements were analyzed. This study established that CP, DM, fat, NDF, ADF, and ME composition were highly variable, with significant (P<0.05) differences among the browses and grasses. Browses like *Grewia bicolor* (24% CP) *and Justicia exigua* (20% CP) have a potential to provide recommended daily protein requirements for a camel calves (20-24% CP) as starter feeds and plant-based milk replacer. Browses which have recommended energy above 15 MJ. Kg-1 DM to meet daily energy requirement of camel calves for starter feeds and plant-based milk replacer are *Justicia exigua* (19.3 MJ. Kg-1 DM), *Acacia melliffera* (18.1 MJ. Kg-1 DM) and *Salvadora persica* (18.4 MJ. Kg-1 DM). All the four grass species evaluated (*Aristida mutabilis* (16.3 MJ. Kg-1 DM), *Cenchrus ciliaris* (17.1 MJ. Kg-1 DM), *Leptothrium senegalense* (15.3 MJ. Kg-1 DM) and *Sporobolus species* (15. 9 MJ. Kg-1 DM) have recommended energy to meet daily requirement of a camel calves (15-20MJ.Kg-1 DM). The common supplements used by pastoral camel keepers like *Acacia tortilis* pods (15.42% CP), *Tinnospora caffra* (14.05% CP) and *Prosopis juliflora* (11.08% CP) as protein sources have lower than the recommended 20-24% CP. However, the energy sources used as common supplements like sheep fat (26.87 MJ. Kg-1 DM), camel fat (28.57 MJ. Kg-1 DM) and maize meal (26. 10 MJ. Kg-1 DM) have adequate energy to meet daily energy requirements as starter feeds and plant-based milk replacer. The commonly used forage supplements i.e., *Acacia tortilis* pods, *Prosopis juliflora* and *Tinnospora caffra* are low in limiting amino acids methionine, lysine and threonine for calf nutrition, thus recommended for supplementation. Tannins concentrations of commonly used supplements were within the safe range that would not be harmful to the animals. The *Acacia tortilis* pods (Ca 3.72% and P 0.91%) and Prosopis juliflora pods (Ca 1.44% and P 0.75%) used as common supplements have sufficient Ca and P to meet daily requirements of camel calves and thus can be recommended to supply the two important minerals for the growth of the calves'. However, *Prosopis juliflora* pods should be used in grounded form because it can easily colonize rangelands through fecal propagation. It is concluded that the selected browses, grasses and commonly used supplements for camel calves have an enormous potential as ingredients for formulation of camel calves plant-based milk replacer and starter feeds when harvested at the right time. Therefore, they could reduce nutritional related mortality, enhance the camel calves' performance and result in more camel milk available for sale and home consumption.