This study was conducted to assess effects of harvest date (i.e., 40 and 60d after planting) and N fertilization rate (i.e., 120, 180, 240 kg N/ha) on the nutritive value of amaranth forage (Amaranthus hypochondriacus) using a factorial experiment with a randomized complete block design. The content of dry matter (DM), crude protein (CP), true protein (TP), ether extract (EE), water soluble carbohydrates (WSC), ash-free neutral detergent fiber (NDFom), ash-free acid detergent fiber (ADFom), lignin(sa), ash, Ca, P, Na, K, oxalic acid and nitrate were determined. Soluble CP (SP) and protein fractions non-protein N (A), true protein rapidly degraded in the rumen (B1), true protein degraded in the rumen at a moderate rate (B2), true protein associated with the cell wall and slowly degraded in the rumen (B3) and acid detergent insoluble CP (C) were measured according to the Cornell Net Carbohydrate and Protein System. In vitro gas production (IVGP), OM disappearance (OMD) and NDFom disappearance (NDFD) were determined using a gas production technique. Results showed that the later harvest date increased (P<0.05) DM, EE, WSC, NDFom, ADFom, lignin(sa), B3 and C; while CP, TP, ash, Ca, P, K, SP, A, B1, B2, nitrate, total and soluble oxalic acid, IVGP, b (i.e., gas production from the insoluble fermentable fractions at 120 h), c (i.e., rate of gas production during incubation), OMD and NDFD decreased (P<0.05). With increasing N fertilization rate, CP, TP, EE, P, nitrate, oxalic acid, SP, A, b, OMD and NDFD increased (P<0.05), however B2 declined (P<0.05). Increasing N fertilization increased yield, CP concentration and nutrient digestibility. At 40 d after planting use of amaranth forage as a ruminant feed is limited due to its high nitrate content. However, at 60 d, although a depression in digestibility and CP content occurred, this forage has the potential as a ruminant feed due to the much lower nitrate levels [D. Abbasi, Y. Rouzbehani*J. Rezaei (Animal Science Department, Faculty of Agriculture, Tarbiat Modares University, Tehran, P.O. Box 14115-336, Iran), Animal Feed Science and Technology, 2012, 171(1), 6-13]

Effects of ensiling and adding molasses or fresh cheese whey on the conservation and rumen degradability of temperate pasture silages were evaluated. Forage from three paddocks of mixed grass and legume pastures was used to make 45 silages (15 silages per paddock) with 5 treatments, including silage without additives (control), silage with 15g/kg dehydrated molasses and silage with 20, 50 and 100g/kg fresh cheese whey. The chemical composition and fermentation quality (i.e., pH, ammonia N, loss of dry matter (DM) and neutral detergent fibre (NDF), effluent production) of the silages were determined. Fresh and ensiled materials were evaluated for in situ rumen degradability. Ensiling reduced DM and NDF rumen degradability (P<0.01). When additives were employed, the reduction of DM degradability of the silages decreased (P≤0.03). Addition of molasses led to the lowest pH (P<0.01) and DM losses (P<0.01), and highest DM degradability (P<0.01). The conservation and DM degradation results of dried molasses silage were superior to those of fresh whey silages. In general, an increase in the level of whey increased DM degradability (P≤0.03), but linearly increased effluent production (P<0.01) and losses (P<0.01) [Cecilia Cajarville*, Alejandro Britos, Daniel Garciaarena and José Luis Repetto (Departamento de Nutrición Animal, Facultad de Veterinaria, Universidad de la República Oriental del Uruguay, Lasplaces
A broiler experiment was conducted to examine the effects of sorghum particle size and milling type on the performance, nitrogen corrected apparent metabolisable energy (AMEn), digestive tract development, digesta pH, duodenal digesta particle size and digesta passage rate. Complete pelleted diets with identical botanical and chemical composition containing 750 g/kg whole sorghum (WS), sorghum ground through hammer mill with 1mm and 3mm screen (HM1 and HM3) and sorghum ground on a roller mill with 0.15 mm spacing (RM0.15), were made. Sorghum for diets HM3 and RM0.15 were milled to approximately the same mean particle size. Diet WS resulted in poorer (P<0.05) weight gain and feed conversion ratio (FCR) than the other diets from 11 to 21 days of age, while diet RM0.15 resulted in improved FCR. Apparent MEn determined between 25 and 28 days of age, however, was higher (P<0.05) for diet WS than for the other diets. This was possibly due to a longer adaptation time to a larger feed particle size, as indicated by a lower (P<0.05) pH in the gizzard and smaller duodenal digesta particle size for this diet. Diet HM1 gave similar performance as diet HM3, but resulted in a significantly smaller gizzard, a higher pH of the gizzard content, a lower pH of the duodenal content and larger particles in the duodenal contents, thus indicating that gizzard development and activity were compromised by this diet. Total tract passage rate of the liquid phase marker was slower (P<0.05) in the WS fed birds, but there were no differences in solid phase marker excretion rates [N.J. Rodgers, M. Choct, H. Hetland, F. Sundby and B. Søivhus* (Department of Animal and Aquacultural Sciences, Norwegian University of Life Sciences, P.O. Box 5003, N-1432 Ås, Norway), Animal Feed Science and Technology, 2012, 171(1), 60-67].

NPARR 3(2), 2012-0140, Extent and method of grinding of sorghum prior to inclusion in complete pelleted broiler chicken diets affects broiler gut development and performance

Objective of this study was to investigate the effect of feeding protected fat and proteins on milk production, composition and nutrient utilization in Murrah buffaloes (Bubalus bubalis). Eighteen buffaloes were divided into two groups (9 each) on the basis of most probable production ability. Buffaloes in control group (C group; most probable production ability 2204 kg) were fed chaffed wheat straw, chopped maize fodder and concentrate mixture as per requirements. Buffaloes in supplemented group (S group; most probable production ability 2211 kg) were fed same ration as C group plus 2.5% rumen protected fat (on dry matter intake basis) and formaldehyde treated mustard and groundnut oil cake (1.2g formaldehyde/100 g crude protein) in place of unprotected cakes. Group S buffaloes were supplemented rumen protected fat and protein 60 days pre-partum to 90 days postpartum and persistence of milk production was monitored up to 210 days of lactation. Milk yield during supplementation period (90 days) in S group was 13.11 kg/d and was 19% higher (P<0.01) than the C group (11.01 kg/d), whereas after supplement withdrawal (120 days), it was 11.04 kg/d and was 15% higher (P<0.01) than the C group (9.61 kg/d). There was no effect on total solid, protein, solid-not-fat (SNF) and lactose contents in the two groups, whereas milk fat yield was increased (P<0.05) and level of milk urea nitrogen was decreased (P<0.01) in S group. Moreover, the supplement produced noticeable changes in the fatty acid profile of the milk fat, i.e., reduction in the concentration of saturated fatty acids (SFA) by 19% and an increase in that of unsaturated fatty acids (USFA) by 36%. Besides, digestibility of dry matter, crude protein, acid detergent fiber and neutral detergent fiber
were not affected, whereas ether extract digestibility was higher (P<0.05) in S group. There was no effect on plasma glucose, non-esterified fatty acids, triglycerides and cholesterol concentrations between two groups, whereas blood urea nitrogen concentration was lower (P<0.01) in S group. Supplementation of protected nutrients to buffaloes increased milk production and unsaturated fatty acids content in milk fat and persistence of lactation after supplements were withdrawn [S.K. Shelke*, S.S. Thakur and S.A. Amrutkar (Dairy Cattle Nutrition Division, National Dairy Research Institute, Karnal 132001, India), Animal Feed Science and Technology, 2012, 171(2-4), 98-107].

NPARR 3(2), 2012-0142, Hemp seed cake in organic broiler diets

The aim of this study was to examine production and health of fast-growing broilers fed diets with and without hemp seed cake (HSC) in organic broiler production. Two diets, a control diet (C) and a diet including HSC (H), were fed to 1200 Ross 308 chickens which were divided over 8 pens. Birds were housed indoors until 21 d, and thereafter kept in the same groups in two chicken houses with access to outdoor pasture up to slaughter at 70 d. Production performance was registered weekly. The number of Clostridium perfringens (C. perfringens) in caeca, as well as leg and foot health and carcass quality was registered during the study period or at slaughter. Total mortality was high regardless of diet due to a short heat wave extreme for Swedish conditions which predominantly affected the heavy male broilers. The inclusion of HSC did not affect total production performance or mortality. Furthermore, no effect of HSC inclusion in the feed was seen on the number of C. perfringens in the caeca. There were differences in litter condition and foot health of birds, which may have been related to the high crude fibre (CF) content of the H diet [M. Eriksson* and H. Wall (Department of Animal Nutrition and Management, Swedish University of Agricultural Science, Uppsala, Sweden), Animal Feed Science and Technology, 2012, 171(2-4), 205-213].

NPARR 3(2), 2012-0143, The effect of feeding expeller-pressed canola meal on growth performance and diet nutrient digestibility in weaned pigs

The effects of feeding increasing levels of expeller-pressed (EP) canola meal in substitution for soybean meal as an energy and amino acid source were evaluated in 240 weaned pigs with an initial body weight of 7.3±0.6kg. Five pelleted wheat-based diets containing 0, 50, 100, 150 or 200g EP canola meal/kg were formulated to contain 10.0MJ net energy (NE)/kg and 1.18 g standardised ileal digestible (SID) lysine/MJ NE and were fed for 4wk starting 1wk after weaning at 19 days of age. Expeller-pressed canola meal was added at the expense of soybean meal and the diets were balanced for NE using canola oil and for amino acids using crystalline lysine, methionine, threonine and tryptophan. Increasing inclusion of EP canola meal linearly reduced (P<0.001) the apparent total tract digestibility of energy, dry matter and crude protein and the digestible energy content of diets. From 0 to 28 days on trial, increasing inclusion of EP canola meal did not affect body weight gain, feed intake and feed efficiency. In conclusion, up to 200g EP canola meal/kg can replace soybean meal in diets formulated to equal NE and SID amino acid content and fed to nursery pigs starting 1wk after weaning without reducing growth performance [J.L. Lander, E. Beltranena, M. Cervantes, A.B. Araiza and R.T. Zijlstra*(Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta T6G 2P5, Canada), Animal Feed Science and Technology, 2012, 171(2-4), 240-245].