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The effect of forage to grain ratio on *in vitro* methane production from wheat vs corn

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In ruminant diets, the inclusion of greater proportions of grain have been reported to reduce methane, but not all grains are equally effective and there are indications that the proportion of grain in the diet may have a non-linear effect on methane production. The aim of the study reported here was to study the *in vitro* methane mitigating effect of different proportions of wheat and corn in the substrate. It was hypothesized that a greater proportion of wheat or corn in the incubation substrate fermented *in vitro* will reduce methane production (MPR) in the fermentation gas. This *in vitro* study included ten treatments, five rates of corn (0, 250, 500, 750 and 1000 mg/g DM) and five rates of wheat (0, 250, 500, 750 and 1000 mg/g DM). The *in vitro* incubation was conducted using the Ankom GP system over 24 hours. Alfalfa hay was used as base forage and was substituted with increasing rates of grain. Treatments that contained wheat were incubated in ruminal fluid from donor cows fed wheat and treatments that contained corn were incubated in ruminal fluid from donor cows fed corn. Ruminal fluid was collected from six cows, three fed wheat and three fed corn. The experiment was repeated in two *in vitro* runs. Each run involved 4 replicates of each grain at each rate. Data were analysed by Anova with a 2×2, factorial treatment structure of grain type by proportion of grain, with polynomial contrasts for that proportion of grain embedded in the ANOVA, and blocking structure of run (1-2) and fermentation bottle (1-4) within run. Greater proportions of wheat had a negative linear effect ($P<0.001$) on MPR, but there was no effect ($P=0.15$) of greater proportions of corn on MPR. Methane production was less ($P<0.001$) in treatments that used wheat as substrate than in treatments that used corn as substrate. It is concluded that a greater proportion of wheat, but not corn, in the substrate, reduces *in vitro* MPR.

Grazing systems production with forestry on Brazilian beef cattle productivity

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Sustainable options of intensification and integration of beef cattle production systems increase the productivity, diversifies financial income and reduce the pressure on forests in Brazil. To assess the productivity of different grazing system production scenario, a total of 30 Canchim steers (284.8±6.00 kg of LBW; 15 months old) were allotted to five grazing systems with two replicates each (blocks) during one year: (1) Extensive (EXT) – continuous grazing system; (2) Integrated Crop-livestock System (CL) – rotational grazing system with crop rotation in each paddock in four year cycles (three years with pasture and one year with corn); (3) Integrated Crop-livestock-forestry System (CLF) – the same as CL with eucalyptus trees (15×2 m spacing); (4) Intensive (INT) – dryland rotational grazing system; (5) Integrated Silvopastoral System (SP) – rotational grazing with eucalyptus trees (15×2 m spacing). With exception of the extensive system, all systems were limed, fertilized and manage in a rotational grazing system. Data were analysed as completely randomized block design using PROC MIXED. Animals were slaughtered with a minimum of 450 kg LW. The INT and IPF systems presented greater stocking rate ($P=0.001$) (INT=2.3, SP=2.4 AU/ha) than those grazed the EXT and CL areas (EXT=1.2, CL=1.5 AU/ha). The CLF area presented similar stocking rate (1.9 AU/ha) to other systems. The INT system presented greater productivity in kg/ha/year on live BW ($P=0.045$) (INT =515.9, IPF=446.7, CL=439.4, CLF=393.5, EXT=245.4), carcass ($P=0.038$) (INT =280.7, CL=236.9, IPF=230.7 CLF=203.4, EXT=129.8) and carcass edible portion ($P=0.045$) (INT =199.3, IPF=159.3, CL=170.0, CLF=142.1, EXT=92.9) than EXT area, with no difference for other systems (CL, CLF and SP).The forestry inclusion in integrated systems as SP and CLF provided intermediate productivity in kg/ha/year as conventional system (INT and EXT). It is possible to reach high levels of productivity as well as environmental, social and economic sustainability with Agroecosystems.