Anaerobic digestion of slaughterhouse by-products

Anaerobic digestion of animal by-products was investigated in batch and semi-continuously fed, reactor experiments at 55 degrees C and for some experiments also at 37 degrees C. Separate or mixed by-products from pigs were tested. The methane potential measured by batch assays for meat- and bone flour, fat, blood, hair, meat, ribs, raw waste were: 225, 497, 487, 561, 582, 575, 359, 619 dm(3) kg(-1) respectively, corresponding to 50-100% of the calculated theoretical methane potential. Dilution of the by-products had a positive effect on the specific methane yield with the highest dilutions giving the best results. High concentrations of long-chain fatty acids and ammonia in the by-products were found to inhibit the biogas process at concentrations higher than 5 g lipids dm(-3) and 7 gN dm(-3) respectively. Pretreatment (pasteurization: 70 degrees C, sterilization: 133 degrees C, and alkali hydrolysis (NaOH) had no effect on achieved methane yields. Mesophilic digestion was more stable than thermophilic digestion, and higher methane yield was noticed at high waste concentrations. The lower yield at thermophilic temperature and high waste concentration was due to ammonia inhibition. Co-digestion of 5% pork by-products mixed with pig manure at 37 degrees C showed 40% higher methane production compared to digestion of manure alone.