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Expired hydrogen level is measured in humans to assess glucidic macromolecule quantity non digested in the small bowel, and fermented in the colon. This method was used to evaluate whether the dog is capable of fermenting lactulose, and what is the origin of the hydrogen production. Six dogs (beagle, 11.3 ± 1.5 kg) were fed meat (300 g) and extruded rice (150 g) for 3 weeks; during the second week (from day 8 to day 14) 10 g of lactulose was added to the meal. Expired air from the dogs was collected at regular times for 10 h after the meal, at day 7, 8, 14 and day 21. The expired hydrogen level was assessed by gas chromatrography. Five hours after the meal, the hydrogen level increased significantly. The maximum was attained 7 h after the meal, except at day 21 (9 h). The hydrogen peak fell after giving lactulose for one week (day 14: 8 ± 3 ppm), compared to day 7, 8 and 21 (23 ± 6, 21 ± 2, et 27 ± 14 ppm, $P < 0.05$). The dog weight did not change, and dogs did not expire any methane. We concluded that intestinal degradation of extruded rice and meat came with an hydrogen production, and that lactulose adaptation induced a behavior change within the colic bacteria flora, yielding less hydrogen.

Effect of seaweed on mineral bioavailability. A Pointillart, C Colin, H Lacroix, L Guéguen *(LNSA-Inra, 78352 Jouy-en-Josas cedex, France).*

Seaweed and seaweed by-products contain alginates and carragheenans which are potent cation chelators. In a 2-month nutritional study on pigs, the effect of seaweed ingestion on mineral bioavailability was investigated.

Three groups of 8-week Large White pigs were fed a diet containing 10% Ascophyllum powder (A1), or 10% of the same powder after partial demineralisation (A2), or a control diet without seaweed. Dietary calcium content was reduced to 70% of the recommended level for the pigs to exacerbate potential seaweed effects on mineral bioavailability. Mineral (Ca, P, Na, Mg) absorption and retention were evaluated by a balance trial. At slaughter, plasma was collected to monitor various markers of bone formation: carboxyterminal propeptide of type I procollagen (PICP), osteocalcin and alkaline phosphatase activity (ALP). Collagen crosslinks (deoxypyridinoline, DPYR) and hydroxyproline (OHPr) two markers of bone resorption, have been determined in urine. At slaughter various bones were collected to measure bending moments (reflecting breaking strength) and mineral contents.

Seaweed had no effect on growth performance or on bone bending moments (BM) and mineral content (BMC). Absorption and retention of the three cations, and plasma ALP decreased in the pigs fed A2 diet only. Plasma PICP (marker of collagen synthesis) decreased and the urinary excretion of DPYR and OHPr (markers of collagen degradation) increased in the pigs fed A1 diet. Thus, direct measurements of bone mineralisation (BM, BMC) indicated no deleterious effect of seaweed, but the plasma and urine bone markers suggested altered bone collagen metabolism in one group (A1), while the balance data indicated a decreased mineral availability in another group (A2). Since both of these groups were fed diets containing seaweed, these results are not coherent. These discrepancies could be due to a time lapse between the plasma or balance changes and their occurrence at bone level. Possibly these plasma and balance changes, which usually indicate bone disturbance, were too weak or of too short a duration to register an alteration in the bone mineral content. In further investigations the mineral absorption in healthy volunteers receiving various seaweed preparations will be checked.