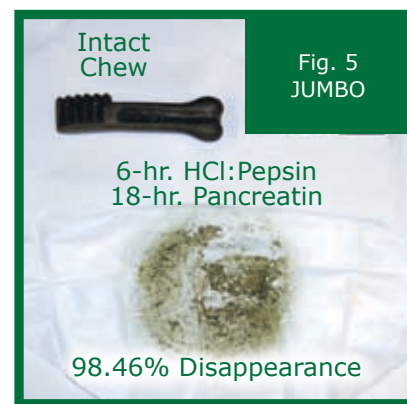
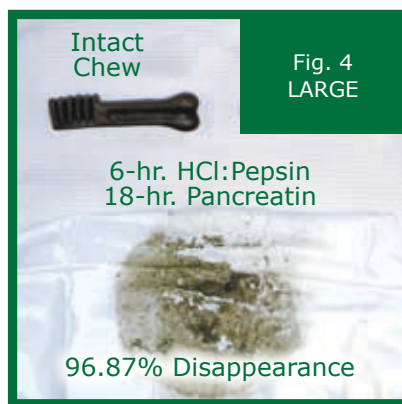
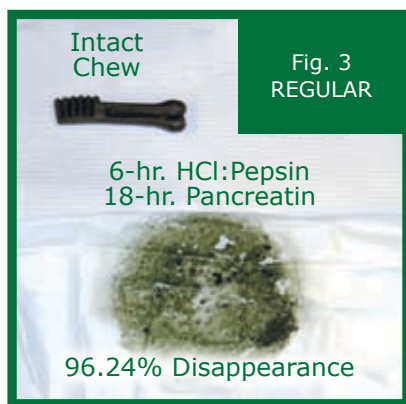
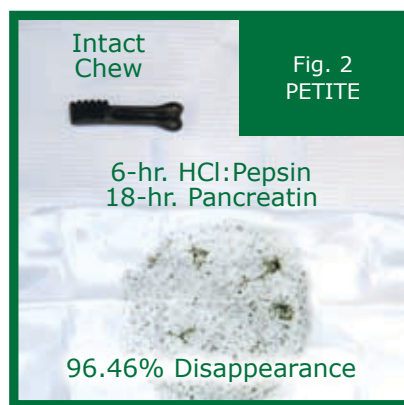
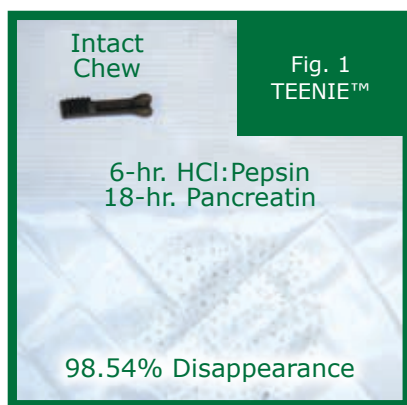


# Independent Study Confirms High Solubility Of Greenies® Canine Dental Chews

An independent study conducted earlier this year by the University of Illinois confirms that the new formulation of Greenies® canine dental chews is highly soluble. Solubility in this case is defined as the susceptibility or extent of a solid dissolving or breaking down in a liquid.

The study employed an *in vitro* system based upon established, respected models developed by Boisen and Eggum (1991)<sup>1</sup> and Boisen (1991)<sup>2</sup> that involves two steps simulating gastric and small intestinal digestion.

The study steps include exposing intact samples of each of the five sizes of Greenies® dental chews to enzyme solutions at a fixed pH and temperature during a fixed period of time. For gastric digestion, Greenies® dental chews were exposed to hydrochloric acid and pepsin at a pH of 2.0 for six hours. After gastric digestion, the samples were then exposed to pancreatic enzymes at a pH of 6.8 for 18 hours, simulating small intestinal digestion (Figs. 1–5).



Outcomes of both the gastric and small intestinal digestion are determined by the percent disappearance of solid matter, among other measures. In the Greenies® dental chew study, outcomes measured also included the percent dissolvability and decrease in dimensions of the intact dental chews.

All sizes of the new formulation Greenies® dental chews, tested as intact chews, broke down and lost structural integrity. Proper and complete chewing of Greenies® dental chews—as will happen in a majority of dogs—and mechanical action *in vivo* should further enhance their solubility by increasing the surface area exposed to digestive fluids. Any residue remaining after digestion will be soft with no intact, hard pieces. In addition, the test indicates that the probability of a digestive issue is minimal should a dog swallow a large piece or a whole, intact Greenies® dental chew.

<sup>1</sup> Boisen, S., and B. O. Eggum, 1991. Critical evaluation of *in vitro* methods for estimation of digestibility in simple-stomach animals. *Nutr. Res. Rev.* 4:141–162.

<sup>2</sup> Boisen, S. 1991. A model for feed evaluation based on *in vitro* digestible dry matter and protein. In: *Digestion In Vitro*. M.F., Fuller, editor. pp. 135–145. Commonwealth Agricultural Bureaux International, Slough, UK.