Comparison of Two Hydration Gel Products for Use in Shipping of Guinea Pigs

Y. Luo, G.B. Mulder, and R.R. Morin
Charles River, Wilmington, MA 01887, USA

Introduction
 Provision of feed and water to research animals in transit is both a regulatory requirement and a welfare requirement (1). Historically, shippers have used potatoes and other vegetables, as well as water-soaked feed to provide moisture for rodents during transit. The first description of a canned sterile shipping diet appeared in 1967 (2). Since that time, many commercial sterile water replacement products have emerged. Among them, flavored or unflavored gel products have gained in popularity in the laboratory animal industry due to their long shelf life and ease of use. Guinea pigs are generally considered to adapt poorly to changes in food presentation and to novel food items, unless exposed to such items at a young age. The goal of this study was to investigate preference of guinea pigs for two different water replacement gels that differed primarily on based on sweetener content. The preference and consumption of two commercially available gel products, one with and one without the sweetener high fructose corn syrup (HFCS), were compared in guinea pigs. In addition, the study further evaluated the effect of the sweetener ingredient on palatability to this species.

Material and Methods

Animals
 Fifty-two male Hartley guinea pigs (Crl:HA) weighing 330 – 400 grams were used. They were produced and raised in a barrier production room that was maintained at 21 ± 1°C with a relative humidity of 60 ± 5% and a 12/12 hour light/dark cycle. Animals accessed standard guinea pig diet and water ad libitum.

Experimental Design
 Within the production room, thirty-six animals were randomly selected from the stock colony and assigned into two groups with 18 animals in each group. A third group of 10/12/2 hours that served as control was sent directly from the production area to a procedure room for terminal bleeding. The animals in groups one and two were individually identified. Each group was packed according to standard shipping practice, which includes a supply of hard diet and water replacement gel, with 6 animals per crate. Group one was provided with unsweetened gel (Hydrogel™, ClearH2O®, Portland, ME). Group two was packed with HFCS-sweetened gel (Transgel™, Charles River, Wilmington, MA). Both groups were then shipped via truck to a remote facility overnight and held in the crate at the facility for a total of three days to mimic a trans-continental shipment before evaluation. During clinical evaluation, the body weights of the animals were recorded. Consumption of both gel products was recorded by weighing the remaining gel products. At the end of the evaluation, animals were euthanized with CO2. Blood samples were collected and submitted to a pathology lab for clinical chemistry and CBC analysis. Follow-up flavor preference testing was performed by providing 6 singly housed male guinea pigs with both water and HFCS-flavored water and the consumption of both fluids was monitored daily for 5 days.

Statistical Analysis
 The body weight changes, consumptions of gel products, and water/flavored water were assessed using two-tailed t-test. The changes of CBC and blood chemistry parameters were analyzed using one-way ANOVA and two-tailed t-test. Differences were considered to be significant when P was less than 0.05.

Results

In this study, the serum chloride value (113.8 ± 2.70mEq/dl) from animals in the unsweetened gel group was similar to the value (113.1 ± 3.14mEq/dl) of the control group (Figure 5). However, the value (120.6 ± 4.41mEq/dl) from animals in the sweetened gel group was significantly higher (P<0.05). The total protein value for the animals in the control group was 53.1 ± 0.54, and the values for the animals in the unsweetened gel group and sweetened gel group were 62.2 ± 0.59 and 69.6 ± 1.11, respectively (Figure 6). The difference among the groups was statistically significant (P<0.05).

The control serum albumin value (3.54 ± 0.37g/dl) was less than both treatment groups at 3.99 ± 0.19 g/dl and 4.25 ± 0.47g/dl for the animals in the unsweetened gel group and sweetened gel group, respectively (Figure 7). The difference among groups was statistically significant (P<0.05). The result of the water preference follow-up study suggested that animals consumed approximately 20% more unflavored water than water sweetened with HFCS, although the difference was not statistically significant (Figure 8).

Discussion

The results of this study indicated that Crl:HA guinea pigs provided with an unsweetened hydration gel consumed greater amounts of gel, showed reduced body weight loss, and decreased preference, or aversion, for HFCS.

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References