Executive Summary: Study 275.31

In 2010, CVM completed a study to measure the concentrations and speciation of arsenic (As) residues (re: inorganic As^{+3} or As^{+5}, or organic metabolites) in tissues obtained from chickens treated with the organic arsenical, 3-Nitro 20®. Zoetis (formerly Pfizer Animal Health) noted two main concerns with the study: (1) feed homogeneity and stability testing had not been conducted, and (2) testing of incurred residues in frozen tissue to determine potential variances in speciation over time had not been performed. The objective of this pilot study was to generate incurred liver tissue for OR to use in conducting stability analyses of certain arsenic species over time, which was not done previously. A separate study addressed testing for feed homogeneity and stability.

Twenty-three 1 day old, straight run, Cornish Giant broiler/roasters were obtained from Moyers Chicks, Inc. Gender was visually determined after comb and wattle development. Six males and twelve females were used in this study; two birds were euthanized then necropsied for health check of the shipment. The extra three birds were euthanized, used for wing banding familiarization and then necropsied.

The one day old chicks were weighed, wing banded with the same number in each wing, and randomized without regard to gender, into one of two treatment groups: (1) control group (6 birds) or (2) roxarsone-treated group (12 birds). The birds were housed individually on one side of a brooder. Two units were used for the treatment group and one for the control group. At the start of the third week of treatment, the birds were moved into finishing units by group until day 42.

All of the chicks were fed control feed during a 5-day acclimation period. The base diet for all birds was unmedicated, control feed from Southern States, Inc., SKU#52351011 All Grain Meat Bird Maker, lot G3198. Feed containing 3-Nitro 20® (active ingredient; roxarsone) was prepared in the Office of Research feed mill. The 3-Nitro 20® was mixed into the control feed according to label directions so as to provide exposure to the maximum approved level of roxarsone, 50 ppm or 0.005%. The chicks were given feed ad libitium, with the troughs topped-off daily. All birds were fed their assigned feed for 42 treatment days. Feed and water was available ad libitum and refilled or topped off daily. Verification of the concentration of roxarsone and homogeneity in the mixing of the feed for this pilot study was completed prior to being used.

The room where the birds were housed had reduced lighting and a light: dark cycle of 20 hr of light and 4 hr of darkness. During the acclimation period, room temperature was set to 85°F and the temperature in the brooders was set to 90-95°F. The temperature of both the room and the brooders were gradually decreased as the birds got older and could thermoregulate better. Temperature adjustments were based on a pre-arranged schedule with additional consideration on behavior exhibited by the birds. The room temperatures were monitored and the results recorded.

On treatment day 42, all birds were euthanized by CO_2 asphyxiation followed by cervical dislocation and then weighed. The livers were collected without the gall bladder, weighed, put in Whirl Pak® bags, then stored at -80°C until analyzed under a separate protocol.

Microbiological testing of the water did not show any abnormal coliform counts. There were no differences in the body weight of the birds at the end of the study. The birds fed the roxarsone-mediated feed had a higher mean liver weight.