

Technical *Bulletin* #33

Concerns with Viruses in DPS, a Digested Porcine Protein

Brad J. Thacker, DVM, PhD¹ and Gerry Keller, BS²

¹ Iowa State University and ²-Nutra-Flo Company

Introduction

The issue of potential virus contamination is a concern to swine producers when feeding DPS (a porcine protein) to pigs. We have reviewed the relevant published research on this issue from a variety of sources. In addition, we conducted a study to evaluate whether TGE virus and PRRS virus survives the process used to produce DPS. The results of our review and experimental study are presented in this paper.

This bulletin summarized the complete report, if you want further details please ask for the complete report. We reviewed research work on viruses from Iowa State University, University of Georgia, and some reference journals. We also examined different virus types and their susceptibility to the DPS production process.

Research conducted by Iowa State University and Nutra-Flo Company

An experiment was conducted to determine the survivability of PRRS virus and TGE virus under the conditions of the DPS production process. The inactivation procedure was conducted by Dr. Thacker at Nutra-Flo and ISU facilities. PCR assays performed by Dr. Karen Harmon at the Iowa State University Veterinary Diagnostic Laboratory were used to detect the viruses. A preliminary study was conducted to determine the relative sensitivity of the PCR assays. For the final experiment, TGEV and PRRSV were added to the raw material used to produce DPS at levels that were 100 times greater than the detection limit determined by the preliminary study. The raw material was subjected to the proteolytic enzymes (under alkaline conditions) and hydrolysis at temperatures that ranged from 65 to 75 C for a period of 5.5 hours. The concentration and drying steps were not included in the experimental process. Four virus positive and two negative control vessels were tested and multiple aliquots of the material were obtained from different areas of each vessel. The temperature of each vessel was monitored every 15 minutes throughout the experiment. The samples were frozen at -70 C until testing. Two aliquots per vessel were tested in duplicate. All PCR tests were negative for PRRS virus and TGE virus.

Summary

Some viruses are susceptible to heat inactivation while other viruses are susceptible to enzymatic degradation. The DPS process includes both elevated temperatures and enzymatic digestion. The source raw material for DPS is unlikely to contain most viruses. The meat and bone meal studies conducted at Iowa State University were the most extensive studies that we reviewed. These experiments found that there is little or no possibility that PRV can survive the process used to manufacture meat and bone meal. The DPS production process is more extensive than the meat and bone meal process. We conclude that the DPS process will inactivate PRV. The study conducted at the University of Georgia showed that spray drying destroyed PRRS virus. This data, along with our study conducted in conjunction with Iowa State University, indicates that the more extensive DPS process will destroy the PRRS virus. Our study also showed that the DPS process destroys TGE virus.

In conclusion, since DPS is a digested protein, it has the double biosecurity benefit of high processing temperatures and proteolytic enzyme treatment. It is highly unlikely that any viruses can survive the DPS production. DPS is a safe product.

Literature and information sources:

Information used to prepare this report was obtained primarily from the 8th edition of Diseases of Swine, edited by Straw, D'Allaire, Mengeling and Taylor. Chapters related to the particular virus were reviewed. The chicken anemia virus paper by Urlings was published in Veterinary Quarterly (1993). Project reports prepared by Pirtle and Lukert were reviewed and summarized. Finally, personal communications with several university researchers and industry personnel were incorporated into this report.

The Power of Peptides™