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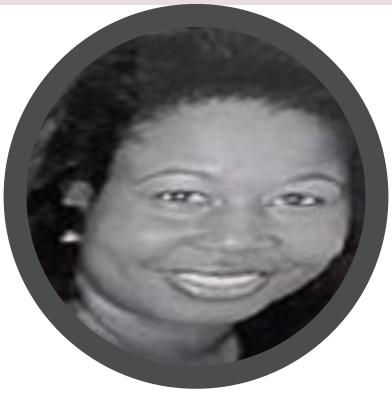
OPTIMIZING THE NUTRITION OF FOOD AND FEEDSTUFF WITH HIGH-OLEIC PEANUTS AND PEANUT-BY PRODUCTS



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Peanuts, Arachis hypogaea, are one of the most widely consumed legume globally due to its nutrition, taste and affordability. Peanuts are protein and energy-rich and have been utilized worldwide to address the nutritional needs of people and production animals in developing countries. In the United States, 85% of the American peanut production is utilized for domestic edible products, such as peanut butter, candy, confections, and snacks. Thus, our goal in MQH-ARS-USDA has been to evaluate the chemical constituents of peanuts and to investigate the usefulness of peanuts and/or peanut products as a feed and/or food ingredient. We aimed to identify the usefulness of new high-oleic peanut cultivars as a preferable feed ingredient for poultry. Previous studies have identified normal-oleic peanuts as a suitable and economical poultry feed ingredient. However, no studies to date have examined the use of high-oleic (HO) peanut cultivars as a feed ingredient for poultry and determined the impact of feeding.

HO peanuts on poultry performance or nutritive qualities of the eggs produced. To meet these objectives layer hens were fed a conventional diet (soybean meal + corn) or a HO peanut + corn diet for 10 weeks. Body and feed weights were collected weekly. Pooled egg samples were analyzed for quality and lipid analysis. There were no significant differences between treatment groups in hen performance or egg quality. Eggs produced from layer hens fed the HO peanut diet had significantly ($p<0.05$) greater yolk color scores (2-fold), HO fatty acid and β-carotene levels in comparison to the controls. Eggs produced from hens fed the control diet had significantly greater content of saturated fatty acids and trans fat in comparison to eggs produced from layer hens fed the HO peanut diet. This study identifies HO peanuts as an abundant commodity that could be used to support local agricultural markets of peanuts and poultry and be of economic advantage to producers while providing a potential health benefit to the consumer with improved egg nutrition.

Secondly, we aimed to determine the usefulness of peanut skins, a significant waste product produced within the peanut industry, as a functional food ingredient. Numerous studies have demonstrated the health promoting benefits of phenolic compounds found in antioxidant rich plant foods such as, green tea, blueberries, broccoli, beets, seaweed, spinach and grape seeds shown to lower serum and liver low-density lipoproteins, prevent free radical DNA damage and to reduce histamine release and inflammation. To meet our objectives mice were fed a control mouse chow diet (A), an atherogenic diet (B) or an atherogenic diet supplemented with peanut skin phenolic extract (C) for 20 weeks. Bodyweights and blood samples were collected weekly and at termination, liver samples were collected for analysis. Mice fed the peanut skin phenolic extract supplemented atherogenic diet (C) had reduced hepatic inflammation and blood glucose levels in comparison to treatment B, suggesting that phenolic extracts from peanut skins like ther naturally occurring plant compounds may have health benefits when consumed in the diet.

Biography

Dr. Toomer is employed with the USDA-ARS as a Research Chemist in the Market Quality and Handling Research Unit and as an Adjunct Professor in the Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh NC. She graduated from North Carolina State University with a Ph.D. in Nutrition with a minor in Biotechnology in 2005. In July 2005, Toomer began a postdoctoral fellowship in the Mucosal Immunology Laboratory of Pediatric Gastroenterology at Massachusetts General Hospital/Harvard Medical School under the supervision of Dr. Allan Walker and Dr. Hai Ning Shi. Toomer completed a second postdoctoral training program at the United States Department Agriculture (USDA)/Agricultural Research Service (ARS) in Beltsville MD with a research emphasis in differential gene expression in the reproductive tissues of turkey hens. Subsequently, Dr. Toomer was employed for over 7 years with the United States Food and Drug Administration-Center for Food Safety and Applied Nutrition as a Research Biologist with a research emphasis in the development and prevention of Pediatric Food Allergy and the identifying immunological biomarkers of food allergy using in vitro and in vivo models, and studying the effects of commensal microorganisms and/or probiotics on early (pre-weaning) immunological development.

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