

HUMAN NUTRITION

Title: Menaquinone content of pork - **NPB #14-100**

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Scientific Abstract:

Vitamin K food values in current food composition tables are generally limited to phyloquinone (vitamin K₁), which is plant-based. As such, fresh meat cuts and processed meat products are not considered significant contributors to dietary vitamin K intakes. The purpose of this study was to measure phyloquinone (PK; vitamin K₁) and 10 forms of menaquinones (MK; vitamin K₂) in fresh-cut and processed pork products. Fresh-cut pork products (chops, chops with bone, back ribs with bone, shoulder blade with bone, tenderloin and St. Louis style cut ribs; n=5 per cut) and bacon (n=4) were purchased from retail outlets in the New England region. In addition, nationally representative samples of processed pork products (n=28) were obtained as part of the National Food and Nutrition Analysis Program (NFNAP). All samples were analyzed by HPLC (PK and MK4), followed by APCI-LC/MS (MK5-MK13). PK was below the limit of detection (0.2 µg PK/100 g) in all fresh pork cuts and in the range of below the limit of detection to 2.1±0.5 µg PK/100 g in processed pork products. In contrast, all fresh pork cuts and processed pork products contained MK4, MK10 and MK11 (range: 68.7±18.1-164.8±0.5 µg MK/100 g for fresh pork cuts; 35.1±11.0-534±89.0 µg MK/100g for processed pork products). Pork sausage contained the highest concentrations of MK10 (274-615 µg/100 g). The total vitamin K (PK + MK) content of processed pork products were strongly associated with fat content (r=0.935). Moreover, PK + MK contents were stable during cooking as demonstrated through comparing uncooked and cooked products. In summary, pork and processed pork products are an unexpected rich dietary source of MK forms that are currently unaccounted for in the assessment of dietary vitamin K. Very little is known about the biological activity of dietary menaquinones but given their abundance in pork products, more research is required to determine their contribution to the role of vitamin K in human health.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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