

Enrichment of pork products with DHA omega-3 lipids

W. Jon Meadus, Bethany Uttaro, Jennifer L. Aalhus,
Pascale Duff and Lorna Gibson

Agriculture & Agri-Food Canada, Lacombe Research Center, Lacombe, AB T4L 1W1;
Email: meadusj@agr.gc.ca

Health Canada recommends that adults receive at least 200mg of docosahexaenoic acid (DHA) a day to promote proper brain development and immune health. However, North Americans typically consume only 80mg a day. DHA is a long chain (C22:3) omega-3 fatty acid normally found in fish. Pigs and humans can convert shorter dietary omega-3 fats (18:3) from plants, such as flax, to DHA but only at a rate < 10%. Standard corn or grain fed pork typically contains < 20mg DHA per 100 g serving but this can be increased to ~70mg if the pigs are fed 15% crushed flax. The present trial was conducted to determine if pork DHA content could be raised even higher, if DHA was fed directly. Barrows at 80kg were fed standard diets supplemented with a dried microalgae biomass containing ~18% DHA, at 0, 0.06%, 0.6% or 1.6% for 25d prior to slaughter. Animal performance and meat quality parameters were not negatively affected, even at the 1.6% DHA (~2880 mg DHA/d) dose. An examination of the animal's health and liver metabolism showed a reduction in inflammation (COX-2) and internal DHA synthesis (Delta-6 desaturase). Bellies from the animals were processed into bacon at a commercial meat plant. The bacon (n=40) was distributed for sensory evaluation in a home use test (HUT) survey. Often feeding highly unsaturated fats to pigs can lead to problems of 'off' odours caused by fat oxidation. Bacon from pigs fed diets of more than 0.6% DHA (~1188 mg per day) began to have off odours and off flavours described as 'barnyard' or 'fishy' which correlated with the amount of oxidation, as measured by thiobarbituric acid reactive substances (TBARS). In a survey of 40 panellists, over 60% said they would choose omega-3 bacon over regular bacon; however only ~ 60% would buy bacon supplemented above the 0.6% level.

Implications: Fortification of feeds to improve the nutritional value of pork products can be achieved to offer new products for the health conscious consumer. Omega-3 DHA bacon may be marketable, if quality issues surrounding oxidation are controlled.