

## FAST BREAKING PAPERS - 2009

April 2009



Jeff Wood talks with *ScienceWatch.com* and answers a few questions about this month's Fast Breaking Paper in the field of Agricultural Sciences. The author has also sent along an image of his work.



**Article Title: Fat deposition, fatty acid composition and meat quality: A review**

Authors: Wood, JD;Enser, M;Fisher, AV;Nute, GR;Sheard, PR;Richardson, RI;Hughes, SI;Whittington, FM

Journal: MEAT SCI

Volume: 78

Issue: 4

Page: 343-358

Year: APR 2008

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### SW: Why do you think your paper is highly cited?

It is a review paper and gives an overview of published work on fatty acid composition. The fatty acid composition of meat is a major factor in nutritional value as well as in the quality (taste and keeping quality) of meat. Ways to change fatty acid composition, improving nutritional value, while maintaining or improving quality, are needed. Review papers are a quick way for people to get into a topic.

### SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

It is a synthesis of knowledge on the factors affecting fatty acid composition and the implications for meat quality. It shows that a major underlying factor explaining variations in the fatty acid composition of tissues (muscle and adipose tissue) is the total amount of fat in the animal. At low levels, the polyunsaturated fatty acids predominate, but as growth proceeds, these are gradually diluted by fatty acids formed from diets, which are mainly saturated and monounsaturated. From birth to maturity, all the fatty acids change in characteristic ways, with interesting differences between species. These interrelations have not always been as well described before.

Figure 1:



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### SW: Would you summarize the significance of your paper in layman's terms?

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The paper shows that the nutritionally beneficial polyunsaturated fatty acids in muscle are located in the cell structures and are at high concentrations when the amount of visible white fat is low. As the animal grows, it deposits more and more saturated and monounsaturated fatty acids and nutritional value declines. The use of diets containing high levels of polyunsaturated fatty acids in pigs and poultry can override this effect because these are incorporated direct into body tissues after digestion.

This is more difficult in ruminants because polyunsaturated fatty acids in the diet are changed to saturated fatty acids in the rumen. Nevertheless, some fatty acids escape this process and are incorporated into body tissues as in pigs. This is why meat from grass-fed cattle and sheep has high concentrations of omega-3 fatty acids. The precursor fatty acid is a constituent of grass.

**SW: How did you become involved in this research, and were there any particular problems encountered along the way?**

Much of the research reviewed was conducted at the University of Bristol over several years. It is very satisfying to be able to assemble the findings from all this work into a comprehensive picture. The subject is of importance to the agricultural industry and so it has been well funded up until recently. I have always been interested in the growth processes of farm animals and this paper continues that interest.

**SW: Where do you see your research leading in the future?**

This paper sets a baseline from which research to fundamentally change the fatty acid composition of meat can proceed. More understanding of the genetic control of fatty acid composition will be needed to produce less saturated fat in ruminant meats. Polyunsaturated fatty acids are more prone to oxidation, which causes color changes and reduces shelf life in lean meat. This problem requires a greater understanding of the use of antioxidants and packaging systems.

**SW: Do you foresee any social or political implications for your research?**

Eating more healthily is very important and to be able to deliver healthier meat is a challenge. Meat is criticized on several fronts (e.g., a high carbon footprint). Meat is imported from countries with lower production costs and possibly lower standards. There are several implications!

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**Figure 1:**




**Figure 1:**

Pork loin steak.

KEYWORDS: CONJUGATED LINOLEIC-ACID; DIETARY VITAMIN-E; ADIPOSE-TISSUE; EATING QUALITY; N-3 PUFA; OXIDATIVE STABILITY; PRODUCTION SYSTEMS; FRIESIAN STEERS; PROTEIN-LEVEL; PORK

QUALITY.

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