e.g., Diez-Gonzalez F, Callaway TR, Kizoulis MG, Russell JB. Grain feeding and the dissemination of acid-resistant Escherichia coli from cattle.Science 1998; 281:1666-8. (http://www.sciencemag.org), and also the Greener Pastures report from the Union of Concerned Scientists:
http://www.ucsusa.org/food_and_environment/sustainable_food/greener-pastures.html.
For a prospective non-invasive pathogen detection method at a future time , see 3. below.

2. Bioheterogeneity of test samples, e.g., the presence of infective agents in cells, has also been determined biophotonically (as cited in the history at www.lifescientists.de, and as abstracted at PubMed: Lipkind, M: Indian J Exp Biol. 2003 May;41(5):457-72.: Registration of spontaneous photon emission from virus-infected cell cultures: development of experimental system.

3. A biophotonic measurement system for milk and milk products is coming to market from www.biophox.de in May 2007 at International Milk Analysis World in Munich.

References and other Resources

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http://www.biophotonik.de/index.html: home page of the IIB

www.lifescientists.de: English web pages of the International Institute of Biophysics

http://www.lifescientists.de/ib_003e_.htm: recent and downloadable publications

www.biophotonik-international.de

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http://www.lifescientists.de/ibo200e_.htm#Yu%20Yan, provides a closely referenced modern biophotonics research chronology starting out with a food quality focus.

Thanks to contributors.

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Fresh Milk is Alive!

Life Gives Off Light

Living things radiate their own photons of light (e.g., Rahn, 1936). They are ultra-weakly luminescent in the visible spectrum as well as in shorter and longer wavelength ranges. These non-thermal emissions fluctuate with the other biological rhythms of the organism (e.g., Popp, 1979, 2003; see also a bibliography and a scientific history of biophotonics at http://www.lifescientists.de/history.htm.).

Living Food

Food in a darkroom illuminated briefly with ultraviolet light gives off extra photons which when measured for the first 5 minutes (delayed luminescence, DL) are shown to be relaxing hyperbolically around a minimum background level of biophoton emission which is non-zero if the food is alive. Biophotons are quanta which are permanently emitted from living systems "far away from thermal equilibrium", and they are squeezed as well as coherent; they show long-range order (Popp, op. cit. and 2002).

The germination capacity of seeds can be predicted from biophotonic measurement (cited as Y.Yan: Dissertation, Fachbereich Biologie, Universität Mainz, 2002).

Cows, Milk and Light

Based on field studies of bovine dairy herds on several farms between 2001 and 2005, and laboratory analysis in the visible light wavelength range using these methods, a Dutch working group with the International Institute of Biophysics showed that the milk has a characteristic photonic emissions signature which matches the individual cow and which characterizes such factors as the cow's state of health (including acquired resistance to stress as measured biochemically and by veterinary bills); kind of feed (i.e., whether or not green-pastured, e.g. hay vs grain (Note 1); aging of the milk; enzymatic digestibility; and, processing such as homogenisation and pasteurization (Roeland van Wijk et al., IIB Summer School 2006, and forthcoming). With technical advances (Note 2), biophotonic quality control is likely eventually to supplement biochemical and culture assays as a desirable additional method of microbiological quality control in production, again because it could be applied close to source and conveniently for rapid and precise feedback (Note 3).

A Revolution in Food Production Quality Control Measurement

After World War II, American statistician W. Edwards Deming offered production process parameter measurement for fast quality control feedback to the Detroit auto industry, who apparently were not interested. He then brought statistical process control (SPC) to Japan, and within a generation Japanese car manufacturers led and now dominate world markets because they produced better quality for cost.

The same thing appears to be happening again in Japan with research and emerging applications of biophotonics, e.g., in food quality control and medicine.

The Future of Milk Quality

By focusing on scientific quality control methods using sensitive measurement feedback on which to base early, precise action to prevent problems as well as solve them earlier, Canadian dairy farmers and processors, and therefore also consumers – the final beneficiaries of quality – can gain from better informed quality choices and, combined with other practices to increase sustainability, producers can achieve a renewal of dairy farming based on standards of living quality.

Celebrate Life!

You can support the right of free choice in quality food, and in particular at the current time, the right to choose to produce and to consume high-quality living milk, by continuing to inform yourself; by helping to spread the word about food aliveness and food quality; and by choosing products and methods of farming, including quality management methods, which work constructively to enhance the aliveness of foods.

To contribute to this initiative, including to costs of legal defence of the constitutional right to choose our food, and receive a charitable donation receipt, please make your cheque payable to Family Life Foundation (Federal Charity Registration #888762663 RR001; www.flfcanada.com) and marked "Food Rights" or "Food Rights: Milk", and send it to Free Choice in Quality Food, 19 Maryvale Crescent, Richmond Hill, Ontario L4C 6P6. 100% of the contribution will be applied as directed by you the donor. Enquiries: info@foodrightsalliance.ca.

Notes.

1. Green pasturage, such as hay, has been shown to reduce acidity and bioterrain-based host susceptibility to E. Coli in cattle. For beef, even feeding 100% hay for the last five weeks seems to be enough to compensate for this at slaughter: See