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Can we trust these food scientists? J Ralph Blanchfield

Abstract

The continued erosion of public confidence in science and scientists has been accentuated, in the case of food scientists, by a succession of food scares, sometimes well-founded, sometimes ill-founded and propagated by activists, and always amplified and sensationalised by the media. This is a worldwide phenomenon. What can professional food scientists do to address this challenge? This paper suggests that it can only be done by considering and finding ways of conveying to the public the fundamental nature of “science” as distinct from what they are told about science by the media and often by scientists themselves.

The fundamental nature of science lies in its methodology. How do the ways in which science is variously represented to the public relate to its true essence? Unfortunately not all scientists are trustworthy. What forms of untrustworthiness occur? What are the distinguishing characteristics of those who are trustworthy and those who are not? What are the responsibilities of being a professional food scientist and how are they exercised, in general and more specifically in relation to

- contributing to the determination of food policy;
- the carrying out and reporting of food research; and
- food safety measures to protect the health and wellbeing of the consuming public?

Lecture

Good evening. I’m Ralph Blanchfield, and I feel honoured to have the opportunity to give this lecture at the IUFoST 13th World Congress.

The more senior scientists here will forgive me for saying things which many of them know, but my remarks are directed primarily at newer members of our profession and beyond them to the public; and even for us older members it does no harm occasionally to remind ourselves from time to time of the fundamentals on which our profession and our work are based. More importantly, it is essential that as scientists we are able to convey it to non-scientists -- the general public and the legislators who are responsible for risk management. The “We” in the title refers to the whole of society, and this lecture has intentionally been prepared in language and terms that can also be understood by non-scientists. I encourage you all to use it or borrow from it in writing or talking to non-scientists. One caveat -- “Food scientists and technologists” is a bit of a mouthful to keep repeating – so to save time I’ll use “food scientists” as a convenient bit of verbal shorthand.

I've been in the practice and management of food science and technology for 60 years. I am still very actively involved professionally, still working as a consultant, and hopefully with some useful experience-based knowledge and wisdom picked up along the way.

Can we trust these food scientists? Let's start with –

“Can we trust scientists?”.

Can we trust scientists? Well I am a scientist and I warn you, beware of anyone who suggests that you can trust a whole category of people, scientists or any other category. Believe me, there are some scientists I wouldn't trust as far as I could throw them! We'll come to that later. How then, do you sort the sheep from the goats? How do you determine – and how does the public determine -- which you cannot trust and which you can?

First one needs to have an insight into what science is, and nobody will get that from the media or from politicians or even from some scientists, because that term is used in many different ways without explaining which meaning is being used - and hardly ever is the real meaning of science mentioned. How's that for a bold dramatic assertion?

Does it mean the community of scientists – those who practise science? Partly

Does it mean government scientists? Partly.

Does it mean industrial company scientists? Partly.

Does it mean science facts that we learn at school? Partly.

Does it mean what scientists do in laboratories? Partly.

Does it mean the results of scientific discoveries? Partly.

Does it mean how industry uses scientific discoveries? Partly.

Does it mean how governments use scientific discoveries? Partly.

These are all ways in which you'll hear or read about science in the media.

All these are true aspects of science, but don't get to the heart of the matter.

Well then, what on earth does?

Science is:

A methodical process of

- obtaining knowledge
- thinking about it
- testing our ideas about it
- and systematically organising knowledge about our universe and world.

“Hang on bit”, I hear non-scientists say, “isn't that just the commonsense approach that we adopt in running our own lives?” Well indeed, science is organised commonsense, but using special techniques to obtain knowledge, to test whether our ideas are valid and to organise knowledge in a meaningful way.

Scientists obtain new knowledge by observing and recording what is already there; or by setting up an experiment and observing the results.

We think about knowledge, both new knowledge and its combination with existing knowledge. Does it suggest a pattern? Does it lead to any conclusion? How can that conclusion, which is called an “hypothesis”, be tested?

To test an hypothesis one sets up an experiment designed to test it. and publishes the details and results in a peer-reviewed scientific journal. Can other scientists repeat it and get the same result? Are the actual results what were expected and thus seeming to confirm the hypothesis?

If so, the hypothesis becomes a “theory” – but, hang on a minute --

A theory isn’t just facts, it’s also how we interpret the facts we now know. So a theory is open to challenge in two ways; either by other scientists drawing different conclusions; or by further research adding new knowledge that now has to be taken into account to produce a better theory.

It is my experience that scientists who professionally, honestly, ethically and objectively adhere to the scientific methodology I have outlined, can be trusted.

Now we come to the unfortunate bit about the people who call themselves scientists but cannot be trusted.

Yes, unfortunately every community has a few “rogues”, so how do we identify them? They include

- those who falsify or suppress results for gain or glory;
- or those who present speculation as though it were established fact;
- or those who assert that an apparent association between A and B proves that A causes B;
- or those who are militant fundamentalist zealots and campaigners for or against something.

No matter what scientific qualifications they have, they can’t be trusted, and in my opinion they sacrifice the right to use the honourable description of “scientist”.

So are there any yardsticks that the public can use to judge the trustworthiness of particular scientists? A string of letters after their names may mean something, but remember the previous slide! What about, for example, membership of the recognised professional body? Well, that signifies quite a lot, but membership is not legally required in order to work as a scientist, some who are specialists in sciences applied to food are members of other professional bodies, and a few are not joiners by inclination.

However, “These food scientists” include members of professional bodies of food scientists and technologists, like the Institute of Food Science & Technology (IFST) and many of the adhering bodies to IUFoST. I’ll speak of IFST because that’s the one I know so well. Let’s look at what membership of IFST signifies, what yardsticks it provides. IFST is ---

- not-for-profit , self-governing, self-funding
- completely independent of government, of industry or of lobbying groups,
- collaborates in the public interest with government, academia, consumer bodies, and industry BUT retains its complete independence.

Who are its members? They are not companies or organisations but individuals elected in their personal capacities on the basis of their qualifications and experience and representing no-one but themselves. Most importantly, they all have made a signed undertaking to adhere to the Institute's ethical Code of Professional Conduct.

They work in

- Food and ingredients manufacturing
- Food product development
- Food retailing and distribution
- Foodservice
- University teaching and research
- Research Institutes ; Research Associations
- Government departments and agencies
- Local government: Food law enforcement
- Consultancy

The first of IFST's four purposes is:

To serve the public interest by furthering the application of science and technology to all aspects of the supply of safe, wholesome, nutritious and attractive food, nationally and internationally.

The other three purposes?

(2) To advance the standing of food science and technology, both as a subject and as a profession;

(3) To assist members in their career and personal development within the profession;

(4) To uphold professional standards of competence and integrity.

It upholds professional standards of competence by the strict standards of qualifications and experience required for entry to professional membership

It upholds professional standards of integrity by requiring a signed undertaking by every member to comply with IFST's ethical Code of Professional Conduct.

<http://www.ifst.org/uploadedfiles/cms/store/ATTACHMENTS/codeprofconductglines.pdf>

The Code has twelve simple ethical principles and there are ten detailed Professional Conduct Guidelines expounding the principles in foreseeable situations. And yes, the Code has “teeth” to deal with non-compliance but it is a measure of success of the Code in guiding members to “do the right thing” that only twice in the Institute’s 44 years has it had to be invoked.

It assists members in their career and personal development within the profession. New knowledge is accumulating at such a rate that to stay fully competent food scientists and technologists need to make special efforts to keep up-to-date. Continuing Professional Development (CPD) schemes represent one important way of doing so.

Also we communicate with members (and the public) via our publications -- International Journal of FST, Food Science & Technology, Keynote, Monographs e.g. Good Manufacturing Practice, our Website: www.ifst.org and our Information Statements on important food science topics such as BSE, Dioxins and PCB’s in Food, Genetic modification and food, AIDS and the food handler, Dietary fibre, Organic foods, Nanotechnology, Irradiation, Food Allergens, and many more.

We are sometimes asked about Information Statements. What are they? Who prepares them?

Who approves them? How do we make sure they are objective?

A brief outline of the provenance of IFST Information Statements is clearly stated in each and every one, both the printed and the on-line versions.

The nature of the Institute and the mixture of backgrounds of people on the working groups drafting IFST Information Statements, and on the two Committees responsible for finalising and approving them, ensure that the contents are entirely objective.

Who writes them? Nobody writes “them”. In each case when the Technical & Legislative Committee (TLC) decides to progress a new or updated Information Statement, it selects one or more experts on that subject as principal drafter(s). It may suggest helpers or (more often) leave it to the principal drafter to approach helpers of his/her choice. The normal procedure is that the first draft is circulated for comment to TLC and Public Affairs Committee (PAC) members, and to a joint TLC/PAC meeting. It is not uncommon for a proposed Information Statement to go through several drafting cycles before being finalised by a TLC/PAC joint meeting.

It is in many respects a slow and cumbersome process but it is important to get it right.

There is a guidance document which sets out everything do with production of IFST Information Statements in great prescriptive detail, and every TLC and PAC member has a copy, and every selected principal drafter receives one.

These guidelines include stringent requirements to avoid introducing bias of any sort, but the real safeguard of scientific validity, objectivity and suitability to carry the name of the Institute is the mixture of backgrounds of the members of the two Committees that have to give their seal of approval.

As far as the finished Information Statements are concerned they are not the work of any one person but the collective work of all those involved in developing them to the finished state. It has always been IFST's firm policy not to name individuals as "authors".

And that's it. **No** hidden agenda, **no** vested interests, **no** ties. What you see is what you get – the responsible professional body of an exciting, worthwhile and honourable profession, and, by the way, one which scientifically-inclined young people could well consider entering.

But as a profession we also have a responsibility to learn more about our food. Why learn more?

- Improve food safety
- Reduce pre-harvest and post-harvest losses of food
- Minimise food deterioration in storage
- Enable development of more attractive, more nutritious foods

Food science knowledge is a coherent and systematic body of knowledge and understanding of the nature and composition of food materials, and their behaviour under the various conditions to which they may be subject.

What sort of things do we need to learn more about?

- the chemical composition of food materials;
- their physical, biological and biochemical behaviour;
- human nutritional requirements and the nutritional factors in food materials;
- the nature and behaviour of enzymes; the microbiology of foods;
- the interaction of food components with each other, with atmospheric oxygen, with additives and contaminants, and with packaging materials;
- pharmacology and toxicology of food materials, additives and contaminants;
- the effects of various manufacturing operations, processes and storage conditions;
- the use of statistics for designing experimental work and evaluating the results.

Hang on a minute! If we have a coherent and systematic body of knowledge and understanding of these things — Why do we need to find out more? Why do we need research? It is because our collective knowledge on any topic can never be more than partial. So scientists always have to keep open minds. They have to act on existing knowledge while recognising that further research will bring new information and knowledge, which may in turn lead to revised conclusions.

Our profession is the repository of existing knowledge in its field. It includes:

- researchers expanding the boundaries of knowledge and
- experts seeking to apply it for the public benefit.

Knowledge is good to have but better to apply beneficially. We apply it to the practical treatment of food materials to convert them into food products of the kind, quality and stability, and so packaged and distributed, as to meet the needs of consumers for safe, wholesome, nutritious and attractive foods.

But can our food ever be safe? Of course not. Nothing in life is risk-free – and that includes food. Food is constantly under attack from many directions – pests, microorganisms, chemical contaminants, zoonotic diseases and cowboys.

- pre-harvest, post-harvest and storage losses dues to pests including vermin, insects and weeds;
- foodborne pathogens such as listeria, salmonella, botulism, cryptosporidium, e.coli O157 and campylobacter;
- chemical contaminants such as dioxins, PCBs, mercury, Sudan 1, aflatoxins, food allergens, acrylamide, 3-MCPD;
- zoonotic diseases such as BSE and vCJD;
- cowboys – no, not those who ride horses but the minority of dishonest people in the food industry

Against all this array of attacks on the safety and integrity of food, how is food defended?

Food is defended from all those assaults by:

- Responsible behaviour by manufacturers
- Science-based legislation
- Effective enforcement
- Overarching role of professional food scientists

So I conclude YES, we, that is the public, can trust these professional food scientists.