

“Honorary Biomedical Sciences & Health Information Lecture Series”



FOOD SECURITY AND FOOD SAFETY: WHAT COULD A SCIENTIST DO?

A Distinguished Lecture

By

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Abstract: Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life, (FAO, 2002) coupled with a sanitary environment, adequate health, education and care. (FAO/AGN, March 2012). Food safety is an issue that is increasingly important in national and international debates about agriculture, nutrition and health. “Food safety is not a luxury of the rich, but a right of all people” Dr J Diouf (FAO Director General). When food security is achieved it remains to know whether that food available is safe or not. Consumption of large portions of so called edible mushrooms is already known to be risky. The menaces to food safety are inorganic, such as excessive metal ions, or organic, PAH, pesticides and toxins such as Phycotoxins (Marine toxins), Mycotoxins (Fungal toxins), Bacterial toxins and Plants toxins. All are secondary metabolites naturally contaminating foodstuffs and feed. Some of these toxicants and toxins are genotoxic and potent carcinogens (Cd, As, Aflatoxin...). Some bear additionally specific organ toxicity. Because these toxicants are occasionally present in our Foods, they represent a serious hazard for human health and a considerable risk when human kind is exposed to them through food consumption. The assessment of that risk is difficult for several reasons. They are natural substances. They have to be managed for consumers safety, However, no toxicological and/or OECD recommended studies and toxicological dossiers are available. No authorization or license is required. However for their Risk assessment, data such as those required for food additives are needed. That could be found either in the literature or from data yielded by well conducted investigation - on toxicological studies and pathologies in mammals and - on eventual epidemiological data on humans. What tools do we have? In general, Regulatory limits in agricultural products and TDI or TWI (Tolerable Daily or Weekly Intake are fixed). Concerning Phycotoxins in general, limits are set-up and indeed very well controlled and managed. However no clear TDI is fixed because of:

- potent and frequent acute toxic effects, and
- mainly because of lack of sub-chronic or chronic study data and/or
- lack of epidemiological data in either domestic animals or humans
- not all marine toxins and derivatives potentially present in sea foods are known...

It is being proposed, in addition to global toxicity assessment, to use molecular impacts of these toxins arise from in vivo and in vitro data to assess the risk for consumers. The question to Risk assessors is: Do the existing limits and TDI or TWI, protect consumers the best way we can achieve? Taking two examples we attempted to give an answer to this question concerning some Phycotoxins (Okadaic acid and Domoic acid). For Mycotoxins, in general, Regulatory limits in agricultural products and TDI or TWI (Tolerable Daily or Weekly Intake) are fixed. Taking few examples we attempted to give an answer to this question concerning some Mycotoxins (Aflatoxin B1, Ochratoxin A, Fumonisin B1, Fusarium toxins in general and their respective combinations representing the most current situations in foodstuffs. One must consider this kind of research as a never lasting sentinel duty in which I am engaged and for which some fellows have lost their life for having been too much exposed.