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Recent advances on biosensors for food safety

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Biosensors encompass the whole range of analytical instruments which can be associated intimately with a biological component for the target recognition step. It have several advantages over other methods of analysis, including real-time detection, portability, multianalytes determination for both on-site and laboratory analysis. The development of biosensors for real-time identification of multiple bacterial pathogens in food remains a challenge for ensuring food safety. Successful applications of sensors developed for analysis of food borne pathogens, including *E. coli*, *Staphylococcus aureus*, *Salmonella* and *Listeria monocytogenes* will be presented in this lecture. Biosensors can also be used for rapid evaluation of cleaning effectiveness as part of good manufacturing practices and HACCP programs. Experimental results obtained exclusively in our laboratory or in collaboration with known international laboratories involved in food safety will be presented and discussed. Indeed, analytical performances of sensors for toxins, phenols, bisphenol A, heavy metals, pesticides, acrylamide and drug residues at trace levels will be presented and highlighted. Special attention needs to be focused on the complexity of food samples. Indeed, turbidity of the sample will affect optical methods while salts concentration will have a major impact on electrochemical methods. Although rapid and sensitive biosensors for industrial food applications are reported in literature, simple biosensors used by non skilled persons are still required in the market.

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Wild honey: Healing or killing food

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The Gurung tribal people of Nepal have been collecting wild honey from Himalayan cliffs (2500-4000 m asl) and this wild honey is believed to promote health of general well-being and hence used to treat a variety of ailments for centuries. However, studies reported elsewhere pinpoint that wild honey is poisonous. This poisoning is well known from the ancient time. The toxicity of wild honey is supposed to cause due to the presence of grayanotoxin which is found on the leaves, nectar and pollen of *Rhododendron* species. Ingestion of honey obtained from these plants resulted in mad-honey intoxication. This may cause serious life-threatening effects such as bradycardia, complete atrioventricular block, atrial fibrillation or convulsion. Twenty two honey samples were collected from Himalayan regions of Nepal and were studied for its antioxidant activity and pollen analysis to identify the poisonous plant. The result showed that all tested honey has significant antioxidant activities. Pollen analysis showed that the collected honey was heavily contaminated with *Rhododendron* species pollen. Analysis of grayanotoxin is not readily available and pollen analysis offers a practical way of detection of honey.

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