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Yeast membrane constituents and their potential beneficial effect against Colorectal cancer

Colorectal cancer (CRC) is one of the third most commonly diagnosed cancers in westerns countries. Diet and life style have important rules as preventive methods and still seem to be the most efficient approach. Consumption of diet containing agents with CRC preventive properties could reduce the risks of CRC incidence. Cancer prevention properties could be obtained via cancer cells cytotoxicity, apoptosis and antioxidant and via enzymatic modulation. QR is a phase II detoxification enzyme recognized to protect against toxic metabolites involved in the first stage of carcinogenesis process and can decrease chemical carcinogenicity compounds by transforming them to compounds with less toxicity. β-glucuronidase enzyme can release carcinogenic compounds in the colon. A reduction in its activity can lead to a reduced exposure to carcinogenic substance. *Saccharomyces boulardii and Kluyveromyces marxianus* are well-known yeasts in food industry. Their membranes are composed of insoluble (47%) and soluble glucan (36%) and mannoprotein (0.45%). Our studies showed that mannoprotein of *K. marxianus* exhibit the most relevant antioxidant activity probably due to the presence of aromatic amino acids and thiol groups but only insoluble glucan from both yeast species can induce Quinone Reductase (QR) enzyme activity. Cell wall extracts of both yeast cells, are able to inhibit the growth of HT 29 cells and colon cancer cells by more than 50% and extracts of S. boulardii show the lowest IC50 values. *In vivo* studies with rats demonstrated that ingestion of crude insoluble glucan (0·5 mg kg-1 day-1), obtained from S. boulardii cell wall exhibited colon cancer prevention properties and enzymatic modulation is one of the mechanism observed. An induction of more than 68% of the QR specific activity and a reduction of more than 50% of the β-glucuronidase activity was found. Also, a reduction of more than 45% in the total count of aberrant crypt (AC), 50% of aberrant crypt foci (ACF) and a 73% reduction of the total number of ACF containing 4-5 AC per focus in the animal colon was observed. Extraction of *S. boulardii* and *K. marxianus* yeast cell wall via simple and fast extraction can be proposed for the development of a new nutraceuticals product against colon cancer.

Speaker Biography

Monique Lacroix has completed her BSc and MSc in Food Sciences Technology in 1980 and 1982 respectively and PhD in Nutrition in 1986. She is a Professor at INRS-Institute Armand-Frappier, Canada and Director of the Research Laboratories in Sciences Applied to Food and of the Canadian Irradiation Centre. She is a Fellow of the International Academy of Food Science and Technology (IAFoST) for her outstanding representatives of international food science and technology. She received 4 awards for her most cited publications in Food Sciences and for the best 10 research Partnership with Industries for two partnerships. She has served as an expert member of several United Nations Research Networks on Food Safety and on Nano Biopolymer using Gamma Irradiation. She is also member of three Canadian networks: Canadian Food Processing Networks, Research Network on Dairy Products in Québec and of the Institute of Nutraceuticals and Functional Foods. She is author of more than 264 publications, 10 patents and 21 book chapters. Until today, she has supervised 14 Post-doc, 98 graduated students of 2nd and 3rd cycles and more than 315 trainees that come from all over the world. She has been invited to present more than 188 conferences in major congresses, including United Nations Conferences as a Member of Expert Committees.

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