

Coffee and Health: the Holistic Approach

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SUMMARY

The assessment of risk to human health of foods, food ingredients/contaminants and nutrients has historically been conducted independently of possible health benefits. In addition, different scientific approaches have been used to estimate health risks and benefits of foods and their constituents. When a food or food constituent is associated with both potential health risks and benefits, and when the health effects appear to be dependent on the level of intake, there is a need to determine a consumption range with an acceptable balance of risks and benefits. The extensive database on the health effects of global coffee consumption developed over the past 30 years provides an excellent opportunity to investigate this balance between risks and benefits. While the health risks of coffee and its key ingredients, particularly caffeine, have been the focus of thousands of published scientific/medical studies addressing almost all known animal toxicity endpoints and human disease outcomes, more recent research attention has been focussed on investigating the possible health benefits of coffee consumption. As evidenced by the conclusions of the other expert presenters in this symposium, a growing literature appears to be concluding that moderate coffee consumption may be associated with reduced risk of type 2 diabetes, coronary heart disease, Parkinson's disease and even some cancers. There is also a well-established database on the benefits of human coffee and caffeine consumption in improving both physical and mental performance. In concert with this "good news" about coffee consumption are extensive investigations underway in many laboratories throughout the world to determine the biochemical mechanisms by which these beneficial health effects may be operating. One of the most exciting areas of mechanistic research is the possible cancer-protective role of coffee's naturally occurring polyphenolic antioxidants (chlorogenic acid derivatives) and heat-produced antioxidants (Maillard Reaction Products, including volatile heterocyclic compounds and melanoidin polymers). Studies in many countries have shown that coffee is actually the major individual source of dietary antioxidant potential, and laboratory studies have shown that some coffee constituents can induce the formation of carcinogen-detoxifying enzymes. Therefore, while trace levels of many animal carcinogens can be found in coffee as consumed, there are also many compounds now identified in coffee that may reduce the risk of cancer. In conclusion, the dietary cancer risk of coffee consumption cannot properly be assessed by examining just the concentrations and potencies of the individual animal carcinogens contained in the product. Instead, coffee should be evaluated using the "Holistic Approach" that also takes into account the simultaneous presence of natural, health-protective compounds, the beneficial effects produced by the Maillard reaction, and most importantly the extensive human epidemiologic database clearly showing that coffee consumption reduces cancer risks.