Health benefits of polyphenols-rich foods and beverages: latest science

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International Life Sciences Institute (ILSI) South East Asia Region (SEAR) Australasia brought a highly accomplished panel of experts together to present and discuss the latest science on the health benefits of polyphenols-rich foods and beverages at Glenelg in South Australia.

Following a warm welcome and introduction to the by ILSI SEAR president Dave Roberts, Jonathon Hodgson, University of Western Australia, opened proceedings with a highly informative introduction to the science of polyphenols. He followed with an overview of the Heart Foundation of Australia’s position paper on polyphenols rich foods, released in 2010, particularly focusing on tea, cocoa, coffee and red wine. Tea consumption and cocoa beverages made from raw cocoa powder were encouraged as part of a healthy balanced diet. Chocolate consumption or coffee and red wine drinking were not supported as methods of reducing the risk of cardiovascular disease.

This review led into a presentation of some of the latest epidemiological findings by Rob van Dam from the University of Singapore. He included some compelling evidence for dose dependent effects of cocoa and tea on CVD risk reduction and of anthocyanins (predominantly from blueberries) and coffee intake on type 2 diabetes risk reduction. He offered challenges to improve the quality and clarity of population based studies including evaluation the stability and duration of chronic exposures to these nutrients in the studied populations.

Kevin Croft of University of Western Australia and Alan Crozier from University of Glasgow (currently a visiting scholar with CSIRO) enlightened attendees on the bioactivity and metabolism of polyphenols. They provided evidence that although polyphenols generally appear to have anti-oxidant effects on specific targets, they are not always mediated via a direct antioxidant effect in vivo. It was also clear that these specific target effects are quite different for different polyphenols. The complexity increases when metabolism is considered. The studies showed that there is a wide range of different plasma kinetics and a broad array of different metabolites with each different polyphenols studied. Different polyphenols compounds, and even the same compound, undergo absorption at different levels of gastric transit and consequently different metabolites are produced. The critical message from this work is that these metabolites are by and large the polyphenols compounds found in the blood and tissue. Therefore, evidence of mechanisms of action in vitro needed to be measuring effects of these secondary compounds rather than the ingested forms.

Britt Burton-Freeman, Illinois Institute of Technology, then discussed the benefits of fruit derived polyphenols during postprandial glucose and lipid induced oxidative stress and inflammation. This included some promising effects of wine (and grade seed extract and grape juice) and strawberries on minimizing the consequences of these stressors. Some of the evidence they have found are reduced post prandial insulin, IL-6 & IL-1b and markers of fibrinolysis and improved flow mediated dilatation.
Roger Hurst from the New Zealand Institute for Plant and Food Research discussed his organisation’s work in evaluation polyphenols, mainly from blackcurrants, and their possible application in inflammatory lung conditions and in enhancing the benefits of exercise. He outlined some encouraging results in modulation of inflammation, as opposed to strict attenuation. As he pointed out some inflammation is physiologically beneficial in certain instances. This concept was most evident in results he described whereby following muscle damaging exercise, the initial inflammatory response was enhanced and the delayed response attenuated with blackberry extract supplementation.

Hurst’s presentation was followed by a panel discussion with the previous presenters.

The first question to the panel was whether there is a case for greater confidence in the health effects of polyphenols than the Australian Heart Foundation position statement supports. Generally it was the opinion of the panel that the Heart Foundation position is (appropriately) conservative and the evidence base has grown since the review. Furthermore the potential clinical significance of measures such as FMD need to be more fully realised and appreciated. It was also noted that health claims are hampered by significant disparity between the doses and products considered in short term clinical trials as compared to the consumption habits seen in the epidemiological studies.

Jonathon Hodgson returned to the dais to chair the early afternoon session which included an update of some of the latest developments in polyphenol research.

Roman Buckow, CSIRO Food & Nutrition, covered the experimental work currently involved in how to best retain and preserve polyphenols content in packaged foods. As well as amusing the audience with his perplexity over possible alternatives to the consumers’ cries for convenient and organic foods, he outlined some interesting new approaches to food preservation. He mentioned ongoing work looking into high pressure and pulsed electric field processing but it is unclear if these will offer benefits over traditional heat processing methods for polyphenols rich foods and beverages.

In the new science segment, Alison Coates from UniSA presented some of the latest findings on the vascular benefits of cocoa, resveratrol and wild green oat extract. All have clear effects on FMD, the oat extract also appears to increase the responsiveness of cerebrovascular auto-regulation.

Russell Keast from Deakin then highlighted some exciting work investigating the health effects of olive oil that has redirected focus from the beneficial fatty acid profile to the phenolic content. Deakin had found an intriguing link between the peppery sensation olive oil creates in the throat and ibuprofen. It appears that the compound responsible for this sensation (Oleocanthal) has similar COX inhibition activity to ibuprofen such that three tablespoon of extra virgin olive oil may deliver 10 per cent of the anti-inflammatory effect of a single dose of ibuprofen. This low level chronic anti-inflammatory effect may go some way to explain the well documented epidemiological health benefits.

Finally, Aaron Tan, also from CSIRO Food & Nutritional Sciences, presented CSIRO’s work on identifying and evaluating polyphenol rich indigenous Australian fruits. The most promising of those investigated appears to the Kakadu plum, which is found widely across central northern Australia. The preliminary in vitro evidence of antioxidant and anti-inflammatory effects looked promising.
The final session of the day provided the opportunity for government employees and academics in attendance to hear the industry perspective. Roger Bektash from Mars chaired a dynamic session that began with Hazel Fowler from FSANZ advising the audience on how to communicate health information about food products to consumers. She shared some interesting results about the many ways that health information, particularly those involving ‘functional foods’ can be undervalued or misinterpreted. She said that the “modern health worrier” is a subset of the population that is potentially more receptive to the benefits of polyphenols. However, the best way to communicate more targeted advice about specific properties of different functional foods appears to remain a challenge.

Three case studies of consumer communication approaches by leading industry representatives were presented. Katherine Tocchini from Unilever talked us though the transition they have made from using the term antioxidant to the specific polyphenol term ‘tea flavonoids’ and their ‘health benefits’ to reflect the changed scientific consensus of antioxidants. Katherine highlighted the challenge Unilever faces in transferring the consumer awareness observed for antioxidants to the benefits of polyphenols.

Leisa Rydges detailed a contrasting approach by nestle in educating the consumer about their higher phenolic content Greenblend coffee. Their market research showed that the consumer was familiar with the term ‘antioxidant’ (despite not always understanding the science) and though that tea was a good source of antioxidants. This provided the opportunity to inform consumers that Greenblend has 70 per cent more antioxidants than green tea, thus promoting coffee as a ‘healthier’ alternative.

Roger Bektash of Mars took a different tack and informed the audience of the steps Mars is taking in attempting to provide a clear, factual and responsible message to consumers about the health effects of cocoa and of the questions that must be considered to elucidate the facts in order to provide this message. For example, is there sufficient data to determine dose effects, are the effects studied meaningful for public health and are the mechanisms of action understood?

The audience was then provided the opportunity to quiz the industry representatives further and offer their own perspective on consumer communication terminology. Despite a very enthusiastic discussion and a suggestion to use the term “rich in Phytonutrients” by Alan Crozier, no consensus was reached.

ILSI SEAR should be congratulated for bringing together such a highly informed group of presenters and an informative and thought provoking agenda. Those that missed this event would be well advised to look out for the next instalment. A big thanks to ILSI SEAR for arranging this event, to the speakers for sharing their insights, and to CSIRO, Unilever Australia and Mars Australia for their generous support.

Written by: Kade Davison is an exercise and nutritional physiologist at the University of South Australia with a keen interest in cocoa derived polyphenols.