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Super fruits

like normal fruits, but super

A marketing ploy or the emergence of new scientific based drinks: super fruit mocktails? Dr John Wilkinson investigates.

When a term comes along that seems to indicate that not only are fruits healthy, but certain fruits are superior to others – may slow down the ageing process, keep cancer at bay, increase blood circulation and lower blood pressure compared to other fruits – it is hard to resist the lure of such information. Often such fruits seem to originate from exotic locations or are only slightly familiar to us, thus extending the mystery, curiosity and our interest in wanting to try them. After all isn't biodiversity, and ingestion of it, the spice of life? It is under this seduction that the term 'super fruits' has appeared. Super fruits are the new darlings of the soft drinks industry. A convenient new buzz word for the natural products industry, its use in soft drinks has been quick to be applied. Thousands of new super fruit based products have entered the market over the past few years since the term was first coined in 2005.

Fruit consumption, whether super or not, has long been linked to having a healthy lifestyle together with the intake of other foodstuffs such as vegetables and related plant derived products. Fruits are also a staple part of the diet for vegetarians Jain monks who only eat unpicked fresh fruit falling from trees, and the so called 'raw fooders'. This latter group claims that consumption of only uncooked fruits and vegetables provides maximum longevity, youthful skin and bundles of energy (they seem to need less sleep than most people on conventional diets, possibly due to the increased ingestion of plant sugars).

All these drivers plus a demand for natural drinks has made 'super fruits' a popular term with marketers and consumers alike. So what are the super fruits of the 21st century and do they work or is it just media hype?

The inner sections of the gac fruit (Momordica cochinchinensis) are intensely red due to the high amounts of beta-carotene and lycopene.

Tamarind drink.

What makes a super fruit?

The term 'super fruits' refers mainly to exotic fruits that have potential superior health giving properties compared to 'normal' fruits and vegetables.

The idea is that by consuming these types of fruits we will live longer and be healthier than by just consuming 'normal' fruits from a 'normal' diet.

To be a contender for this new status, super fruits need to be brim full of health promoting phytochemicals, fibre, high amounts of vitamins and minerals when compared to 'normal' fruits They should also display anti-ageing effects, with a preference for potent antioxidant activity. They also preferably have colourful folklore from the country of origin, ideally in an exotic location in South America, Africa or Asia.

There is no doubt that potential super fruits do also exist in the western world, such as rose hips (high vitamin C levels) or perhaps the good old apple with the health associated proverb 'an apple a day keeps the doctor away'. However, this kind of folklore seems weak, and awareness of traditional fruit juices such as apples and grapes remain high without possibly the need for new marketing terms, at least at present.

The typical way of testing fruits, juices and drinks for antioxidant capacity is to use a number of different in vitro assays (test tube experiments) of which the most commonly used are:

- ORAC – Oxygen Radical Absorbance Capacity Assay
- FRAP – Ferric Reducing Anti Oxidant Power
- DPPH – 2, 2-Diphenyl-1-picrylhydrazyl
- TEAC – 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid (Trolox)

Based on these assays, fruit juices such as blueberry, grape, black cherry and pomegranate score highly. However, it has not yet been determined how relevant this data is when applied to ingestion of super fruit derived antioxidants and their possible health benefits.

Another problem is – if we compare the anti oxidant capacity of fruit juices gleaned from the

ORAC assays to other antioxidant assays, the hierarchy of potent super fruits starts to vary immensely. Even different labs undertaking ORAC assays often find different results with the same fruit.

From a regulatory point of view, recently in Europe, certain antioxidant health claims have been approved by EFSA. These have been granted with very limited statements about their possible health benefits. ORAC and other in vitro assay data are barely considered relevant to these health claims and the claims allowed, appear almost as a kind of joke, to health scientists and informed, health conscious consumers. It may take 20 – 50 years or longer to establish the possible relevance of antioxidants to health benefits. In fact some scientists suggest that other factors and not antioxidants at all that are responsible for the seemingly diet based increases in longevity.

How relevant are antioxidant assays and their use in supporting the term 'super fruits' for use in the soft drinks industry?

Despite misgivings on their ability to predict health benefits in vivo, these assays do seem to tally reasonably well with the amount of anti oxidant compounds found in a particular plant or juice. As far as water soluble antioxidants go this means principally polyphenols, such as low chain proanthocyanins, hydrolysable tannins and flavonoids which are found in most plants and highly likely to have some therapeutic effects. These phytochemicals also contribute to the astringent taste of fruits and are undoubtedly antioxidants in a test tube environment, so do help to confer stability in juices although this is an over simplistic view point.

Super fruits also derive their status from other factors such as that they contain phytonutrients that display anti-cancer effects (in vitro) and often have a rich folklore of use.

New science is also evolving to show that there are potent pharmacological synergy effects found in plant extracts and that these are derived from the phytonutrients found in them.

Juice made from camu camu (Myrciaria dubia).

Amla fruits (Phyllanthus emblica) also known as Indian gooseberry.

Which super fruits are emerging at the moment?

The list is becoming longer and longer but some of the most fashionable at the moment are:

Acerola, amla, baobab, blueberry, bayberry, camu camu, cocoa (chocolate), cranberry, gac, goji, lychee, mangosteen, noni, papaya, pumpkin, pomegranate, red guava, saskatoon berry, tamarind, watermelon, and yuzu.

Here are some selected examples of particular fruits including, where possible, commercially available extracts which potentially can be used in new drink formulations:

Camu Camu (*Myrciaria dubia*) is an Amazonian fruit used in drinks and ice creams. The pulp is also used in nectars and marmalades. The extraordinarily high vitamin C content (on the order of 2–3% of fresh weight) is the most important property of the fruit, which has been exploited in positioning camu camu on international markets.

Gac (*Momordica cochinchinensis*) also known as spiny bitter gourd is used as a medicine and food in South East Asia. The inner sections of the fruit are intensely red due to the high amounts of beta-carotene and lycopene. Recent studies have shown that the fruit contains a protein that inhibits the proliferation of cancer cells.

Amla fruits (*Phyllanthus emblica*) also known as Indian gooseberry, is found primarily in India with a rich history in Ayurveda (a system of traditional medicine) particularly as 'Rasayana' (for longevity and rejuvenation). It contains a cocktail of phytochemicals, such as gallic and ellagic acid. SunAmla amla fruit extract from Taiyo has recently been shown to have powerful anti-inflammatory and anti-coagulant properties which suggests that this is another contender for 'super fruit' status.

Pomegranates (*Punica granatum*) contain active compounds that are based upon hydrolyasable tannins and in particular punicosides such as Punicalagins. Recent research has shown that these compounds inhibit melanin production and could therefore be used as an oral skin lightening product in the future. Geni

Continued on page 43

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Herbs manufactures a standardised polyphenol rich pomegranate extract called Pomella, which in a clinical study increased human ORAC plasma by 32% which was significantly higher compared to grape seed and green tea extracts.

What does the future hold for super fruits?

As understanding of the biological activity of phytonutrients increases, researchers will be able to combine them in a scientifically meaningful way to optimise and synergise their health benefits. Innovative combinations of different botanical juices in a drink will be developed not just because of a unique sensory or visual experience, but because the science will show that such combinations have superior health benefits.

This will result in the emergence of what I call 'super fruit mocktails' (SFMs) – non-alcoholic combinations of super fruit cocktails.

In fact, with the development of SFMs, scientists will (and are) looking at the synergy effects of phytonutrients operating at a molecular level. If these can be optimised it will lead to the scientific development of SFMs.

The search for synergy of single active phyonutrients is similar to music and composition development in the Middle Ages in the West. Composers discovered that certain combinations of single musical notes could produce wonderful sounding chords when played together. These were then used to create the most evocative and

Yuzu fruit.

beautiful musical compositions. Similarly in nutrition, scientists are trying to discover the synergistic combinations of phytonutrients or 'chords' that will lead to optimum health.

As the scientific basis for health nutrition evolves, super fruits may indeed have their place and longevity in the industry. However, in the mean time colourful folklore stories, fruits from exotic locations with high amounts of phytochemicals, combined with compelling data gleaned from in vitro antioxidant assays are leading the way. These efforts can be seen as industry's way of trying to map out the future based on an evolving science. It is the beginnings of a science-based optimum nutrition approach to the creation of healthy soft drinks. ■

SUPER FRUITS – continued from page 41

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Dr Wilkinson is a Phytochemist and Pharmacognosist and an expert in the regulatory approval of supplements and novel foods. He has been a consultant on the regulatory approval of natural products in the EU and the USA for the past 20 years. He also established the world's first Herbal Medicine BSc degree in Herbal Medicine in the UK in 1994 where he was Senior Lecturer in Pharmacognosy and Phytochemistry.
Prior to this he was awarded the prestigious SERC NATO postdoctoral research fellowship and worked with the Nobel Prize winner George Olah in California, USA, after obtaining his PhD in Organic Chemistry at Imperial College, London. He provides regulatory advice to companies from targeted one hour teleconferencing problem solving sessions to full dossier submissions for novel foods, supplements, food additives, health claims and labelling. He also undertakes new product development specialising in natural product derived ingredients and is a specialist writer on new ingredients in the natural products industry. He is the scientific adviser to Soft Drinks International.
He is also a professional saxophonist and composer specialising in music used for relaxation, stress reduction and healthy living. He produces CDs, videos and music for corporate health brands and performs live at corporate events and public concerts.

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Sun Branding Solutions will present a recent case study on the redesign of a cross-country branding project, and RPC Containers Corby will be touching upon Heinz's latest revolution in packaging.

Mike Fairley, Managing Director at Labels & Labelling Consultancy, will be discussing the latest print technologies – new brand and marketing opportunities, and building on the theme of labels. Ian Schofield, Own Label Manager at Iceland Foods, will be looking at the packaging challenges for retail.

Steve Morgan from Recoup will give delegates a clear idea of the Plastics Recycling Agenda for 2014 looking at the UK's progress against its plastic recycling targets and how this will be affecting compliance costs.

The BIG Packaging Debate will also be returning to the NEC, where a panel of packaging experts will form a lively Question Time style session, discussing whether packaging is designed for the consumer or for the supply chain.

Visitors can also get one-to-one personalised advice on any aspect of their packaging from expert professionals at the Packaging Consultancy Clinic, or take part in Lions' Lair where the audience can grill a selection of brave exhibitors as they pitch their latest innovations to a panel of experts, all hoping to receive a very public thumbs up.

Those interested in exploring what active and intelligent packaging can do for their brand can gain tailored and specific advice on the Active & Intelligent Packaging Industry Association stand. Furthermore, on the second day of the show, the BIG Print Debate will bring industry experts together to discuss whether the latest print technologies provide brands sound ROI or are simply a gimmick.

A drinks reception for all those visiting the show will be held after The BIG Packaging Debate at the close of the show on Wednesday providing an opportunity to meet the panel and the rest of the speakers at the show, network with colleagues, new contacts, and exhibitors. ■

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