



Issue 5: February, 2020: This e-bulletin is aimed at health professionals, consumers, growers, farmers, packers, processors, distributors, retailers, and others in the plant foods area.

'Berries are forever'

Berries, like diamonds, are forever. Berries are also precious and should be consumed daily as part of the diet. They are highly coloured and fulfil the slogans 'eat colour' and 'eat the rainbow'. The red/blue/purple/yellow colour of berries is due to anthocyanins (Martín et al. 2017). They are naturally occurring pigments belonging to the flavonoid group and are abundantly present in fruits and vegetables, and especially in berries and red wine. Fifty years ago anthocyanins were only of interest to organic chemists in relation to structure determination. However, they are now recognised as nature's powerful bioactive antioxidants and as such are very important in the diet.

Free radicals and inflammation

Free radicals are atoms/molecules that have an unpaired electron and as such are highly unstable. Therefore, they seek an electron to enable them stabilise and if they get it from the human body this causes inflammation which when chronic is a component of many diseases including cardiovascular, neurological and pulmonary diseases, also cancer and diabetes (Biswas et al. 2017). Our bodies produce millions of free radicals daily as part of body chemistry and they need to be quenched before they cause oxidative stress and inflammation. The immune system helps greatly in this regard but needs support via antioxidants such as anthocyanins.

Measuring antioxidant power

Antioxidant power is a measure of the ability of antioxidants to scavenge (quench) free radicals and can be measured in the laboratory. The so called DPPH (2,2-diphenyl-1-picryl-hydrazyl-hydrate) free radical method is an antioxidant assay based on electron-transfer that produces a violet solution in ethanol (Goupy et al. 1999). This free radical, stable at room temperature, is reduced in the presence of an antioxidant molecule, giving rise to colourless ethanol solution. Scavenging of DPPH radicals was 95% for blackberry and blueberry extracts compared to 55% for strawberry extract indicating the antioxidant potency of the blue/violet pigments of the former two (Huang et al. 2012). A USA

study showed similar results with radical scavenging power (expressed as 1/IC50) of 0.77 (blackberries), 0.71 (blueberries), 0.71 (red raspberries), 0.32 (strawberries) and 0.29 (black raspberries) (Basu & Maier, 2016). More recently, Morrison (2019) reported a number of studies which showed that blueberries can improve cognitive function, blood vessel function and reduce systolic blood pressure; anthocyanins were cited as the active agents.

Vitamin C, potassium, dietary fibre

Vitamin C is a strong antioxidant and berries are a good to moderate source i.e. strawberries (59), raspberries (26), blackberries (21) and blueberries (10mg/100g); these compare with 50mg/100g for oranges. Diets low in potassium increase risk of hypertension, stroke and cardiovascular disease and blackberries (162), strawberries (154), raspberries (151) and blueberries (77mg/100g) are good/moderate sources; in comparison bananas (358mg/100g) are recognised as a very good source. Raspberries (6.5%) and blackberries (5.3%) have a significant dietary fibre content due to their droplet structure and help raise fibre intakes in the fibre deficient Irish diet (see PlantFoods-ucd, 2019, Issue 1).

Availability of berries

Berries are available on a year round basis in retail stores in Ireland and also in farm shops, and in the summer season from roadside sellers/stalls. Strawberries can be produced in Ireland from March to November but the season for raspberries, blackberries and blueberries is shorter. However, seasonality is no longer a problem as berry importation is facilitated by modern transport and distribution systems.

Conclusions

Eating berries should be a way of life due to their health promoting properties. Their ability to help combat inflammation, and contribute to potassium and fibre intakes are key benefits. Therefore, the motto for the next decade should be 'pop berries instead of pills!'

References

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