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Session I Posters

Capturing secrets from nature

P-6

Potentially neuroactive amines in kiwifruits.

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The beneficial effects of a diet rich in fruits and vegetables on human health are generally recognized. The protective effect of a diet rich in fruit and vegetable on cardiovascular diseases and some kind of cancer has been shown in many investigations, including the large scale study using the data coming from the EPIC (European Prospective Investigation into Cancer and nutrition) initiative (Crowe *et al.*, 2011) and the very recent investigation of Oyebode and coworkers (2014). The earlier investigation inspired the launch of various national campaign such as "5-a-day" campaign in UK, France and Germany, the "Fruit and Veggies-more matters" in USA, and the "Go for 2+5" in Australia.

Some very recent investigation highlighted also a positive association between fruit and vegetable consumption and enhanced mood, happiness, psychological well-being feeling (White *et al.*, 2013, Carr *et al.*, 2013; Blanchflower *et al.*, 2012) and decreased depression (Tsai *et al.*, 2001).

However, similar reports referred on specific fruits or vegetables are very rare. Carr and coworkers (2013) reported a specific positive association between the consumption of two kiwifruits per day and less fatigue, more vigour and overall enhanced mood state, while Lin and coworkers (2011) found that kiwifruits seems to improve sleep onset, duration, and efficiency in adults. The precise molecule(s) responsible for these activities have not been yet identified; White and Carr speculated that the observed kiwi fruit effects could be due to the high content of vitamins (mainly vitamin C, D, E), folates, carotenoids, flavonoids, omega-3-fatty acids and micronutrients, while Lin and coworkers speculatively attributed the observed effect on vitamins, antioxidants and serotonin, which has been previously detected in this fruit.

Recently, in a project aimed to the metabolomics characterization of kiwifruits, we found that beside the presence of vitamin C and various different polyphenols, an interesting cocktail of metabolites, which potentially could be involved in the psycoactivities of this fruit, have been detected. This phytocomplex included tryptophan, tryptamine,

serotonin, N-acetyl serotonin and melatonin, i.e. the complete biosynthetic pathway for the production of phytomelatonin.

The putative gene responsible for tryptamine production in kiwifruit was identified and it was characterized by phylogenetic comparison with that of other plant species and by its heterologous expression in *Nicotiana benthamiana*.

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