



Plants for the future: the development of functional foods for nutrition, health and well-being

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Food for your brain....



**A wide array
of Fruits and
vegetables**



**Green & Black Tea:
(Flavanols)**



**Red wine:
(Flavanol, Flavonols)**



**Citrus:
(Flavanone)**



**Cocoa:
(Flavanols
and procyanidins)**

**Berries:
(Anthocyanins)**



The functions of flavonoids

**Antioxidant
effects**

Lower Blood Pressure

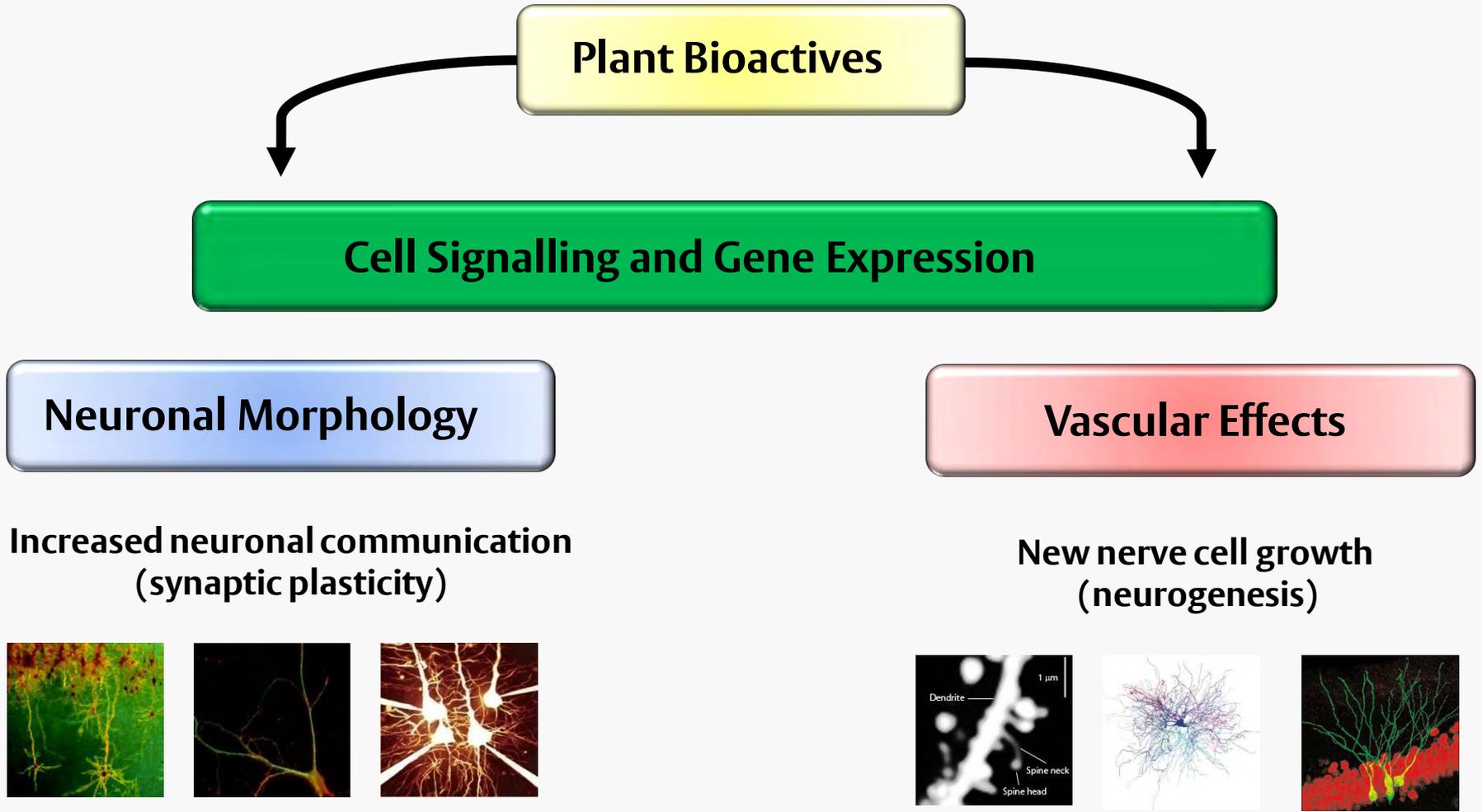
**Inhibit Cancer
Cell Growth**

**Reduce
Cardiovascular
Disease**

**Protect against
neurodegeneration**

**Inhibitors of
Inflammation**

Interactions with the architecture of memory and cognition



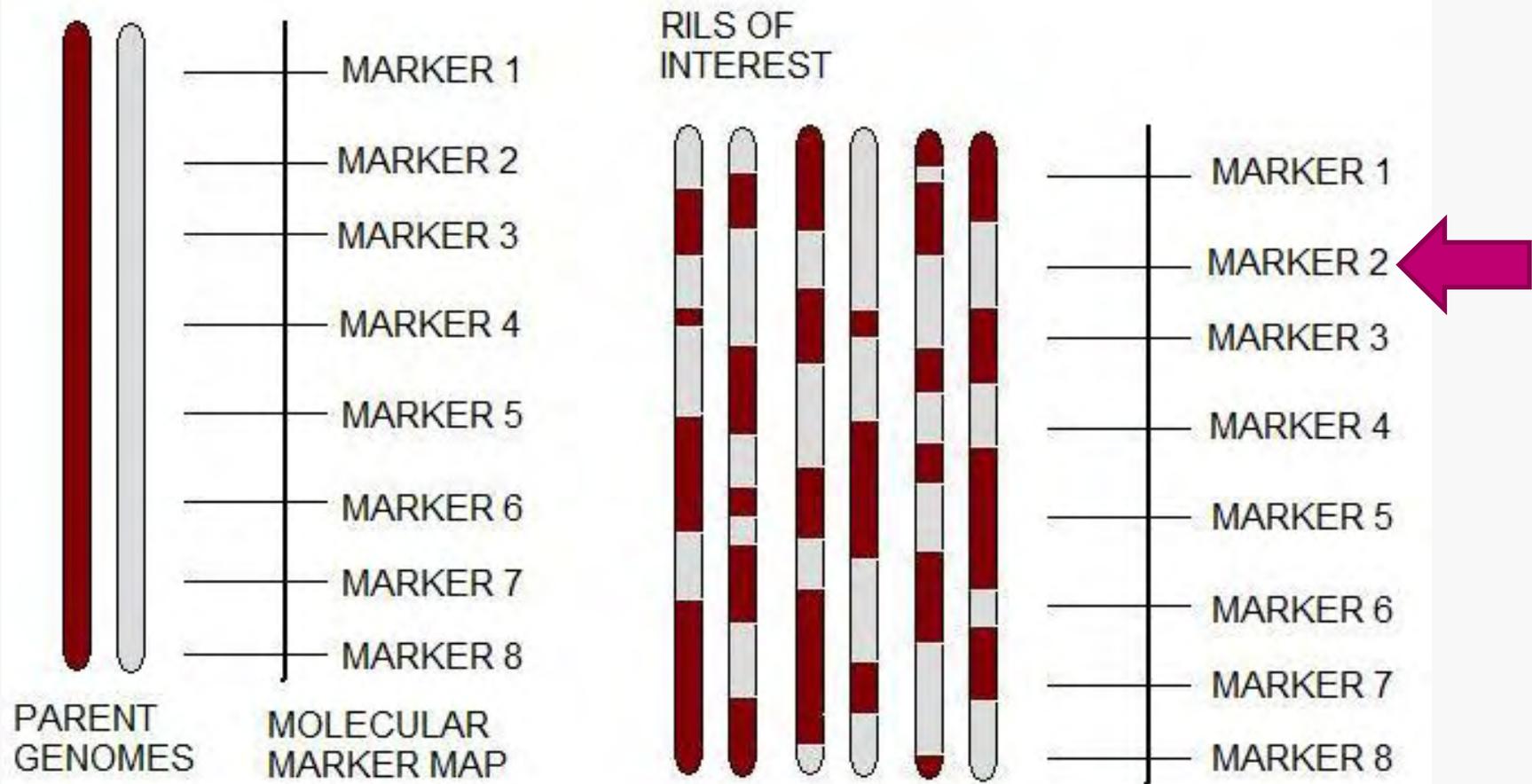
Ways of improving levels of functional bioactives

- Plant breeding
- Cultivation methods
- Better postharvest handling and storage

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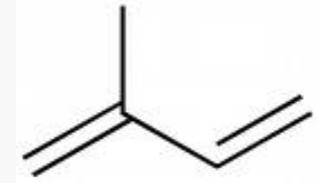
Developing markers for plant breeding



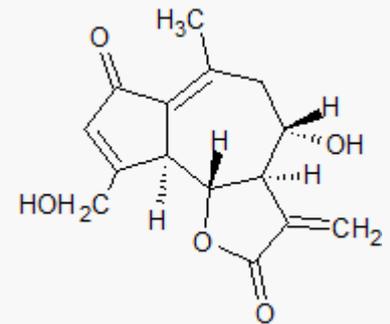
Sesquiterpenoid lactones in lettuce



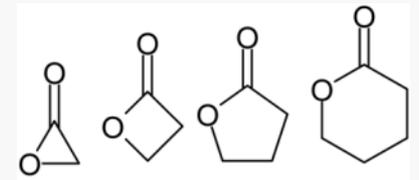
- Responsible for the bitter taste of lettuce
- 15C chain, comprised of 3 isoprene units and lactone groups



Isoprene



Lactucin



Lactone groups

Function of sesquiterpenoid lactones



In humans:

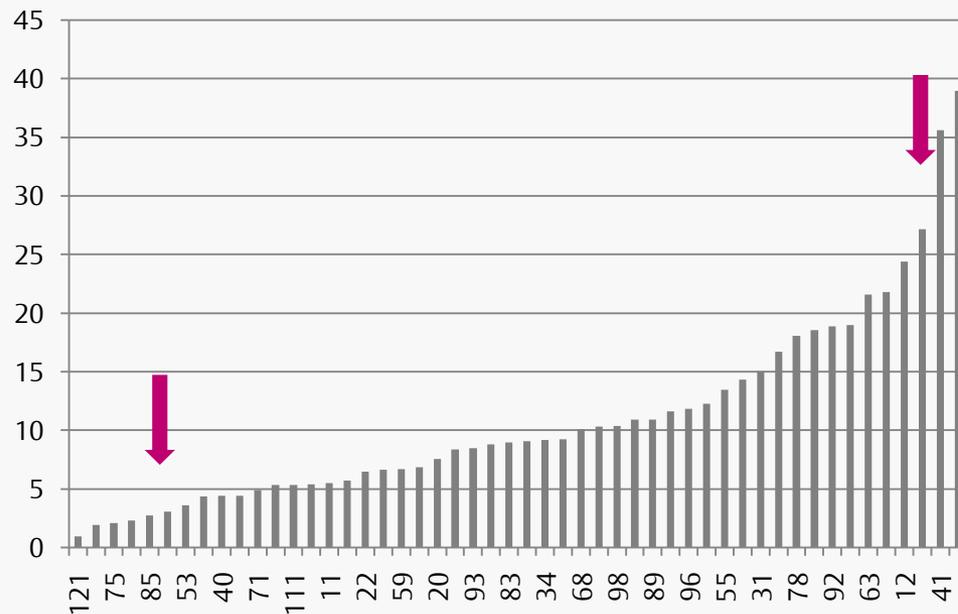
- Tumour treatments
- Tumour sensitisation
- CVD treatments
- Prevention of neurodegeneration
- Flu and burns

In plants:

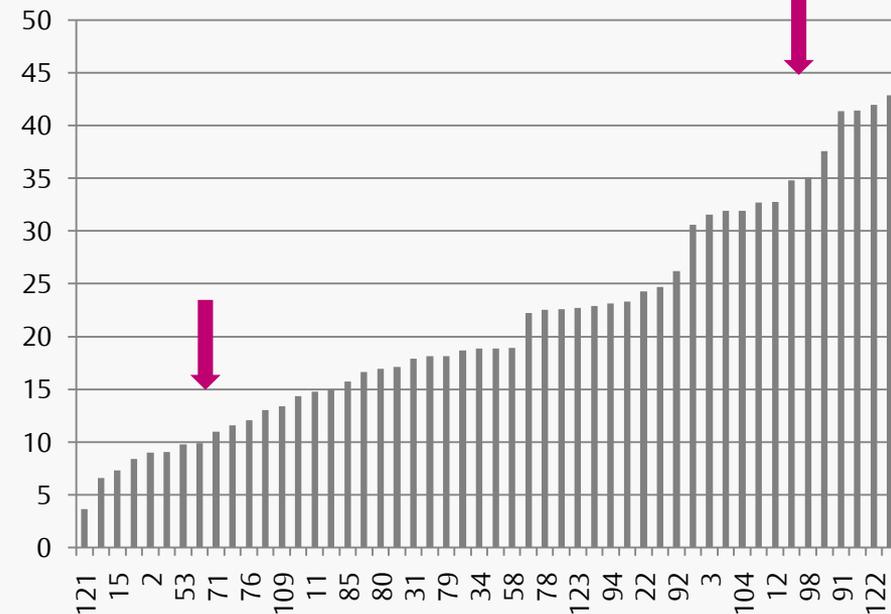
- Antimicrobial activity
- Allelopathy
- Anti-feedants
- UV protection
- Insecticides
- Predator attractors

Diversity in the population extends beyond the parents

Lactucin-15-oxalate



Lactucopicrin-15-oxalate



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Rocket science

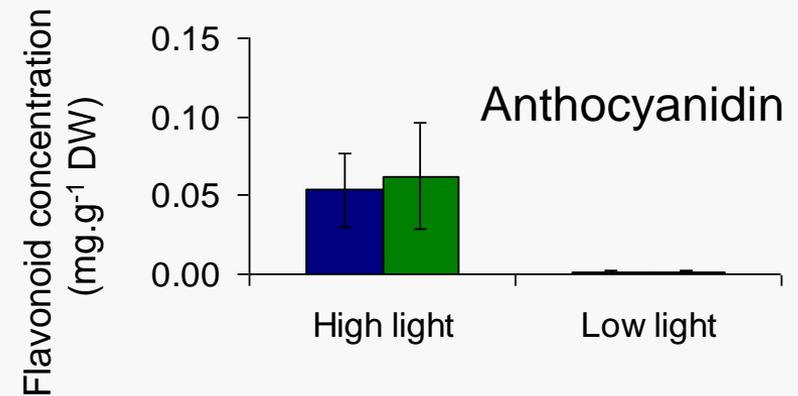
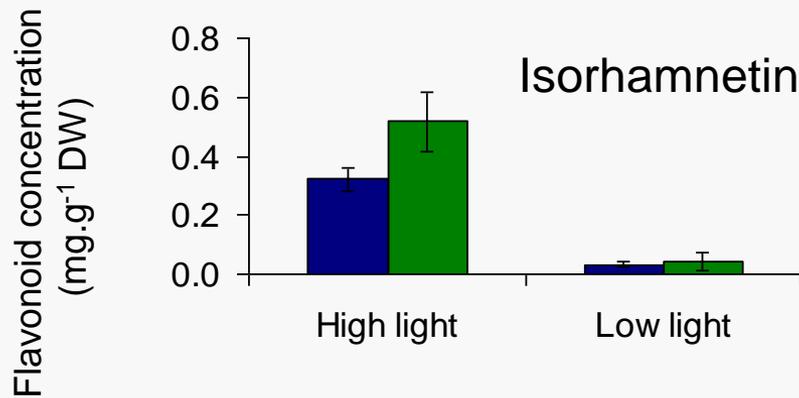
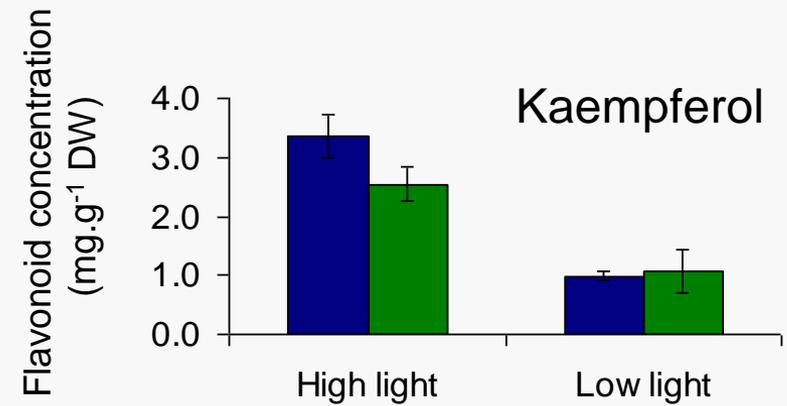
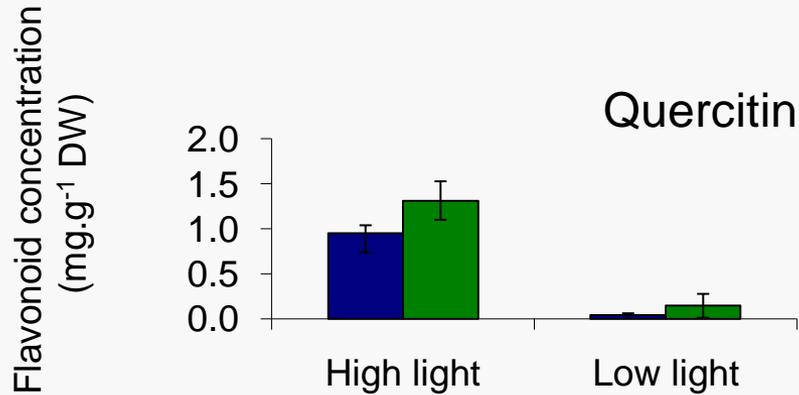
Salad Rocket
Eruca sativa



Wild Rocket
Diplotaxis tenuifolia



Flavonoid profiling: high and low light

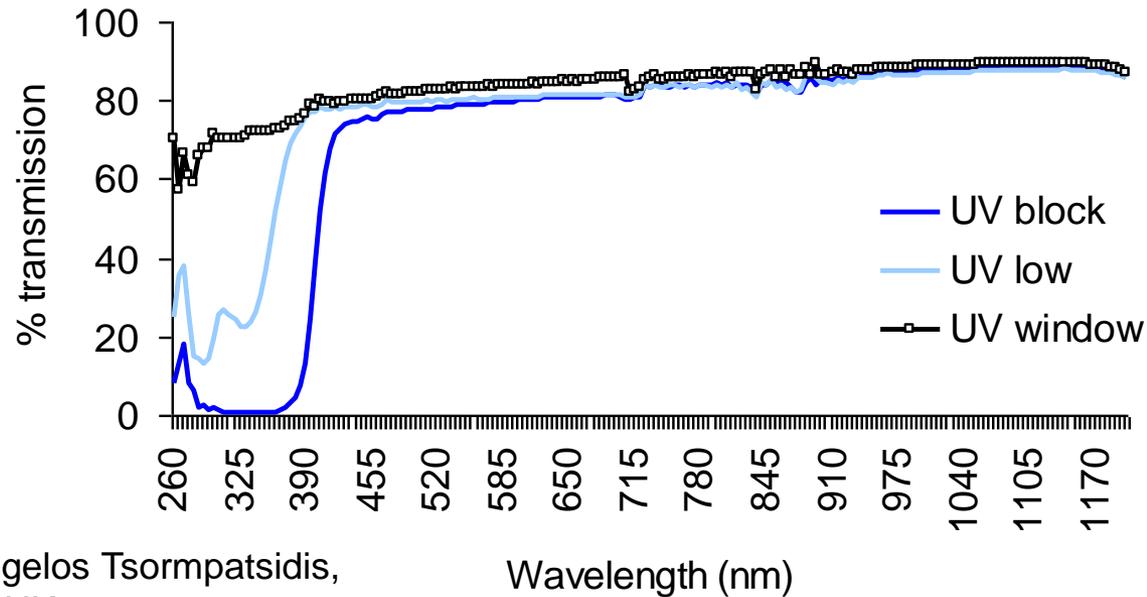


 Salad rocket *Eruca sativa* cv. Sky

 Wild rocket *Diplotaxis tenifolia* cv. Voyager

Effect of UV exposure on fruit and veg

- UV block
- UV low
- UV window



Data supplied by Evangelos Tsormpatsidis, University of Reading, UK

7-span x 75m telescopic tunnel
(Haygrove tunnels, UK)

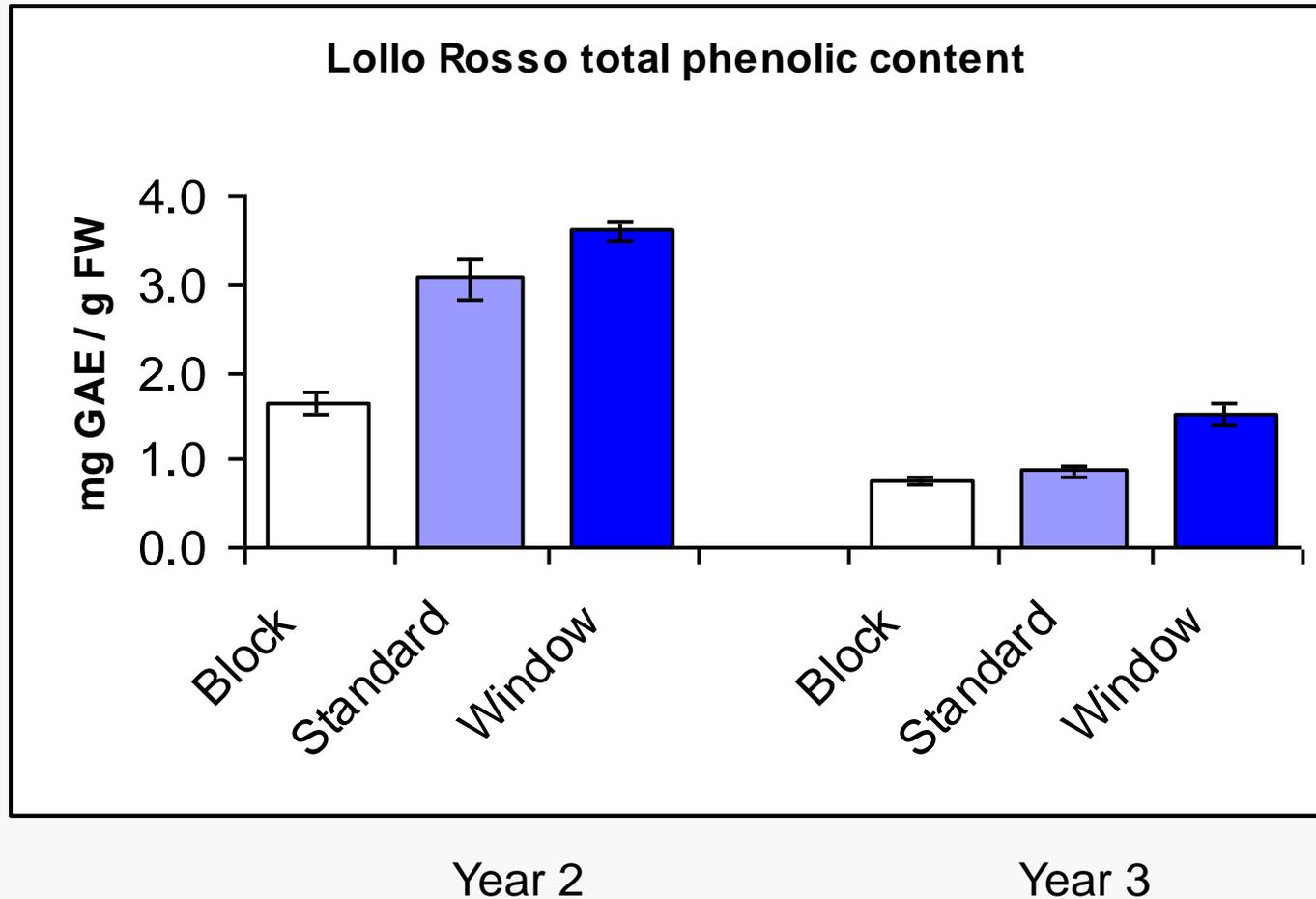
Films were kindly supplied by British Polythene Industries (BPI)



Lollo rosso red leaf lettuce



Phenolics increase with higher UV exposure

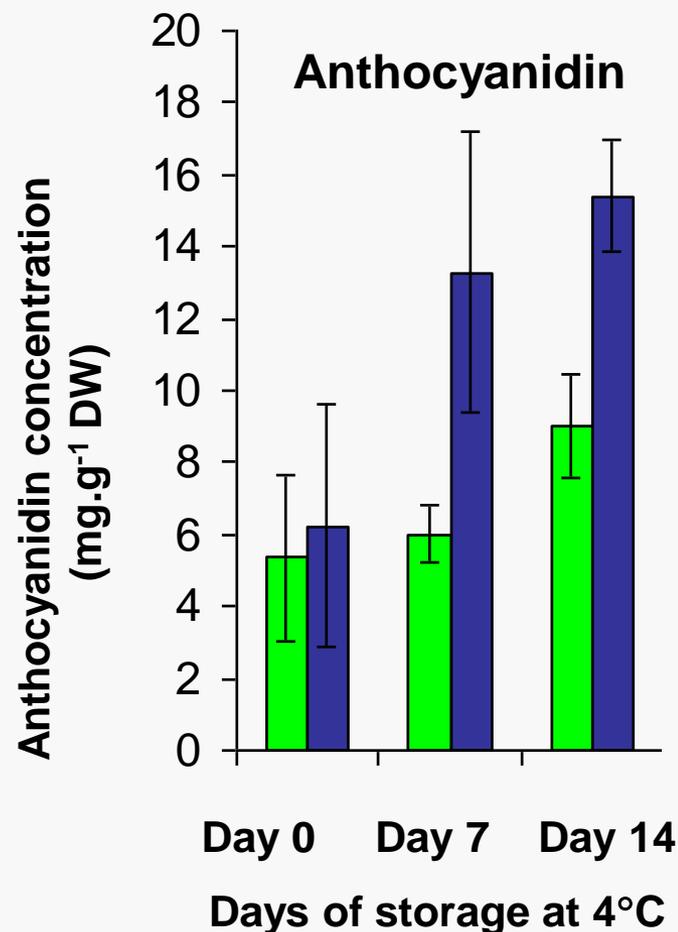
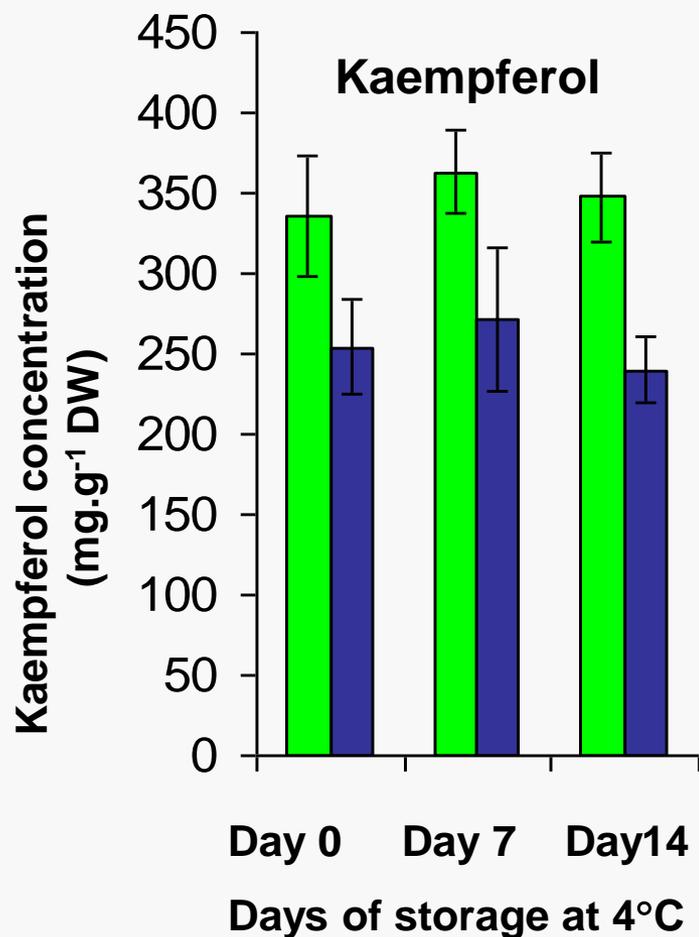


- Block
- Standard
- Window

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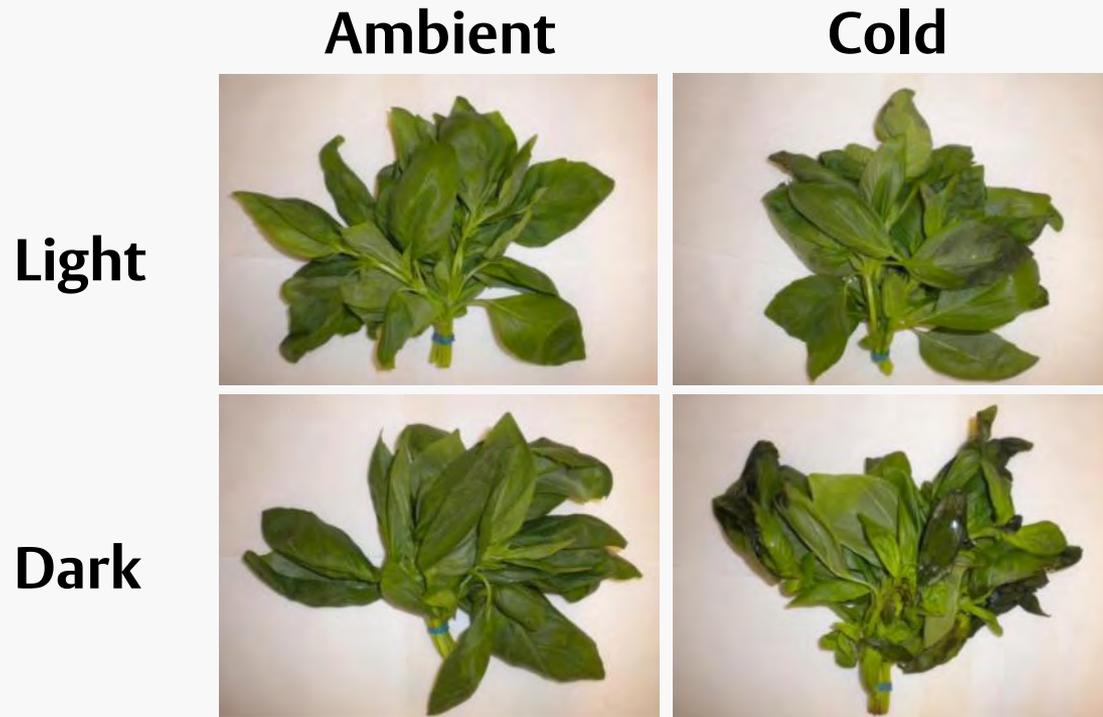
Flavonoid profiling: postharvest storage



 Salad rocket *Eruca sativa* cv. Sky

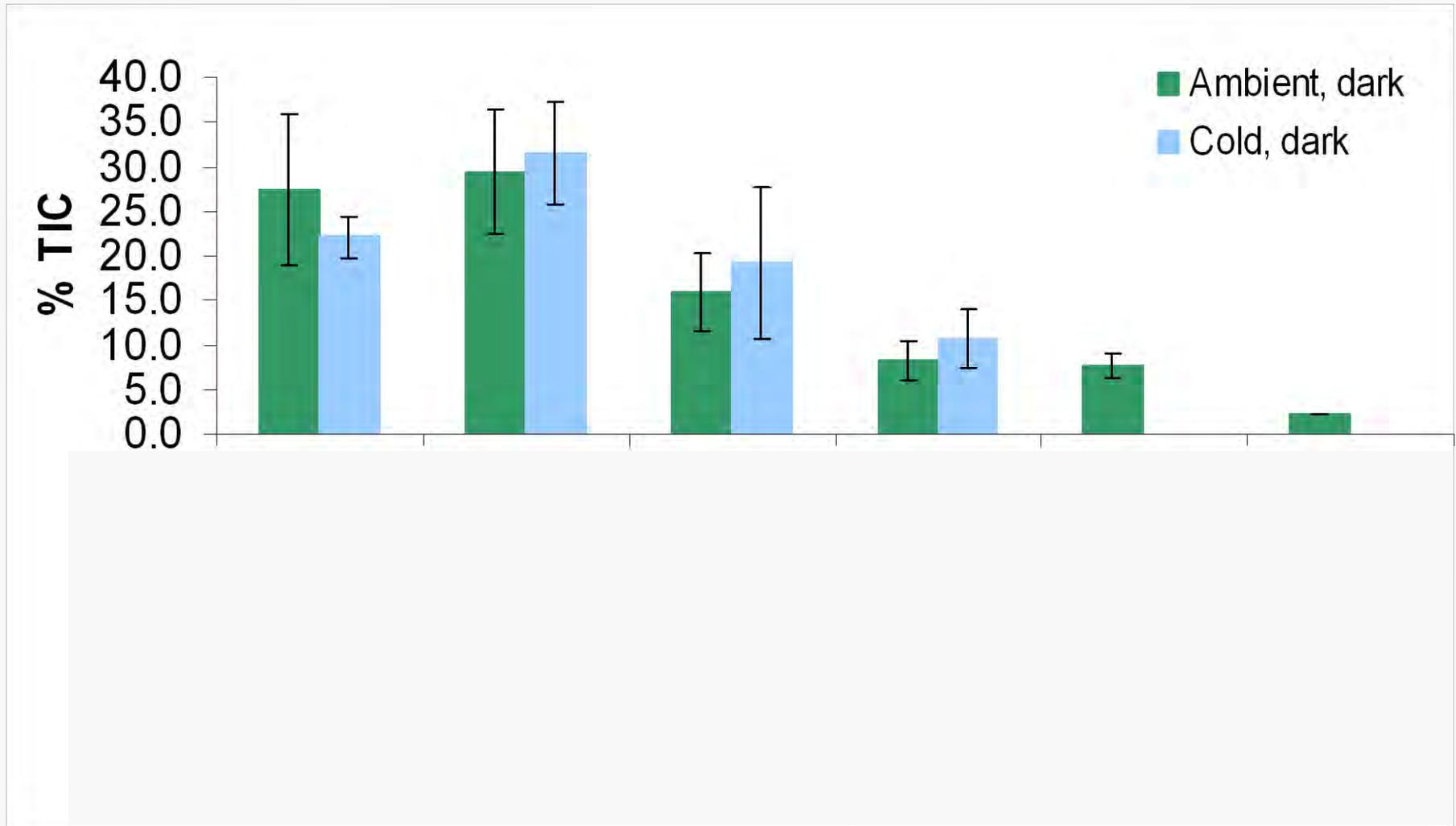
 Wild rocket *Diplotaxis tenifolia* cv. Voyager

Basil – sensitive to poor postharvest management



- Cold/ dark has an adverse effect on the physical condition of Basil

Postharvest influence on flavour



The future for crop quality

- Yield, flavour, nutritional density and shelf life all have the potential for enhancement
- Some simple solutions possible to big challenges
- Feed the world / nurture the population



Carsten Müller
Michael O'Reilly



Tozer Seeds Ltd 

Harriet Trewin, Chenyi Yao
Frances Gawthrop



The University of Nottingham Jerry Roberts



Jackie Barker
Sue Wellham

Radboud University Nijmegen
Simona Cristescu



Mathew Prestwich
Ashley Hyde

