Influence of air-drying temperature on the quality and bioactive characteristics of dried Galega kale (*Brassica Oleracea* L. Var. *Acephala*)

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❑ Introduction

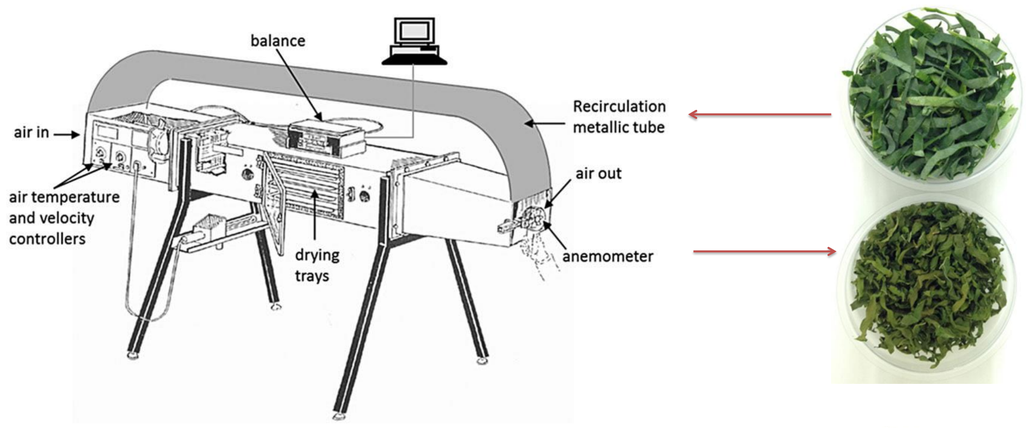
✓ Galega kale (*Brassica Oleracea* L. var. *Acephala*)
- Traditional fresh-cut vegetable
- High amounts of vitamins and other micronutrients
- Often included as soups ingredient
- High moisture content → compromised preservation

✓ Convective drying
- Preserve and increase the shelf-life of perishable food products
- Facilitates storage and transport, and reduces packaging costs
- Frequently used by food industrials to attain large amount of dried vegetables
- Physical, biological and chemical modifications → may affect the overall quality of the dried products and the consumer's acceptance

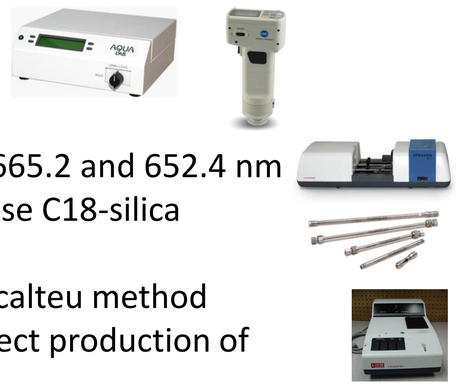
✓ **Objective**
- Study the influence of air-drying temperature on the drying characteristics and some quality parameters of Galega kale

❑ Materials & Methods

✓ Drying equipment

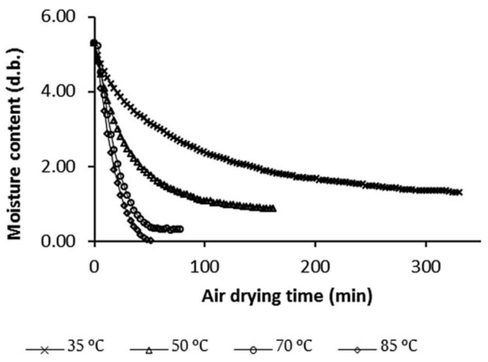


✓ Quality parameters
- Water activity: Water activity meter
- Color properties: colorimeter
- Chlorophylls: absorbance reading at 665.2 and 652.4 nm
- Vitamin C: HPLC analysis, reverse phase C18-silica analytical column
- Total phenolic compounds: Folin–Ciocalteu method
- Total antioxidant capacity (TAOC): direct production of ABTS chromophore

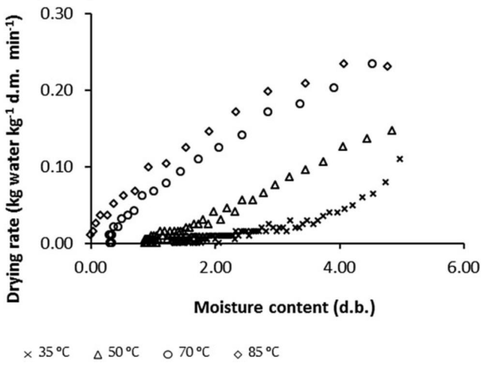


❑ Results & Discussion

✓ Drying curves



✓ Drying rate curves



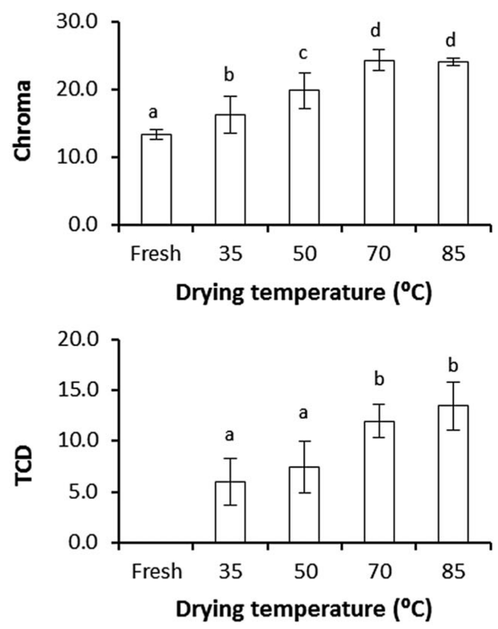
✓ Water activity, final moisture content and air relative humidity

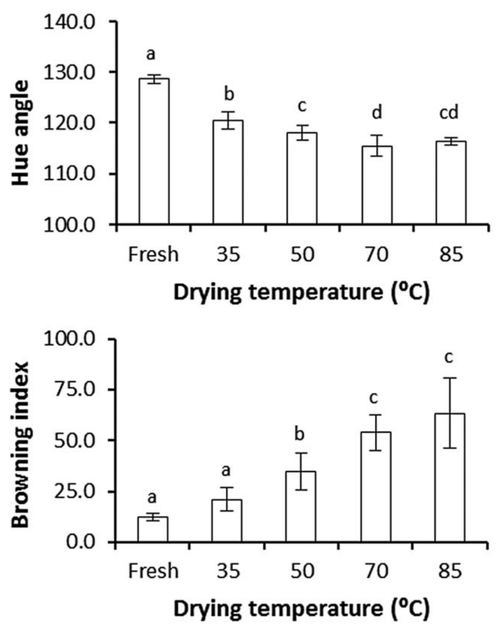
Drying temperature (C)	Water activity[a]	Final moisture content (d.b.)	Air relative humidity (%)[b]
35	0.525 ± 0.001	1.29	43.0 ± 3.3
50	0.487 ± 0.001	0.88	24.8 ± 0.6
70	0.465 ± 0.008	0.29	13.9 ± 0.4
85	0.461 ± 0.001	0.01	10.7 ± 0.5

[a] Values expressed as mean ± standard deviation, $n = 3$. Values expressed as mean ± standard deviation, $n = 5$.

❑ Results & Discussion (Cont.)

✓ Color parameters



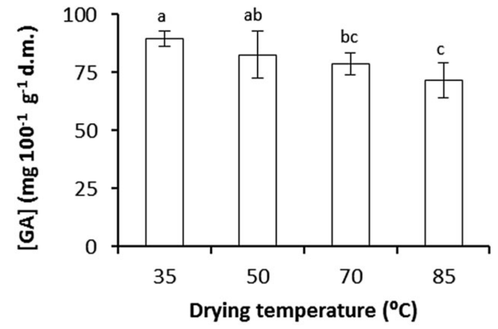


✓ Vitamin C

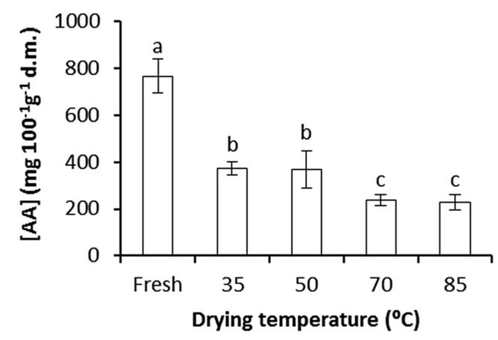
Drying temperature (C)	Vitamin C (mg/100 g d.m.)	Retention (%)
Fresh	566.1 ± 23.3[a]	–
35	539.0 ± 54.8[a]	95.2 ± 9.7
50	379.2 ± 44.0[b]	67.0 ± 7.8
70	336.3 ± 47.0[bc]	59.4 ± 8.3
85	252.1 ± 42.0[c]	44.5 ± 7.4

Notes: Values are expressed as mean ± standard deviation, $n = 4$. Values with the same letter in the first column were not significantly different ($P > 0.05$).

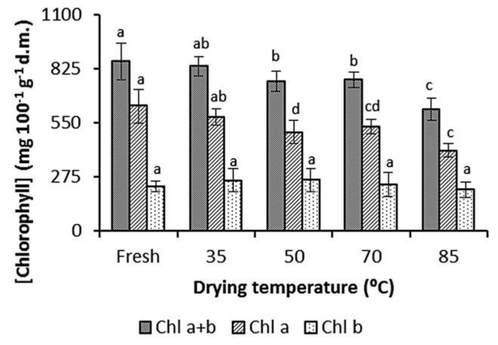
✓ Total phenolic content



✓ Total antioxidant capacity



✓ Chlorophylls



❑ Conclusions

✓ Increasing drying temperatures
- Reduction of the drying time, increase of the drying rate
- Decrease of water activity, final moisture content, and air relative humidity

✓ Convective drying of Galega kale without any pretreatment
- Significant quality deterioration, especially at high temperatures
  - Important nutritive losses: vitamin C, total phenolics and TAOC decreased with increasing temperatures
  - Color parameters also indicated product worsening
  - Degradation of chlorophyll *a* more pronounced at higher temperatures
  - Chlorophyll *b*: high thermal-stability → stable for all temperatures

✓ Further studies
- Evaluate pretreatments to prevent nutrients degradation and minimize color modifications → improve overall quality

❑ Acknowledgements

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