

Argon vs Nitrogen: what is the most effective gas for shelf-life extension of buckler sorrel?

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INTRODUCTION & OBJECTIVE

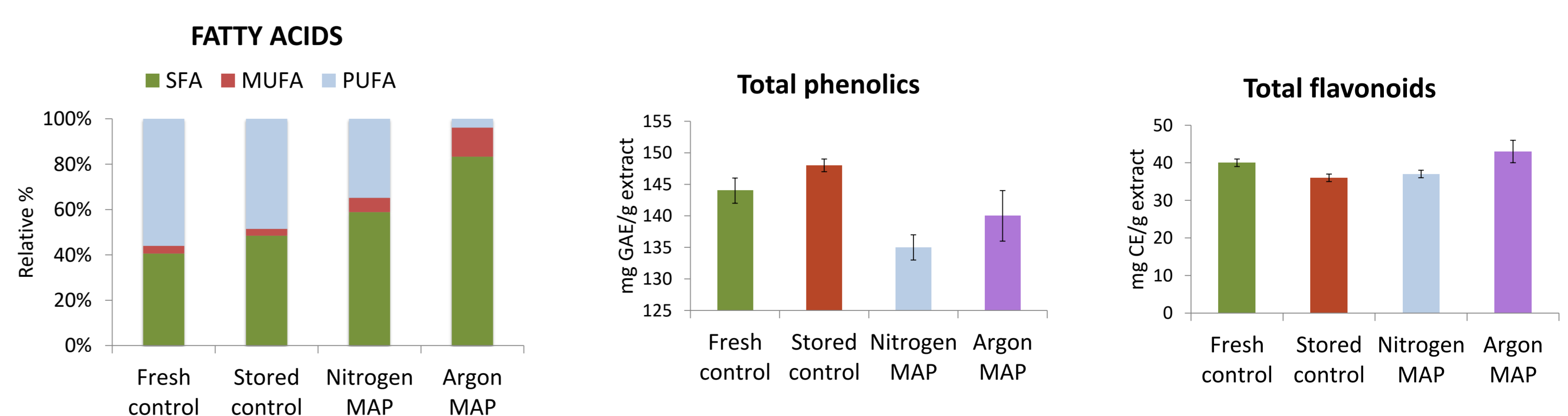
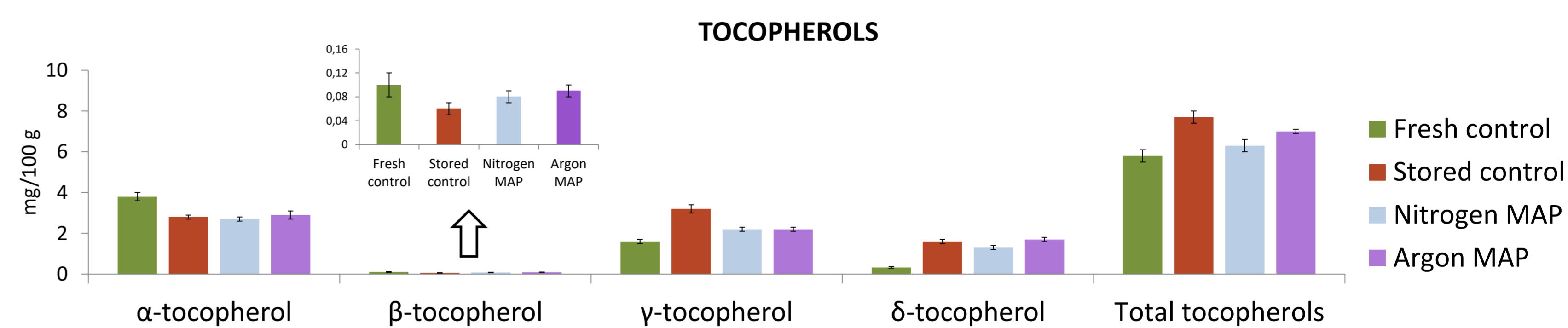
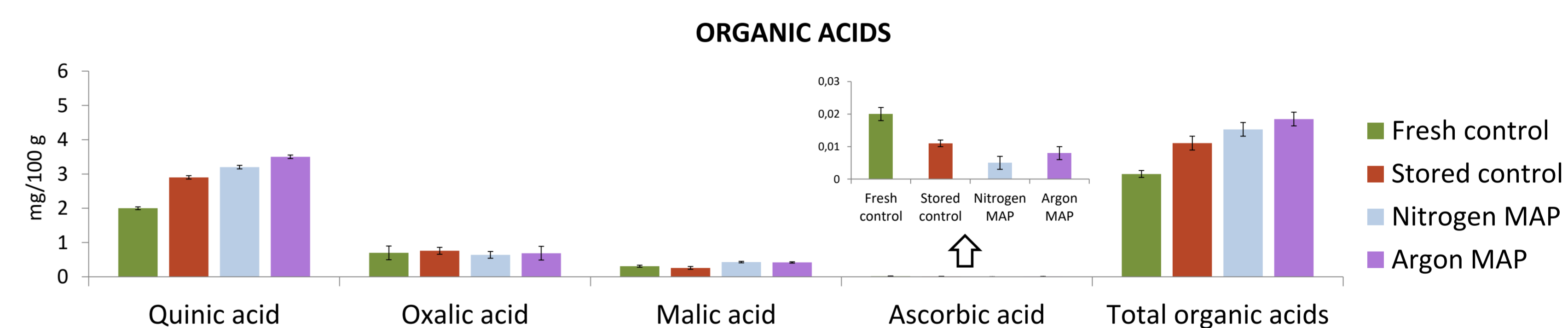
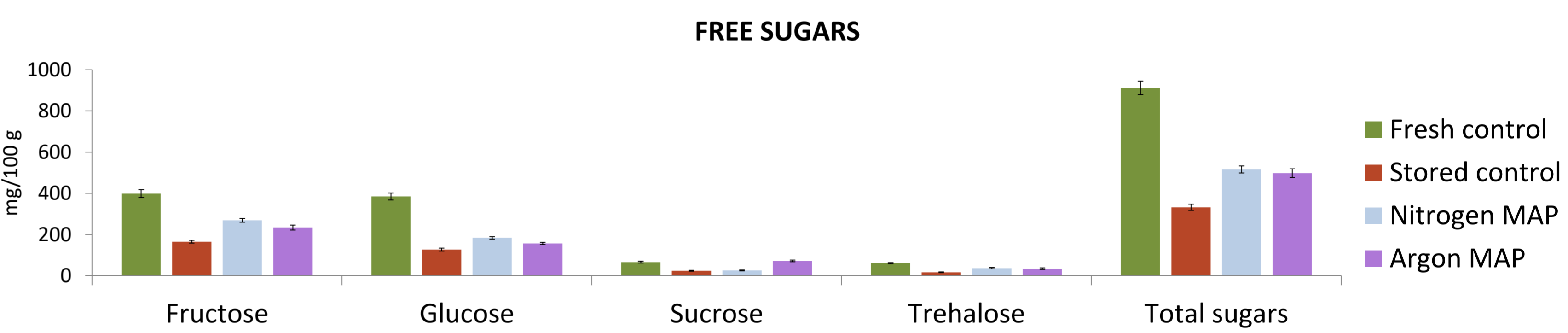
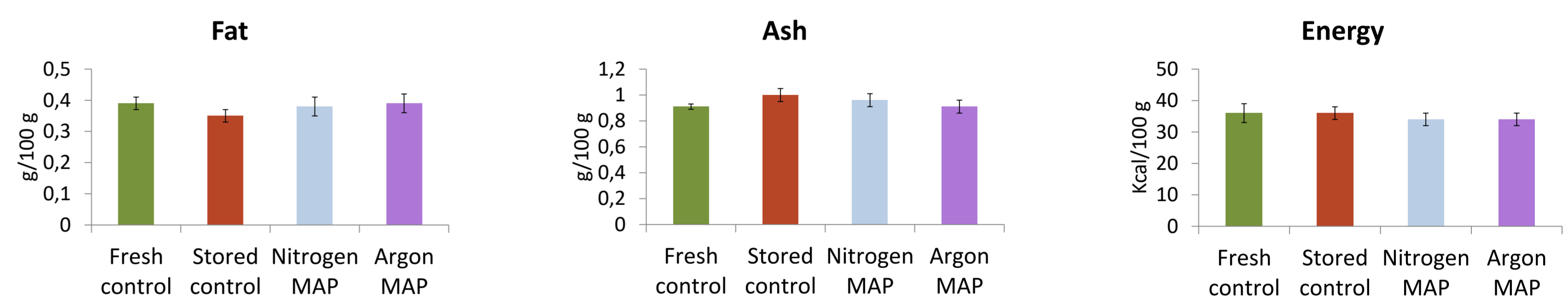
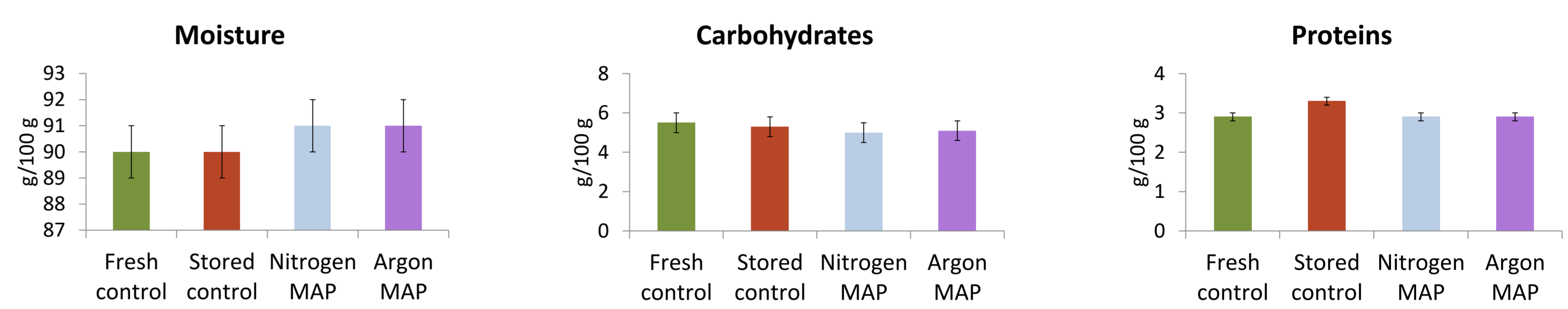
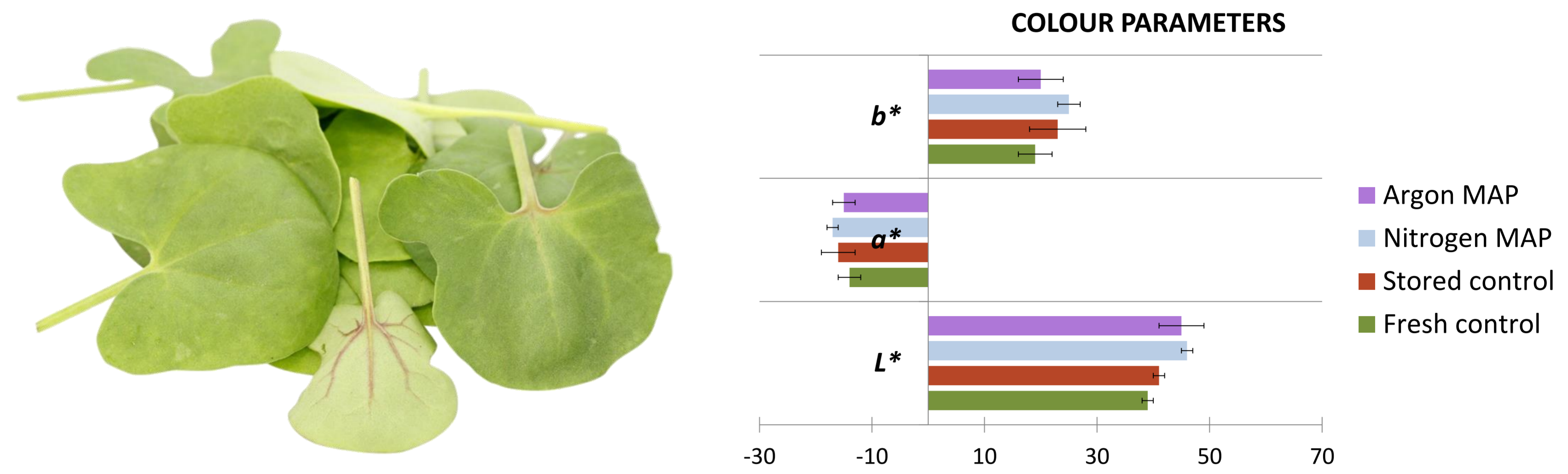
Buckler sorrel (*Rumex induratus* Boiss. & Reut.; Polygonaceae) is an underutilized leafy vegetable with peculiar sensory properties and potential as a gourmet food product. In the food industry, different packaging methods have been used for shelf-life extension, but it is important to know how the quality of minimally processed vegetable is affected by these treatments. Recently, nitrogen and argon have been used for food packaging. Nitrogen is low soluble in water and other food constituents and does not support the growth of aerobic microbes. In turn, argon is biochemically active and appears to interfere with enzymatic oxygen receptor sites. Herein, modified atmospheres enriched with nitrogen and argon were evaluated for shelf-life extension of buckler sorrel leaves.

METHODOLOGY

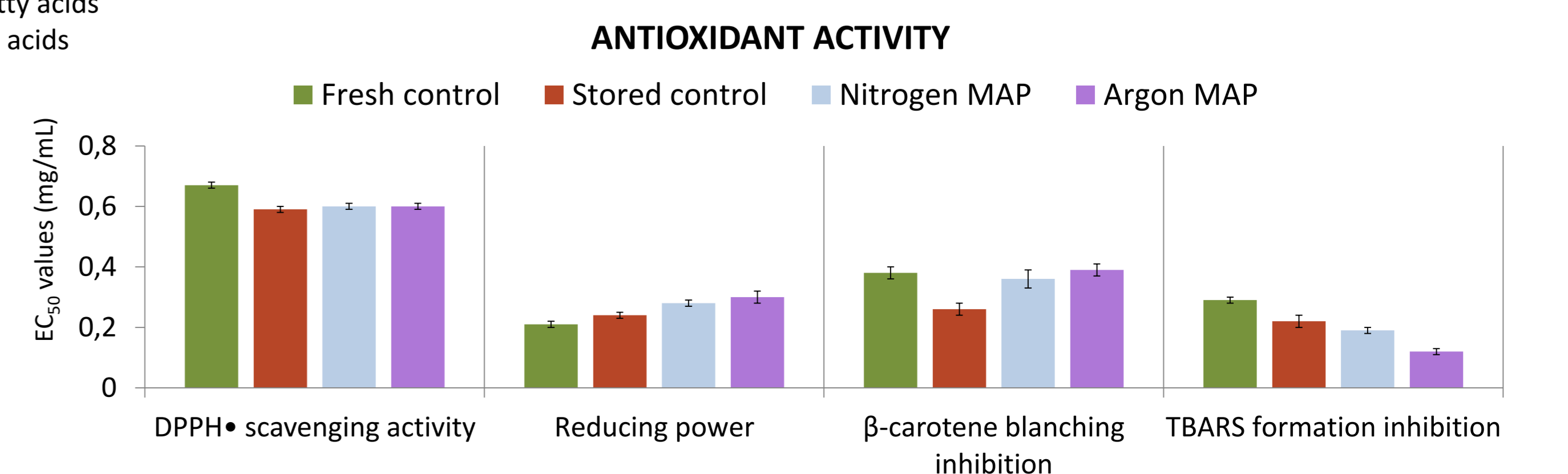
Wild samples were gathered in Bragança, Portugal, considering local consumers' sites and criteria. Healthy and undamaged leaves were selected, rinsed in tap water, and a portion was immediately analyzed (non-stored control). The remaining fresh material was packaged in polyethylene bags under nitrogen- and argon-enriched atmospheres and a conventional control atmosphere (air). All packaged samples were stored at 4°C for 12 d and then analyzed. The headspace gas composition was monitored during storage. Different quality attributes were evaluated, including visual (colour), nutritional (proximate constituents, free sugars, fatty acids, organic acids, and tocopherols) and bioactive (antioxidant activity) parameters.

RESULTS & DISCUSSION

The argon-enriched atmosphere better prevent the samples yellowing (b^* value). The proximate composition did not change significantly during storage. Samples in control atmosphere revealed higher protein and ash contents and lower levels of lipids. The non-stored control samples presented the higher amounts of fructose, glucose and trehalose. The storage time increased the palmitic acid levels and decreased the content in α -linolenic and linoleic acids. The γ - and δ -tocopherols were higher after the 12 d of storage. Probably, the synthesis of these lipophilic compounds was a plant strategy to fight against the abiotic stress induced by storage. Higher levels of total phenolics and flavonoids and increased reducing power and β -carotene bleaching inhibition capacity were also found in the stored control samples. Once again, this result may be attributed to the intrinsic plant-protection mechanisms. Overall, argon atmosphere was more suitable for quality preservation and shelf-life extension.



SFA: saturated fatty acids
MUFA: monounsaturated fatty acids
PUFA: polyunsaturated fatty acids



ACKNOWLEDGMENTS