

Supplementary Materials: Application of Response Surface Methodology for the Extraction of Phytochemicals from Upcycled Kale (*Brassica oleracea* var. *acephala*)

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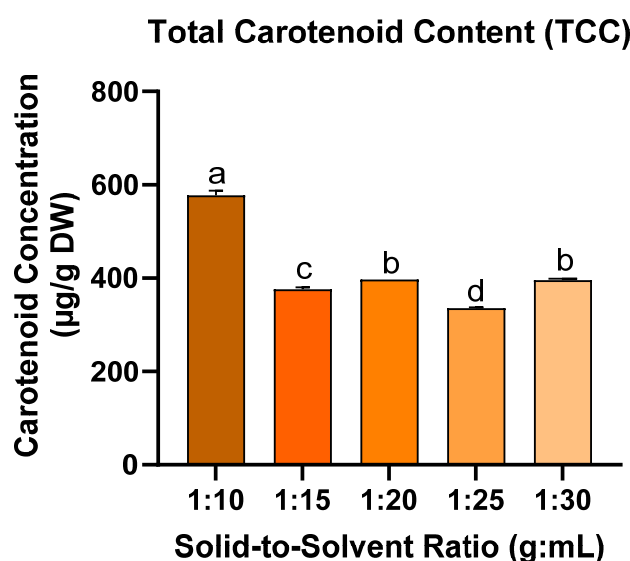


Figure S1. The total carotenoid content of upcycled kale extracted using different solid-to-solvent ratios. The UAE method was employed to compare five different solvent ratios, utilizing 0.5 g of material dissolved in 10 mL of solution (1:20 ratio) under optimized extraction parameters. Results are indicated as symbols for each ratio. The different letters of means (a-d) indicate significant differences ($p > 0.05$) among them. Error bars in the graph are represented for standard errors of the mean ($n=3$).

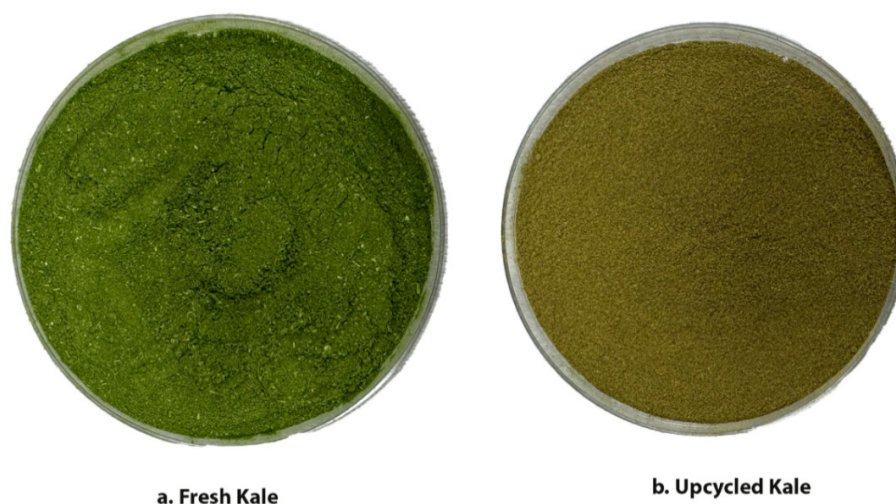


Figure S2. The figure represents a. fresh kale (freeze-dried method) and b. upcycled kale (vacuum-dried method)

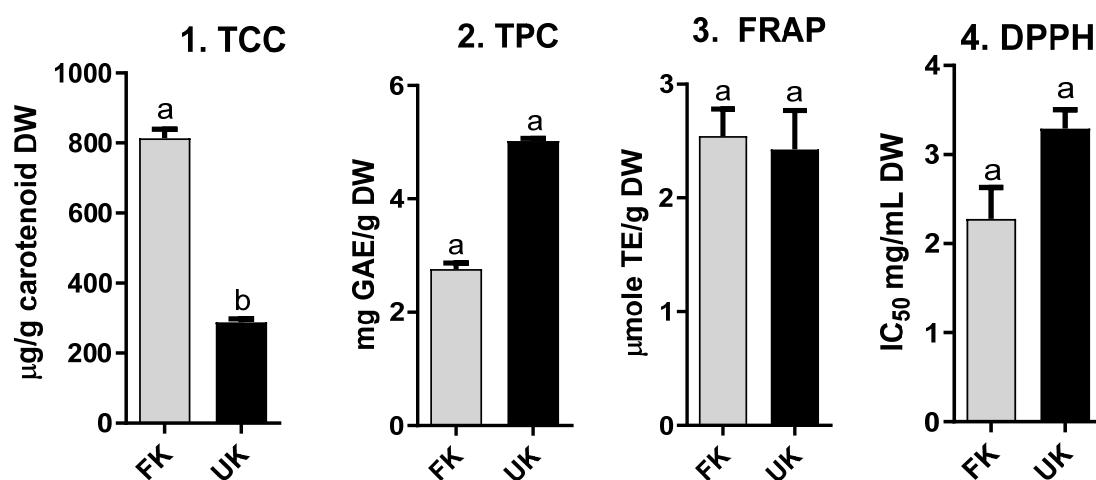


Figure S3. Comparison of fresh kale (FK) versus upcycled kale (UK) obtained from optimized RSM-CCD model conditions. The results expressed for total carotenoid content (TCC, µg carotenoid/g dry weight (DW)), total phenolic content (TPC, mg gallic acid equivalents/g DW), and antioxidant capacity (ferric reducing antioxidant power (FRAP), µmole Trolox equivalence/g DW and DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging of IC₅₀ mg/mL. The symbols indicated for significantly difference for comparison. The results for TCC conclude that FK is three times higher than UK whereas, TPC, FRAP, and DPPH had no significant difference from each other. Standard errors of the mean (n=3) are represented by error bars.