

# Development of value-added chicken burgers by adding pumpkin peel as a sustainable ingredient

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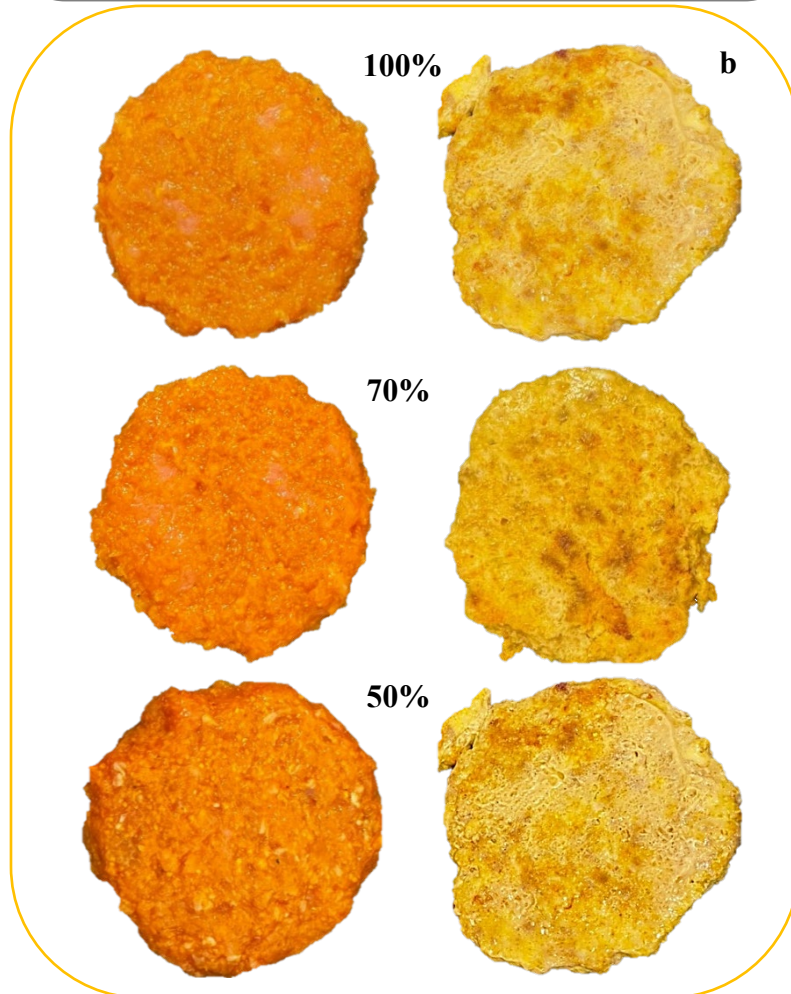
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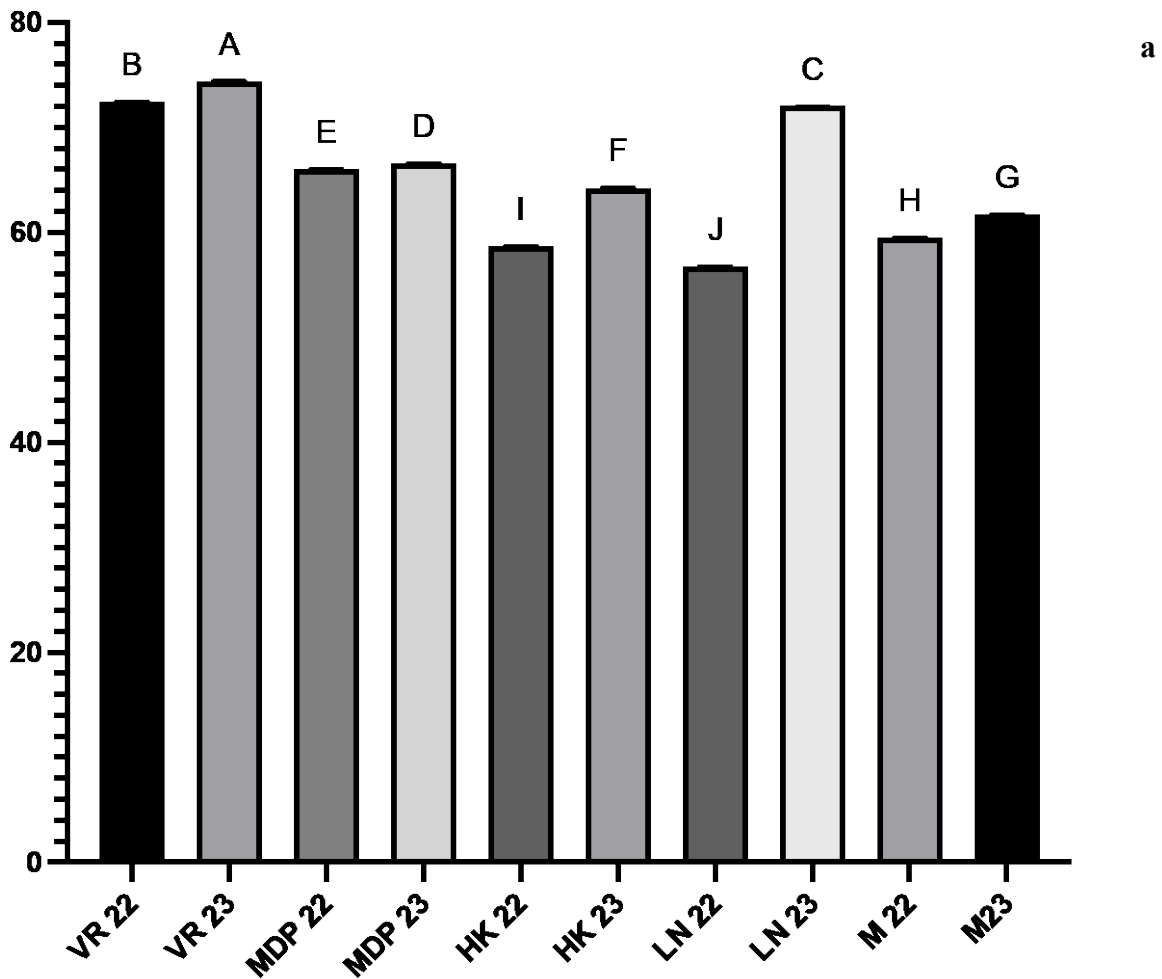
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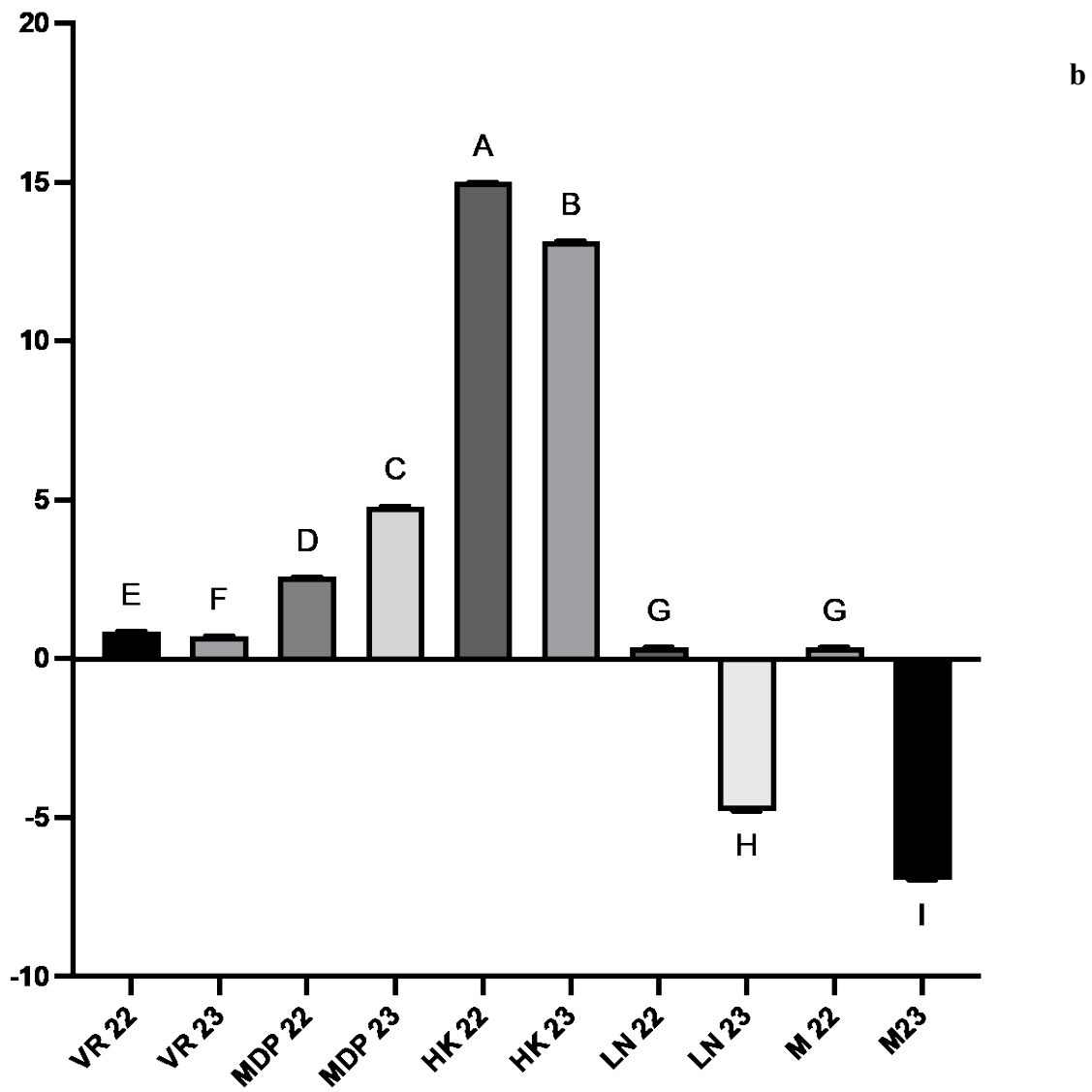
† These authors contributed equally to this work.



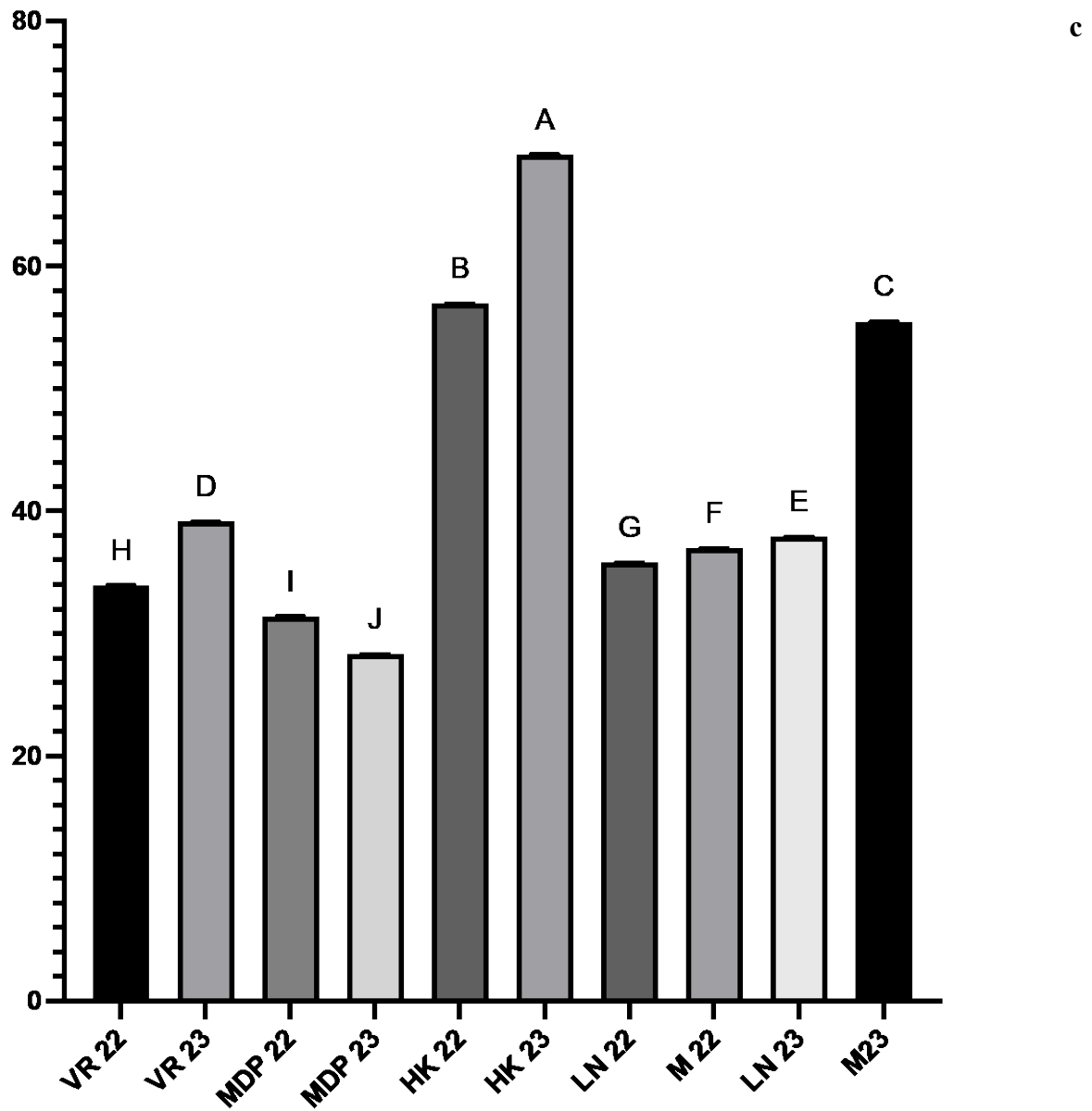
**Figure S1.** Cooking equipment (a), chicken-based burgers before and after cooking (b) with different percentages of chicken meat: 100, 70, and 50%.



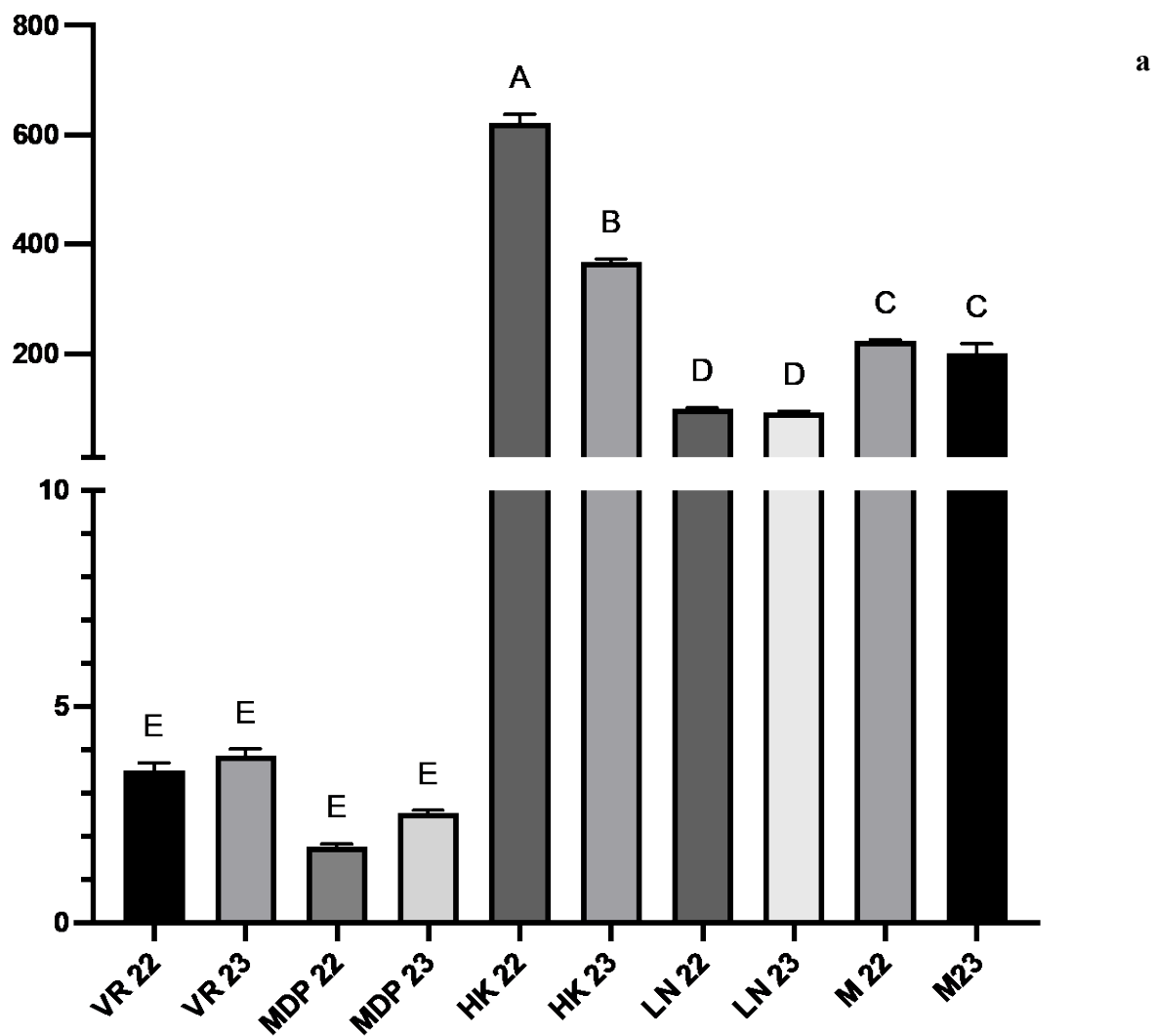
**Figure S2a:** Values of L\* parameter of carotenoid extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD, n = 3). Different letters indicate significant differences with p-value < 0.01. (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023)



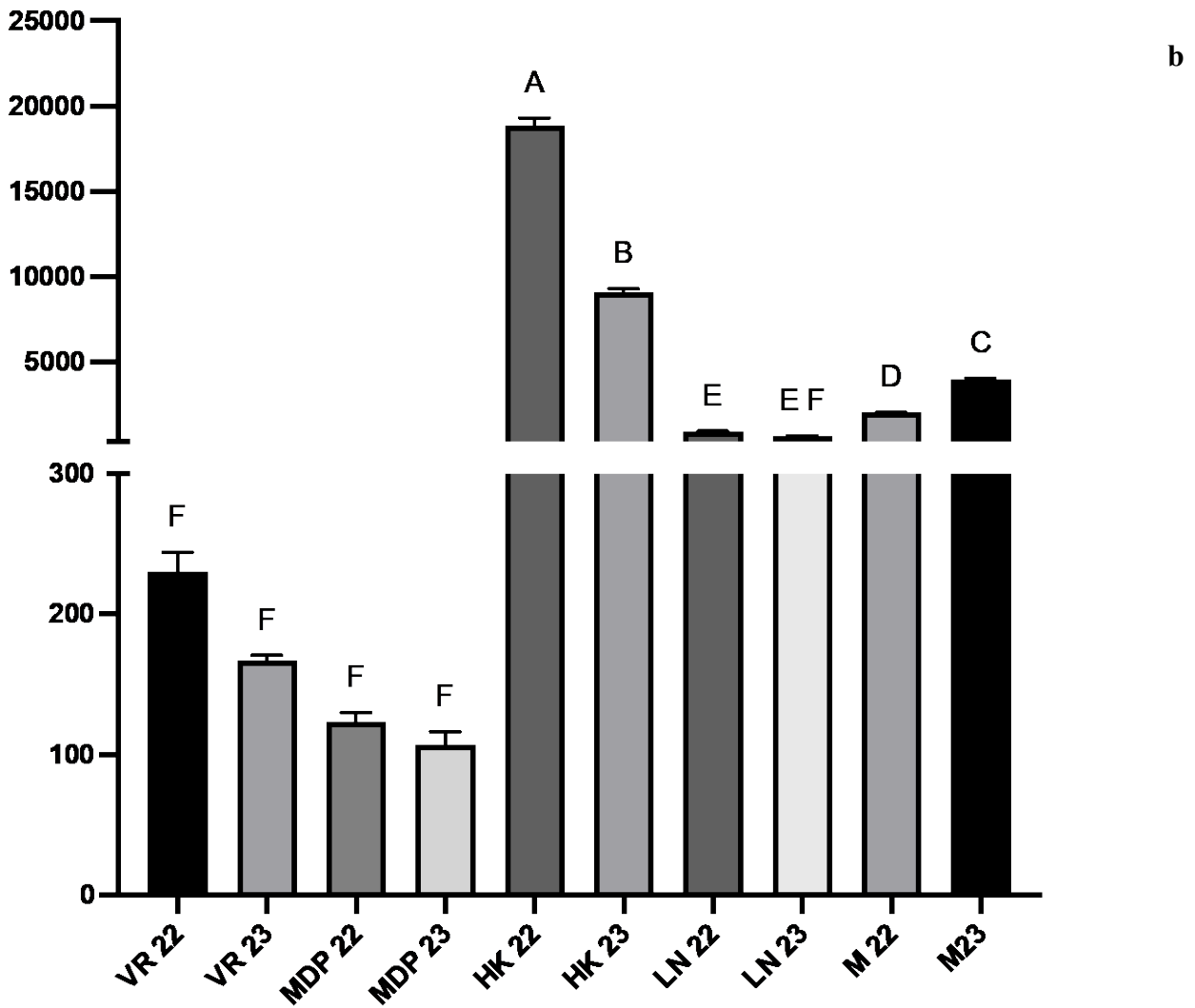
**Figure S2b:** Values of  $a^*$  parameter of values of carotenoid extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD,  $n = 3$ ). Different letters indicate significant differences with  $p$ -value  $< 0.01$ . (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023)



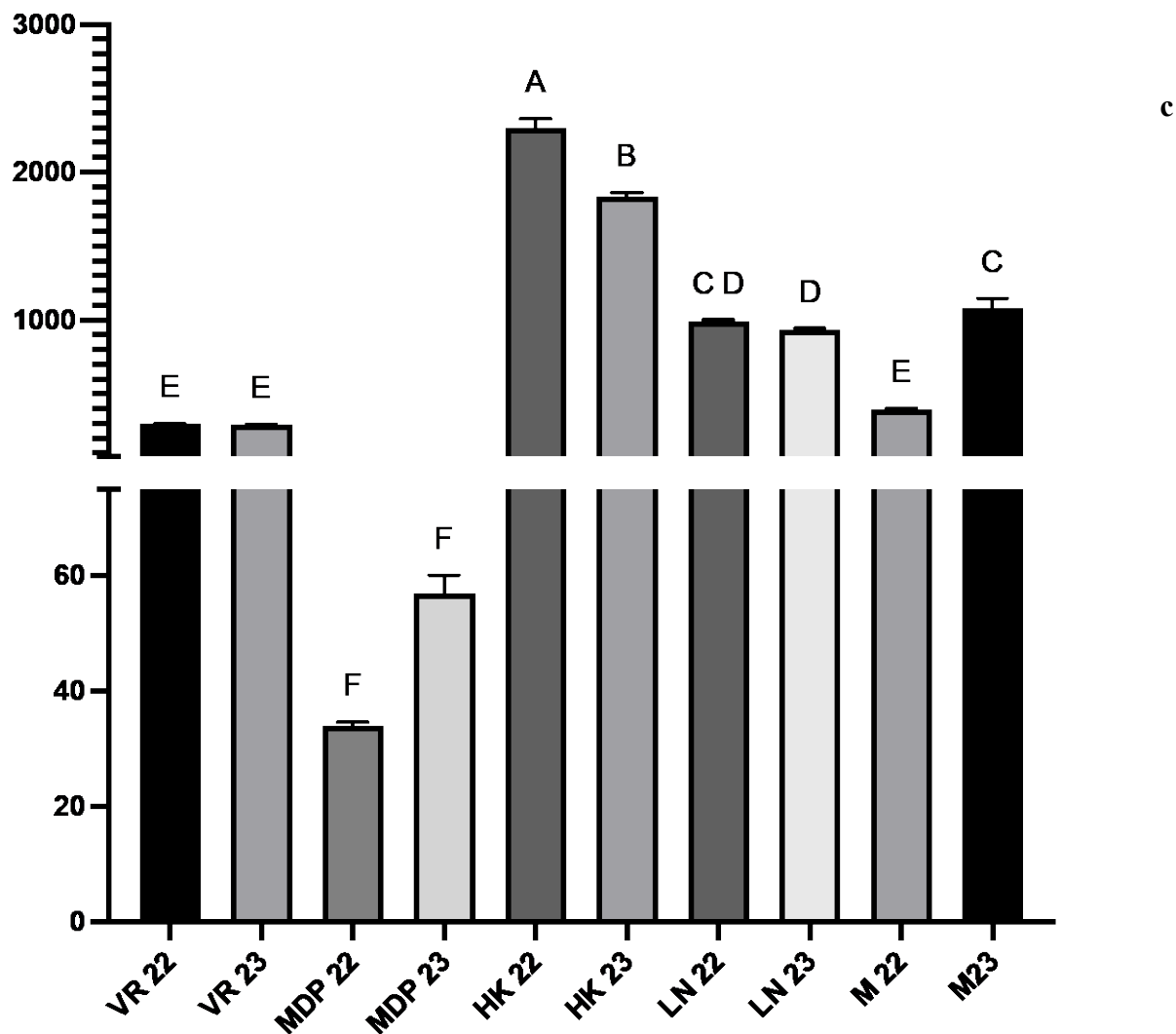
**Figure S2c:** Values of b\* parameter of values of carotenoid extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD, n = 3). Different letters indicate significant differences with p-value < 0.01. (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023)



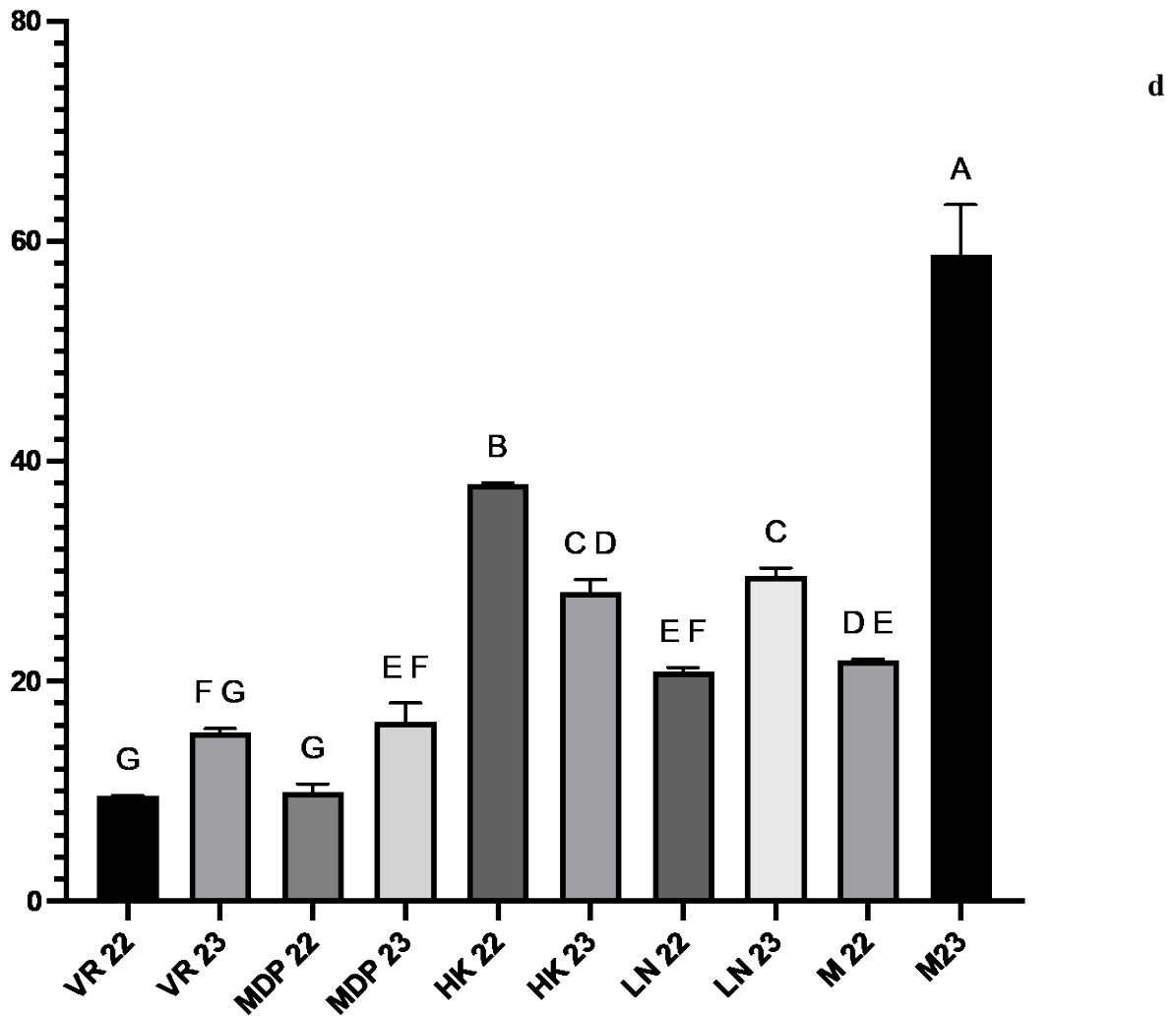
**Figure S3a:** Values ( $\mu\text{g LE/g}$ ) of free xanthophylls of extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD,  $n = 3$ ). Different letters indicate significant differences with  $p\text{-value} < 0.01$ . (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023). LE, Lutein Equivalents.



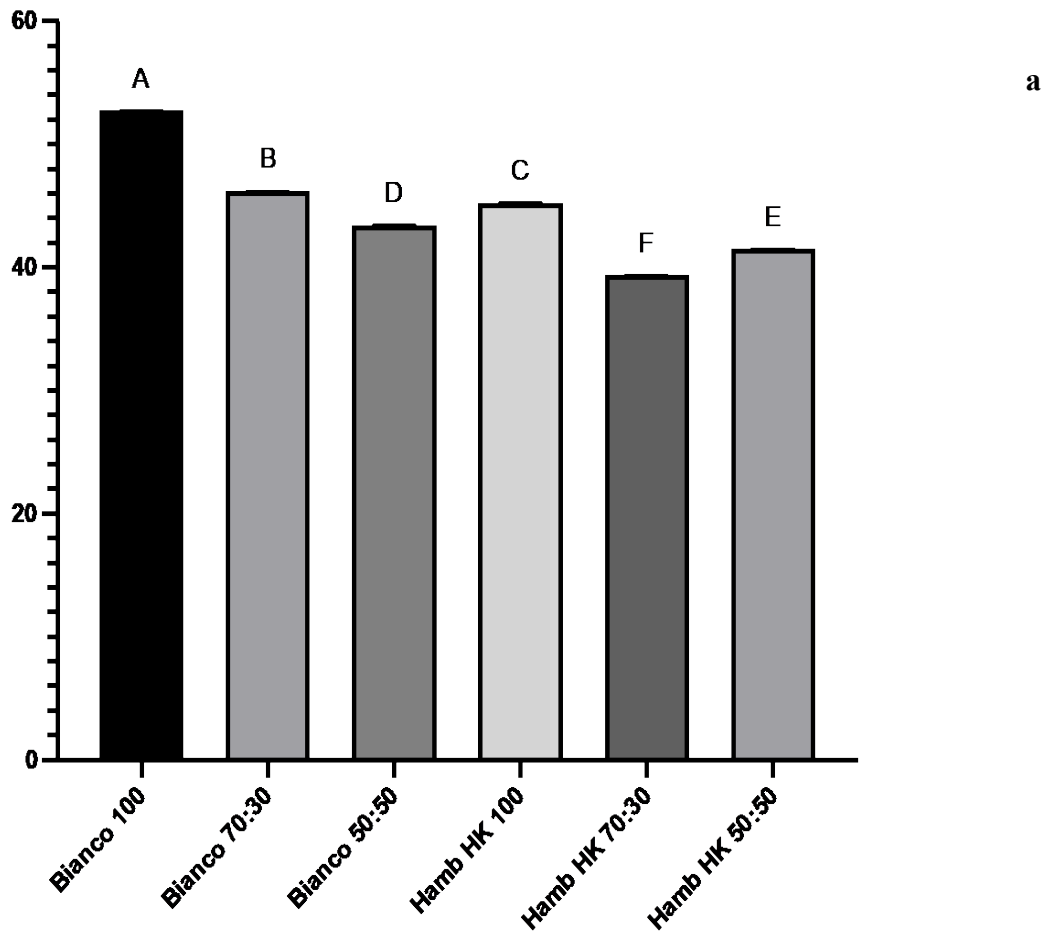
**Figure S3b:** Values ( $\mu\text{g ZDE/g}$ ) of monoesterified xanthophylls of extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD,  $n = 3$ ). Different letters indicate significant differences with  $p\text{-value} < 0.01$ . (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023). ZDE, Zeaxanthin Dipalmitate Equivalents



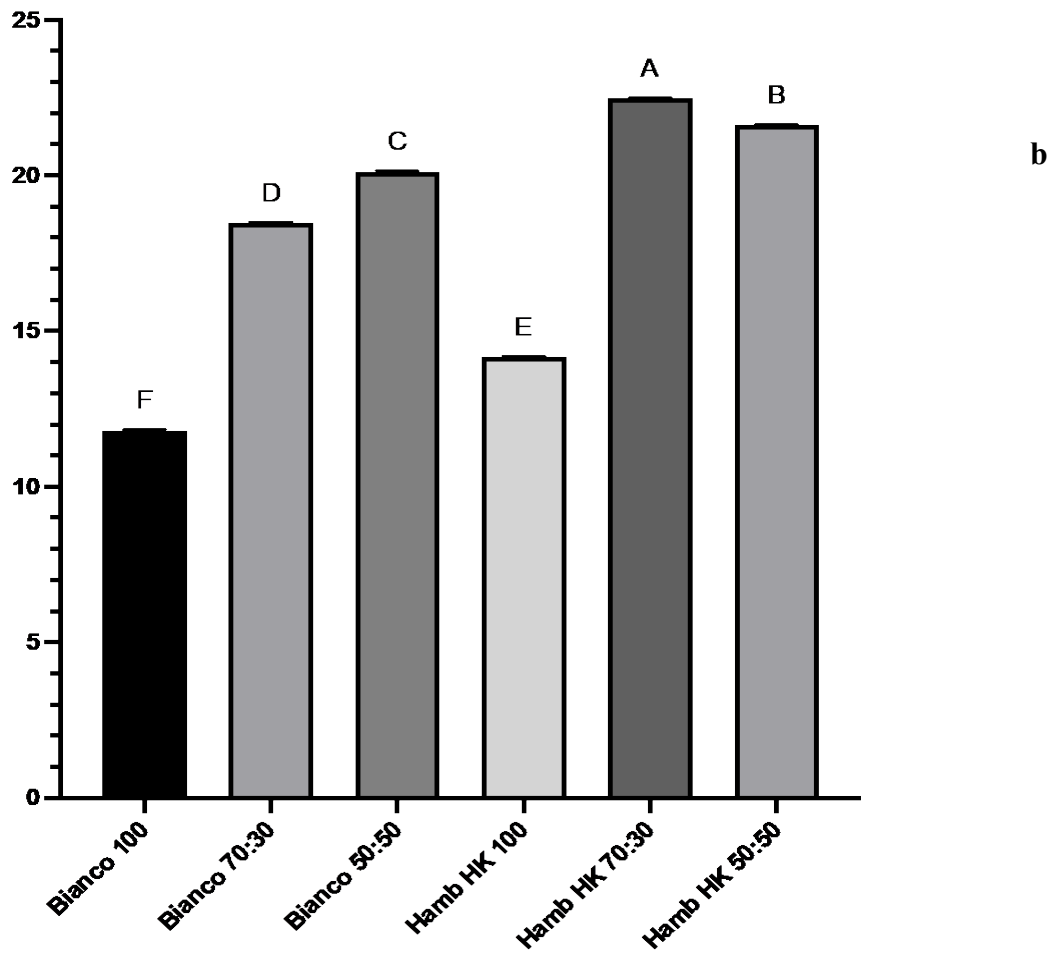
**Figure S3c:** Values ( $\mu\text{g ZDE/g}$ ) of disterified xanthophylls of extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD,  $n = 3$ ). Different letters indicate significant differences with  $p\text{-value} < 0.01$ . (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023). ZDE, Zeaxanthin Dipalmitate Equivalents.



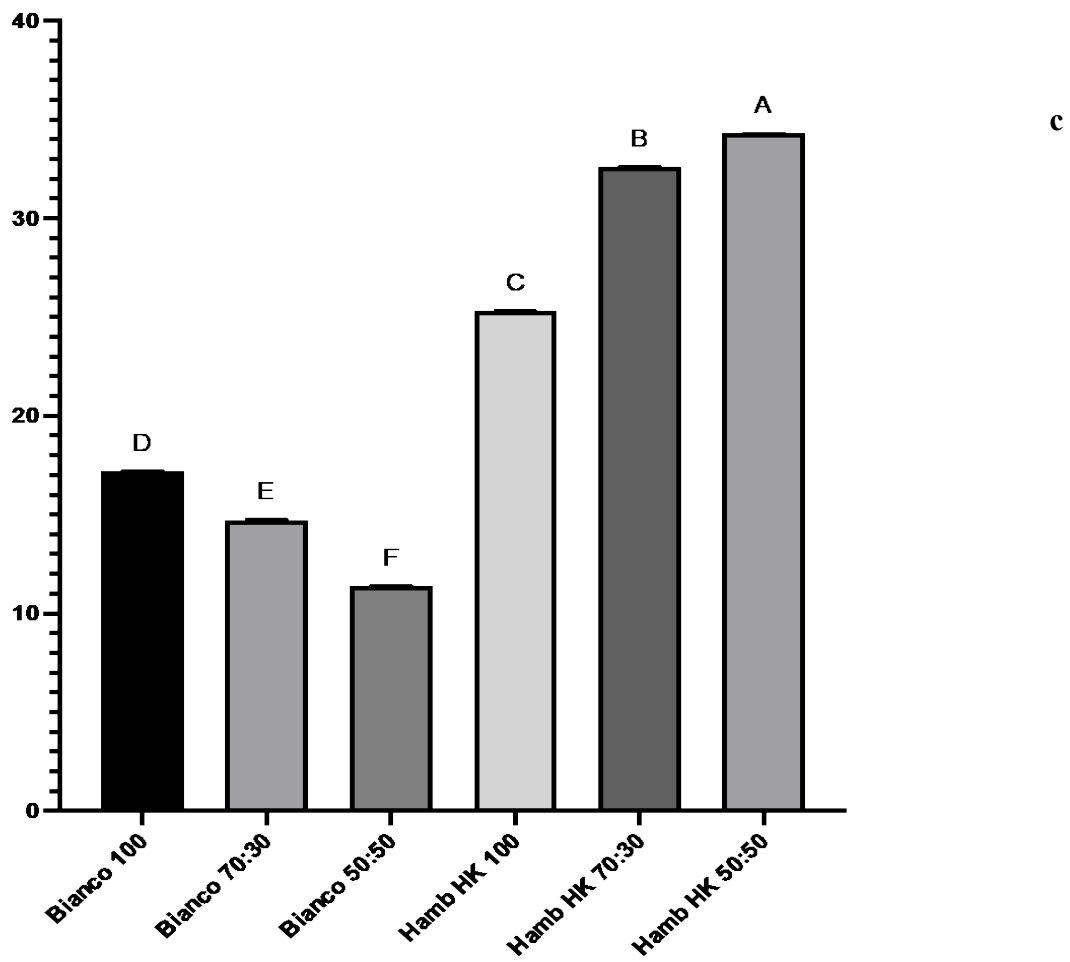
**Figure S3d:** Values ( $\mu\text{g/g}$ ) of  $\beta$ -carotene of extracts from PPP obtained from pumpkin harvested in 2022 and 2023 (mean values  $\pm$  SD,  $n = 3$ ). Different letters indicate significant differences with  $p$ -value  $< 0.01$ . (LN, Lunga di Napoli; MDP, Moscata di Provenza; VR, Violina rugosa; HK, Hokkaido; M, Mantovana) and harvesting years (2022-2023).



**Figure S4a:** Values (mean values  $\pm$  SD,  $n = 3$ ) of  $L^*$  parameter of chicken-based burgers made with 100, 70, and 50% chicken meat, without (control) and with 4% PPP (HK, Hokkaido variety). Different letters indicate significant differences with  $p$ -value  $< 0.01$ . HK, Hokkaido.



**Figure S4b:** Values (mean values  $\pm$  SD,  $n = 3$ ) of  $a^*$  parameter of chicken-based burgers made with 100, 70, and 50% chicken meat, without (control) and with 4% PPP (HK, Hokkaido variety). Different letters indicate significant differences with  $p$ -value  $< 0.01$ . HK, Hokkaido.



**Figure S4c:** Values (mean values  $\pm$  SD,  $n = 3$ ) of  $b^*$  parameter of chicken-based burgers made with 100, 70, and 50% chicken meat, without (control) and with 4% PPP (HK, Hokkaido variety). Different letters indicate significant differences with  $p$ -value  $< 0.01$ . HK, Hokkaido.