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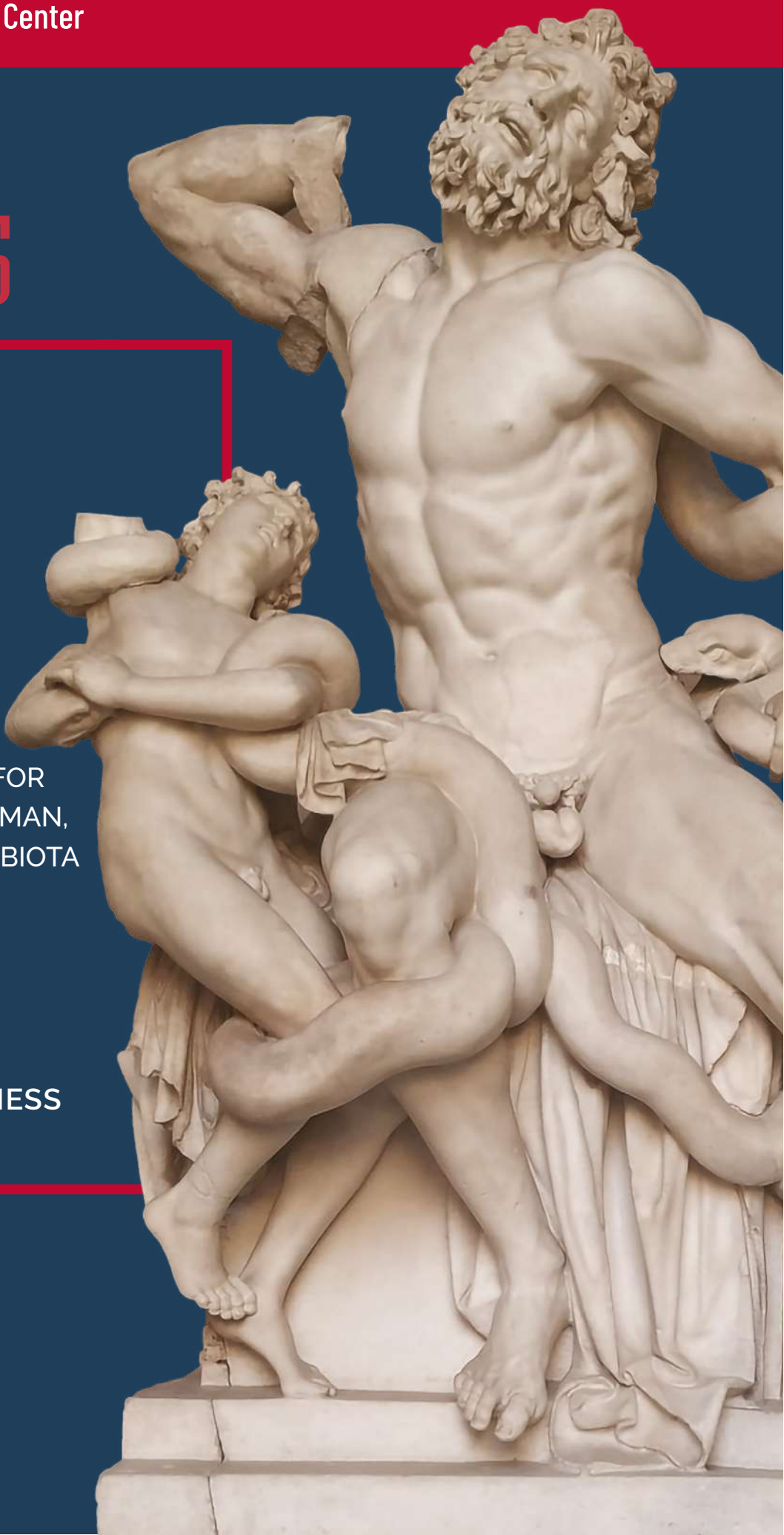
NUTRACEUTICALS, BOTANICALS & PHYTOCHEMICALS FOR NUTRITION AND HUMAN, ANIMAL AND MICROBIOTA HEALTH

4TH SCIENCE & BUSINESS SYMPOSIUM



O.C. 129_168 | REINVENTING SMOOTHIES WITH MICROALGAE: ENHANCING NUTRITION AND ANTIOXIDANT CAPACITY FOR AN INNOVATIVE FUNCTIONAL BEVERAGE

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Objective: This study aimed to develop and assess microalgae-enriched smoothies as stable, nutrient-rich, and sustainable functional beverages. The focus was on enhancing nutritional value and bioactive properties using two sustainably cultivated species: Chlorella vulgaris and Limnospira platensis (Spirulina).

Methods: Two smoothie formulations were developed: SCv (with Chlorella vulgaris) and SSp (with Spirulina), each produced in frozen and freeze-dried formats. Products were stored for 56 days, with biweekly analyses of physicochemical properties including pH, color, and water activity. Nutritional content (macro- and micronutrients) and bioactivity—measured through total phenolic content (TPC), and ORAC, and ABTS antioxidant assays—were also evaluated.

Results: Freeze-dried smoothies demonstrated greater stability over the 56-day period, with minimal changes in physicochemical properties. SSp showed higher antioxidant activity than SCv across all assays (4529.5 vs 2995.5 µmol Trolox Equivalent /L), while both remained modest sources of polyphenols (0.224 and 0.132 mg GAE/mL, respectively). In terms of nutritional claims, SCv qualified as a source of protein (2.5 g /100g of product), and SSp met the criteria for a high-protein product (6.6 g /100g of product), with the clear protein apport provided by microalgae, thus supporting their classification as functional beverages.

Conclusions: Microalgae-enriched smoothies, particularly in freeze-dried format, offer a promising approach to delivering stable, nutrient-dense, and bioactive food products. The combination of enhanced protein content and antioxidant potential, especially in Spirulina-containing formulations, supports their relevance for health-conscious and sustainability-driven consumers.

O.C. 130_173 | VALORIZATION OF FRUIT POMACE THROUGH FERMENTATION WITH ASPERGILLUS AWAMORI ATCC 22342 FUNGUS AND ITS EFFECTS ON ENZYME PRODUCTION

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Objective: This study aimed to valorize fruit distillery pomace (FDP) as substrates for enzyme production via solid-state fermentation (SSF) using Aspergillus awamori ATCC 22342 fungus, with a focus on cellulase, glucoamylase, and endoglucanase production.

Methods: Dried and ground pomace samples were subjected to SSF for 15 days at 30 °C, with samples collected at t0, t3, t6, t9, t12, and t15. As a substrate was used: plum pomace, peach pomace, sour cherry pomace. Buffer solution was used for enzymes extraction.

Results: The results highlight that enzymatic activity varied according to the substrate used. Cellulase activity in peach pomace reached its highest value (66.39±0.21 FPU/g dw on t6), followed by plum pomace with 39.50±0.12 FPU/g dw on t12, and sour cherry pomace with 29.65±0.11 FPU/g dw on t15, respectively. Regarding the glucoamylase content, sour cherry pomace reached 13.00 ±0.29 Units/g dw on t15, followed by peach pomace with 8.04 ±0.33 Units/g dw and plum pomace with 4.22±0.27 Units/g dw on the same day. On the other hand, endoglucanase activity reached 26.23±0.10 Units/g dw in peach pomace, followed by plum pomace with 16.61±0.14 Units/g dw pomace and sour cherry pomace with 13.75±0.25 Units/g dw.

Conclusions: SSF with A. awamori increased cellulase, glucoamylase, and endoglucanase activity depending on the substrate. Peach pomace selectively enhanced cellulase biosynthesis, while sour cherry pomace stimulated glucoamylase activity, and plum pomace derived substrates promoted elevated production of endoglucanase. These findings underscore the biotechnological potential of A. awamori for the valorization of FDP throughout the efficient biosynthesis of commercially relevant enzymes.