



UNIVERSITÀ DEGLI STUDI DI MILANO

CONCORSO PUBBLICO, PER TITOLI ED ESAMI, A N. 1 POSTO DI CATEGORIA D - AREA TECNICA, TECNICO-SCIENTIFICA ED ELABORAZIONE DATI, CON RAPPORTO DI LAVORO SUBORDINATO A TEMPO INDETERMINATO PRESSO L'UNIVERSITÀ DEGLI STUDI DI MILANO - DIPARTIMENTO DI SCIENZE PER GLI ALIMENTI, LA NUTRIZIONE E L'AMBIENTE - CODICE 22293

La Commissione giudicatrice della selezione, nominata con Determina Direttoriale n. 11759 del 13.7.2023 e modificata con Determina Direttoriale n. 14191 del 14.9.2023 composta da:

| | |
|---------------------------------|------------|
| Prof. Eugenio Monti | Presidente |
| Dott.ssa Giovanna Boschin | Componente |
| Prof.ssa Donatella Maria Caruso | Componente |
| Sig.ra Angelica Pafundi | Segretaria |

comunica i quesiti relativi alla prova orale:

GRUPPO DI QUESITI N. 1

-Descriva le principali metodologie biochimiche per indagini proteomiche

-Brano inglese:

The tomato is a preferred model organism for the study of fruit ripening and development due to its fleshy morphology and dynamic transitional physiology. Tomato fruits manifest into different stages such as green, breaker, and mature red stages. This makes them a near-perfect whole model for the analysis of molecular factors associated with fruit development. The rich nutritional quality of tomato fruits is attributed to the maintenance of several metabolic compounds that impart flavor and rich amino acids that are essential for osmotic homeostasis. A vacuole transporter (SlCAT9) in *Lycopersicon esculentum* has been reported to carry out γ -aminobutyric acid (GABA) catabolism to introduce Glu and Asp into the vacuole to impart osmotic homeostasis and preserve the nutritional quality of tomato fruits. Organic acids accumulate inside the pericarp tissue of tomato fruits and enhance the organoleptic property and shelf life.

GRUPPO DI QUESITI N. 2

-Come identificare la presenza di una specifica proteina in una miscela complessa: presentare un esempio di proteina

-Brano inglese:

Organic acids such as oxalic acids have been reported to degrade cell walls through the chelation of Ca^{2+} ions and the downregulation of Ca^{2+} -mediated signaling pathways that regulate fruit ripening. In transgenic tomatoes where the synthesis of oxalic acid was repressed, an enhanced organoleptic property of the fruit and the increased resistance of the plant to necrotrophic fungus were observed. Some proteins that have been identified by further studies in oxalate-downregulated lines include chaperonins, Hsps, peptide methionine sulfoxide reductase, 26S protease regulatory subunit 7, peroxiredoxins, MDHAR, and ubiquitin interactors such as 14-3-3 ligase. Other proteins, viz. importins, GTP-binding nuclear protein Ran-A1, T-complex ϵ -subunit, and diphosphate kinases, showed increased abundance during post-harvest storage in transgenic lines, suggesting maintaining fruit quality requires kinase activity and cellular reorganization to maintain fruit texture. Volatile compounds other than organic amino acids, such as sugars, also enhance fruit flavor and their significance of consumption. Proteomic analysis of downregulated vacuolar processing enzyme (VPE5) tomato lines identified the role of this vacuole transporter in regulating another transporter, namely, acid invertase, which catalyzes the catabolism of complex sugars and serves to maintain the quality and taste of the fruit.



GRUPPO DI QUESITI N. 3

-Indicare quali metodi cromatografici permettono di separare proteine caratterizzate da massa molecolare diversa ma simile PI

-Branco inglese: LC-MS/MS-based proteomics was explored to detect oilseed species-specific peptide markers and meat-specific markers resistant for multispecies authentication of vegan (flaxseed, pumpkin, hemp seeds, nigella, sesame, and sunflower seeds) and meat (pork, chicken, guinea fowl, and rabbit) products. Most heat-stable oilseed-unique peptides were released primarily from specific 11S and 2S seed storage proteins, oleosins, and several enzymatic proteins. The method can help simultaneously characterize specific protein constituents of plant-animal origin and assess various enzymic and nucleic acid tests in complex food matrices. Ge-(In-gel) LC-MS/MS revealed the antibiofilm activity of pepsin-digested bovine lactoferrin (HLF) at sub-lethal concentration against foodborne *Ps. fluorescens* 17,298 under 15 and 30 °C incubation. Although HLF exhibited a marked reduction in biofilm biomass by inducing the cyclic-di-GMP-binding biofilm dispersal mediator (PROKKA_02061), it repressed PleD, TycC, and GbrS and induced the negative regulators of alginate biosynthesis at 15 °C, asserting its potential exploitation as antibiofilm agent for biotechnological applications in cold stored foods.

Milano, 29 settembre 2023

La Commissione

Prof Eugenio Monti - Presidente

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