processes

Editorial

Special Issue: Food Processing and Food Analysis: Principles, Techniques, and Applications

Jung-Feng Hsieh [1,2]

[1] Department of Food Science, Fu Jen Catholic University, New Taipei City 242, Taiwan; 075101@mail.fju.edu.tw; Tel.: +886-2-2905-2516
[2] Ph.D. Program in Nutrition & Food Science, Fu Jen Catholic University, New Taipei City 242, Taiwan

This Special Issue, entitled "Food Processing and Food Analysis: Principles, Techniques, and Applications", explores perspectives and latest advances in the field of food science. The compilation of research papers covers a wide range of topics, including the preservation of quail eggs, the reduction of acrylamide in biscuits, the authentication of coffee beans, the prevention of colorectal cancer by tempeh extracts, the separation of triglycerides and free fatty acids, the textural modification of tofu, and the development of morula-based products. In this Special Issue, de Araújo et al. [1] introduced a novel approach to preserving the internal quality of quail eggs under non-refrigerated conditions through the use of a basil essential oil combined with a corn starch coating. The experiment included three treatments: eggs coated with corn starch, eggs coated with corn starch/basil essential oil, and uncoated eggs. The corn starch/basil essential oil coating demonstrated remarkable efficacy in inhibiting the growth of yeasts, molds, Enterobacteriaceae, and total aerobic mesophilic bacteria on the eggshells when tested for four weeks at room temperature. Moreover, the corn starch/basil essential oil-coated eggs exhibited higher average Haugh unit values throughout the four-week storage period, which indicates superior maintenance of internal quality. Importantly, the sensory evaluation of the coated eggs did not differ significantly from the control treatment, suggesting consumer acceptability. The corn starch/basil essential oil coating presents a promising solution for preserving quail eggs that effectively mitigates contamination risks and maintains internal quality even without refrigeration or humidity control. El-Sayed et al. [2] focused on the effects of green tea powder, baker's yeast, and various enzymatic treatments on the acrylamide content in biscuits. For this investigation, L-asparaginase, glucose oxidase, mixed enzymes (L-asparaginase:glucose oxidase 1:1), green tea powder, or baker's yeast were added to separate batches of biscuits (each at 0.5 g/kg of wheat flour). The sensory properties, color characteristics, essential minerals, and chemical composition of treatment samples were evaluated to ensure the maintenance of biscuit quality. Remarkably, the novel combination of glucose oxidase and L-asparaginase at a 1:1 ratio significantly reduced acrylamide concentrations in biscuits. Indeed, this mixed-enzyme powder resulted in the highest reduction in acrylamide concentrations, from 865 mg/kg in the control sample to 215–260 mg/kg in mixed-enzyme-powder-treated samples when subjected to the newly recommended temperature of 37 °C for 30 min. Moreover, biscuits subjected to L-asparaginase alone demonstrated a 67.63% reduction in acrylamide levels. This paper provides crucial insights into enzymatic methods for reducing acrylamide in biscuits. By implementing the recommended treatments, food manufacturers can produce biscuits with low levels of acrylamide and safeguard consumer health while meeting the demand for safe and nutritionally valuable baked goods.

Lin et al. [3] employed a 500 MHz NMR spectroscopy method to quantify 16-O-methylcafestol, which is a reliable marker for distinguishing Robusta beans from Arabica beans. Among 118 coffee samples, including single coffee beans, commercial products, and those from a particular coffee chain, the results revealed that 16-O-methylcafestol

Citation: Hsieh, J.-F. Special Issue: Food Processing and Food Analysis: Principles, Techniques, and Applications. *Processes* **2023**, *11*, 2475. https://doi.org/10.3390/pr11082475

Received: 3 August 2023
Revised: 14 August 2023
Accepted: 16 August 2023
Published: 17 August 2023

was absent in single Arabica beans, while the content of 16-O-methylcafestol in single Robusta beans varied from 1005.55 to 3208.32 mg/kg. Strikingly, among the 47 blend products that claimed to be 100% Arabica, 17 were found to have 16-O-methylcafestol quantifications ranging from 155.74 to 784.60 mg/kg. All of these adulterated products were sourced from the same coffee chain, which confirms the intentional mixing of Robusta with claimed Arabica blends. In general, this paper emphasizes the importance of robust authentication methods, such as NMR spectroscopy for 16-O-methylcafestol quantification, to ensure the integrity and trustworthiness of coffee products in the market. Divate et al. [4] explored the potential anti-cancer effects of tempeh, a fermented soybean product, on colon precancerous lesions in vivo and colorectal cancer cells in vitro. In in vivo studies conducted on Sprague-Dawley rats induced with 1,2-dimethylhydrazine, daily feeding of tempeh for 12 weeks resulted in a reduction in Clostridium perfringens in cecum contents. Furthermore, the number of precancerous lesions in the colons of treated rats decreased compared to the 1,2-dimethylhydrazine-only control group. In vitro experiments demonstrated that tempeh water extract exhibited anti-proliferative properties against Caco-2 cancer cell lines. Analysis of tempeh water extract revealed the presence of antioxidant dipeptides, tripeptides, and tetrapeptides containing lysine, proline, and methionine. The presence of these bioactive peptides may help explain the inhibitory properties tempeh exhibits against the development of colon cancer. Specifically, the peptides increase antioxidant enzyme activity in the liver and suppress the activation of potential carcinogens in the gut. Overall, by providing insights into potential dietary strategies for colorectal cancer prevention, this paper highlights the promising role of tempeh in suppressing colon carcinogenesis by regulating intestinal flora and preventing the formation and progression of colon precancerous lesions. Changwatchai et al. [5] examined the evaporation rates and mechanisms in edible oil processing through the application of falling film molecular distillation. They focused on the separation of triglycerides and free fatty acids in edible oil using molecular distillation, which provided valuable insights for improving techniques used to process edible oil.

Jao et al. [6] investigated the effects of chitosan and calcium sulfate on the textural microstructure and modification of lentil tofu. For this, lentil milk was subjected to varying amounts of chitosan and calcium sulfate to investigate their impact on the gel properties of the resulting tofu. The addition of calcium sulfate (12 mM) significantly increased the cohesiveness and hardness of the lentil tofu. Conversely, the addition of chitosan (1.0%) decreased the cohesiveness and hardness of the tofu, leading to a slightly continuous network structure with pores. Scanning electron microscopy revealed that the microstructure of the lentil tofu was altered by the presence of chitosan and calcium sulfate. Moreover, gel electrophoresis analysis demonstrated that both calcium sulfate and chitosan induced the aggregation of legumin basic unit proteins, legumin acidic units, and vicilin in the lentil milk. Overall, these findings highlight the potential of chitosan and calcium sulfate as practical food additives which can enhance the texture and structure of lentil tofu. These additives could help improve the overall sensory experience of tofu and offer promising options for the development of texture-modified lentil tofu products. Lastly, Legodi et al. [7] discussed the use of morula fruit for wine production as well as opportunities and challenges associated with morula-based products. This review paper presents a comprehensive summary of the morula tree and its biochemical constituents, with a particular emphasis on the utilization of morula fruit for wine production in African communities. The review also explores the obstacles and prospective developments of morula fruit wine, with a particular focus on southern Africa, which is an area abundantly graced with morula trees. Product development from underutilized morula fruit extends beyond wine, potentially opening new markets for food and beverage products. Improved technology for fermenting morula fruit wine and heat treatment for juice extraction could further enhance product quality and aroma. The application of existing biotechnology tools and advances in winemaking knowledge have the potential to substantially improve the wine production. These papers present innovative approaches, validate the

employed methods, and inspire further investigation. These publications are accessible online at https://www.mdpi.com/journal/processes/special_issues/G76B3JS3K7 (accessed on 1 August 2023).

Conflicts of Interest: The authors declare no conflict of interest.

References

1. de Araújo, M.V.; Oliveira, G.D.S.; McManus, C.; Vale, I.R.R.; Salgado, C.B.; Pires, P.G.D.S.; Campos, T.A.D.; Gonçalves, L.F.; Almeida, A.P.C.; Martins, G.D.S.; et al. Preserving the Internal Quality of Quail Eggs Using a Corn Starch-Based Coating Combined with Basil Essential Oil. *Processes* **2023**, *11*, 1612. [CrossRef]
2. El-Sayed, A.A.; Abdelhady, M.M.; Jaafari, S.A.; Alanazi, T.M.; Mohammed, A.S. Impact of Some Enzymatic Treatments on Acrylamide Content in Biscuits. *Processes* **2023**, *11*, 1041. [CrossRef]
3. Lin, Y.T.; We, Y.L.; Kao, Y.M.; Tseng, S.H.; Wang, D.Y.; Chen, S.Y. Authentication of Coffee Blends by 16-O-Methylcafestol Quantification Using NMR Spectroscopy. *Processes* **2023**, *11*, 871. [CrossRef]
4. Divate, N.R.; Ardanareswari, K.; Yu, Y.P.; Chen, Y.C.; Liao, J.W.; Chung, Y.C. Effects of Soybean and Tempeh Water Extracts on Regulation of Intestinal Flora and Prevention of Colon Precancerous Lesions in Rats. *Processes* **2023**, *11*, 257. [CrossRef]
5. Changwatchai, T.; Nakajima, M.; Felipe, L.D.O.; Neves, M.A. Separation of Free Fatty Acid and Triglycerides by Molecular Distillation-Experimental and Simulation Approaches. *Processes* **2022**, *10*, 2053. [CrossRef]
6. Jao, C.H.; Lin, C.Y.; Chen, C.J.; Hsieh, J.F. Effects of Calcium Sulfate and Chitosan on Textural Modification and Microstructure of Tofu Made from Lentils (Lens culinaris). *Processes* **2022**, *10*, 2000. [CrossRef]
7. Legodi, L.M.; Lekganyane, M.A.; Moganedi, K.L.M. Morula Tree: From Fruit to Wine through Spontaneous Fermentation and the Potential of Deriving Other Value-Added Products. *Processes* **2022**, *10*, 1706. [CrossRef]