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# Section Applied Biosciences and Bioengineering

A vertical strip on the left side of the page shows a microscopic image of cells, likely yeast or bacteria, stained in shades of blue and purple. The cells are irregular in shape and some show internal structures.

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# Section Information

The Section on Applied Biosciences and Bioengineering encourages multidisciplinary research in the field of novel biosciences and biological engineering applications. It spans the full range of bioengineering types, clinical engineering, cardiac bioengineering, neural engineering, system modeling, biosignal processing, health informatics, bioinformatics, bioprocess engineering, biotechnology, biosensors, biomechanics, biorobotics, cardiopulmonary systems engineering, fermentation technology, food technology, and microbiology. The main focus is on novel developments and applications in societally relevant themes. Applied Sciences in general and this Section on Applied Biosciences and Bioengineering in particular offers high-quality peer review followed by a rapid publication decision.

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## Section Editor-in-Chief

Prof. Dr. Roger Narayan

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## Subject Areas

- Practical Applications
- Physiology
- Electronics Technology and Instrumentation
- Biomedical Images and Signals
- Molecular Biology Meets Computers
- Medicine Meets Computers
- Mechanics Meets Biology and Medicine
- Materials Go Very Small
- Chemical Engineering Approaches
- Biology Goes Engineering
- etc.

# Content Highlights

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## Optimized Isolation Procedure for the Extraction of Bioactive Compounds from Spent Coffee Grounds

**Authors:** Theodoros Chatzimitakos , Vassilis Athanasiadis, Konstantina Kotsou , Dimitrios Palaogiannis , Eleni Bozinou and Stavros I. Lalas

**Abstract:** Due to the worldwide consumption of coffee, many tons of spent coffee grounds (SCGs) are discarded each year, as a by-product of coffee preparation. Not only their disposal is costly, but also it may cause the release of compounds that can endanger the environment. However, there are valuable chemical compounds that can be extracted from SCGs and used in the food industry. The aim of this study was to investigate the main parameters affecting the extraction of caffeine and polyphenols (i.e., chlorogenic acid, neochlorogenic acid, and caffeic acid) and to evaluate the antioxidant properties of the extracts. To this end, extraction solvent, temperature, time, and liquid-to-solid ratio were studied. A response surface methodology was used to optimize the extraction process. According to the results, the caffeine content of the optimum extract was found to be 6.14 mg/g in dry SCGs, the total polyphenol content was 19.85 mg gallic acid equivalents/g, while the ferric reducing antioxidant power and DPPH scavenging values were 136.69  $\mu\text{mol}$  ascorbic acid equivalents/g and 230.41  $\mu\text{mol}$  DPPH/g, respectively...

<https://doi.org/10.3390/app13052819>

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## Process Optimization of Microwave-Assisted Extraction of Chlorophyll, Carotenoid and Phenolic Compounds from *Chlorella vulgaris* and Comparison with Conventional and Supercritical Fluid Extraction

**Authors:** Ioulia Georgiopolou , Soultana Tzima , Vasiliki Louli and Kostis Magoulas

**Abstract:** The production of bioactive products from microalgae biomass with efficient and environmentally friendly technologies is a field of great research interest. The present work focuses on the recovery of high-added value bioactive components from *Chlorella vulgaris* through microwave-assisted extraction (MAE) with aq. ethanol 90% v/v. The effect of extraction temperature (40–60 °C), duration (5–25 min), solvent-to-biomass ratio (20–90 mL<sub>solv</sub>/gbiom), and microwave power (300–800 watts) was investigated regarding the extraction yield, extract's chlorophyll, carotenoid and phenolic content, and antioxidant activity. MAE optimization at 60 °C, 300 watts, 14 min, and 22 mL<sub>solv</sub>/gbiom led to 11.14% w/w yield, 63.36 mg/g<sub>extr</sub> total chlorophylls, 7.06 mg/g<sub>extr</sub> selected carotenoids of astaxanthin, lutein and  $\beta$ -carotene, 24.88 mg/g<sub>extr</sub> total carotenoids, 9.34 mg<sub>GA</sub>/g<sub>extr</sub> total phenolics, and 40.49 mg<sub>extr</sub>/mg<sub>DPPH</sub> IC<sub>50</sub> (antioxidant activity indicator)...

<https://doi.org/10.3390/app13042740>



## Quality Assessment of Natural Juices and Consumer Preferences in the Range of Citrus Fruit Juices

**Authors:** Małgorzata Kowalska , Justyna Konopska, Melánia Feszterová, Anna Zbikowska and Barbara Kowalska

**Abstract:** The purpose of the study was to analyse and update consumers' changing preferences in the choice of citrus fruit juices and to evaluate the sensory and physicochemical characteristics of two kinds of juices: juice squeezed from raw fruit and a commercial juice indicated by respondents as best matching their preferences. The survey was conducted in the form of an online survey posted on [app.ankieteo.pl](http://app.ankieteo.pl). The survey was also sent via a link through social networks. A total of 862 people took part in the survey. Consumers are most likely to consume juices one to three times a week (28.3%). Orange juice was the most popular among respondents (52.4%). The main factors influencing decisions to purchase citrus fruit juices are the type of fruit from which the juice was made, the vitamin content and the product's price. In choosing juices, respondents were also guided by favourable health qualities and the presence of minerals. From the physicochemical determinations of orange juices obtained from a juicer and squeezer and commercial juice "O", it was found that the quality of commercial orange juice indicated by consumers in the survey is comparable to juices made with a squeezer or a juicer.

<https://doi.org/10.3390/app13020765>



## TeleFE: A New Tool for the Tele-Assessment of Executive Functions in Children

**Authors:** Carlotta Rivella, Costanza Ruffini, Clara Bombonato, Agnese Capodiecì, Andrea Frascari, Gian Marco Marzocchi, Alessandra Mingozzi, Chiara Pecini, Laura Traverso, Maria Carmen Usai and Paola Viterbori

**Abstract:** In recent decades, the utility of cognitive tele-assessment has increasingly been highlighted, both in adults and in children. The present study aimed to present TeleFE, a new tool for the tele-assessment of EF in children aged 6–13. TeleFE consists of a web platform including four tasks based on robust neuropsychological paradigms to evaluate inhibition, interference suppression, working memory, cognitive flexibility, and planning. It also includes questionnaires on EF for teachers and parents, to obtain information on the everyday functioning of the children. As TeleFE allows the assessment of EF both remotely and in-person, a comparison of the two modalities was conducted by administering TeleFE to 1288 Italian primary school children. A series of ANOVA was conducted, showing no significant effect of assessment modality ( $p > 0.05$  for all the measures). In addition, significant differences by class emerged for all the measures ( $p < 0.001$  for all the measures except  $p = 0.008$  for planning)...

<https://doi.org/10.3390/app13031728>



# Multiclass Skin Lesion Classification Using a Novel Lightweight Deep Learning Framework for Smart Healthcare

**Authors:** Long Hoang, Suk-Hwan Lee, Eung-Joo Lee and Ki-Ryong Kwon

**Abstract:** Skin lesion classification has recently attracted significant attention. Regularly, physicians take much time to analyze the skin lesions because of the high similarity between these skin lesions. An automated classification system using deep learning can assist physicians in detecting the skin lesion type and enhance the patient's health. The skin lesion classification has become a hot research area with the evolution of deep learning architecture. In this study, we propose a novel method using a new segmentation approach and wide-ShuffleNet for skin lesion classification. First, we calculate the entropy-based weighting and first-order cumulative moment (EW-FCM) of the skin image. These values are used to separate the lesion from the background. Then, we input the segmentation result into a new deep learning structure wide-ShuffleNet and determine the skin lesion type. We evaluated the proposed method on two large datasets: HAM10000 and ISIC2019. Based on our numerical results, EW-FCM and wide-ShuffleNet achieve more accuracy than state-of-the-art approaches. Additionally, the proposed method is superior lightweight and suitable with a small system like a mobile healthcare system.

<https://doi.org/10.3390/app12052677>

## Special Issue Reprints



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