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Circular economy and agriculture: mapping scientific productivity, research pattern and future research direction

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Abstract

This study aims at assessing the global research productivity and discovery of knowledge clusters on circular economy and agriculture using bibliometric analysis. A total of 757 articles have been retrieved from the Scopus database covering the period from 2008 to 2022 on the theme of circular economy and agriculture. The analysis reveals interesting theoretical and practical implications of scientific publications on circular economy and agriculture. The idea of a circular economy in agriculture started gaining importance after 2015 and gradually received significant focus from the scientific community with exponential growth in research publications and citations. Out of the top 10 leading publishing countries on circular economy and agriculture, 6 countries belong to the European Union. The keyword analysis identified four key research areas of CE and agriculture. Highly relevant and less developed research themes such as agricultural sustainability, waste management & recycling, anaerobic digestion and food security have been identified as future research focus areas. The thematic research evolution indicates the merging of multiple themes over time and the emergence of circular agriculture as a core model. A comprehensive knowledge synthesis about circular agricultural practices may help in the

adoption of strategic, operational, and competitive advantages, and motivate researchers to undertake further scientific investigations to strengthen the circularity in agriculture.

Author keywords

Agriculture; Bibliometric analysis; Circular economy; Recycling; Sustainability; Waste

Indexed keywords

GEOBASE Subject Index

anaerobic digestion; emergence; food security; growth rate; recycling; sustainability; waste management

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METEOROLOGICAL AND GEOSPATIAL ANALYSIS-BASED INTEGRATED MACHINE LEARNING FOR ACCURATE AIR QUALITY FORECASTING

Journal of Environmental Protection and Ecology • Article • 2024

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Abstract

In light of the growing environmental problems caused by low air quality, this investigation offers a thorough approach to precise air quality forecasting. The goal of the research effort is to disentangle the intricate network of variables affecting air quality by fusing state-of-the-art machine learning algorithms with meteorological and geographic data. The investigation acknowledges both man-made and natural air pollution sources, among other diverse sources. The burning of fossil fuels, industry, farming, waste disposal, deforestation, automobile traffic, and indoor sources are all included in the following list. To create accurate forecasting models, a comprehensive data collection process is employed, which includes historical and current datasets from weather sources and monitoring stations. To comprehend spatial connections and trends, spatial analysis is incorporated using Geographic information system (GIS) capabilities. Continuous hyperparameter tuning is carried out while model validation, using measures like Mean absolute error (MAE) and Root mean squared error (RMSE), assures accuracy. In order to provide dynamic forecasting, the created system is integrated into a real-time framework and continuously assimilates updated meteorological and geographical data. Access to stakeholders is facilitated by an intuitive interface, which highlights the environmental consequences of changes in air quality. Working

together with environmental groups, research institutes, and meteorological agencies promotes data exchange and ongoing model improvement. With an emphasis on the effects on the environment, this integrated method offers a comprehensive solution for precise and fast air quality forecasts. This research helps to proactive decision-making in pollution control and sustainable environmental practices by addressing the important requirement for effective environmental management techniques.

Author keywords

air quality forecasting; environmental impacts; geospatial integration; machine learning models; meteorological analysis; sustainable environmental practices

Indexed keywords

GEOBASE Subject Index

accuracy assessment; air quality; data set; environmental impact; environmental management; forecasting method; machine learning; meteorology; spatial analysis; sustainability

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About Scopus

Non-Destructive Monitoring of Ripening Process of the Underutilized Fruit Kadam Using Laser-Induced Fluorescence and Confocal Micro Raman Spectroscopy

Analytical Letters • Article • 2023 • DOI: 10.1080/00032719.2022.2137523

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Abstract

Underutilized fruits like kadam are bio-reserves of numerous biochemical and minerals and have the potential to be used as food alternatives and supplements to fulfill the needs of malnourished populations. The production of quality fruits needs monitoring throughout the growth and ripening in order to build consumer and industry confidence. The nondestructive optical spectroscopic techniques have immense potential to monitor the growth and ripening indices of the fruits. Hence, this study explores the potential of laser-induced fluorescence and confocal micro Raman spectroscopy for the reliable and cost effective monitoring of growth and ripening of kadam fruits. The analysis of the laser-induced fluorescence measurements reveals that the ripening of the kadam fruits may be monitored by analyzing the fluorescence emission of chlorophyll and carotenoids. The decrease in the intensity of chlorophyll fluorescence accompanied by the increase in the intensity of the carotenoid bands is the characteristic fluorescence signature associated with the ripening of the kadam fruits. Hence, upon the ripening of the fruits, the concentration of chlorophyll decreases considerably with the accumulation of carotenoids. This fact is further complimented by confocal micro Raman measurements, which show that as the fruit ripens, the intensity of carotenoid bands increases dramatically.

The observed spectral features may be used by the horticulture scientists and nutritionists to monitor the growth, maturity, and ripening of underutilized fruits like kadam in order to maximize the quality and minimize postharvest losses. © 2022 Taylor & Francis Group, LLC.

Author keywords

Confocal micro Raman spectroscopy; kadam; laser-induced fluorescence spectroscopy; ripening process; underutilized fruit

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