

# Plant, Soil and Environment

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### **Chitosan in modern agriculture productionReview**

**Yahya Faqir, Jiahua Ma, Yunlong Chai**

Plant Soil Environ. 2021, 67(12):679-699

In the perspective of return to nature, using scientific and technical progress for improved living standards, people began to search for solutions to alleviate environmental pollution. Researchers intend to make clean, affordable products that are gentle yet effective. Chitosan derived from the exoskeleton of crustaceans, cuticles of insects, cell walls of fungi, and some algae are renowned for many decades to exhibit biotic properties, especially anti-microbial characteristics. Here we review each ingredient for sourcing organic chitosan, with clean raw materials that can make pure, rich, and powerful products working naturally. Our study elaborates...

### **Naturally coloured roots as a tool for studying root interactions in mixed croppingOriginal Paper**

**Affendy Hassan, Dorte Bodin Dresbøll, Kristian Thorup-Kristensen**

Plant Soil Environ. 2021, 67(12):700-710

The objective of this study was to evaluate the usage of species with coloured roots to study root growth patterns during intercropping. Red beet (*Beta vulgaris* L. cv. Detroit), having clear red roots, was used in a semi-field and field experiment to allow identification and quantification of roots of the individual species in the mixture. In the field experiment, red beet was strip intercropped with lucerne (*Medicago sativa* L. cv. Creno) and kale (*Brassica oleracea* L. var. Sabellica), respectively while the red beet-lucerne intercropping was conducted in large rhizoboxes where root growth distribution and <sup>15</sup>N...

### **Studying standard and rheological quality parameters of winter wheat by Python visualisationOriginal Paper**

**Zoltán Magyar, Péter Pepó**

Plant Soil Environ. 2021, 67(12):711-720

This study was carried out to present an innovative solution for interpreting large data sets in agri-statistics with the invocation of programmed visualisation. Moreover, the following polyfactorial long-term experiment embodies a comprehensive study of 18 wheat quality parameters. The effect of increasing dosages of fertiliser (control, N<sub>90</sub>PK, N<sub>150</sub>PK) was examined on 3 winter wheat cultivars (KG Kunhalom, GK Csillag, Hybiza) in two consecutive growing seasons (2018-2019). The ecological conditions of 2018 gave a significantly higher yield, meanwhile...

## **Effects of wheat root exudates on bacterial communities in the rhizosphere of watermelon****Original Paper**

**Jibo Shi, Xiaoya Gong, Muhammad Khashi u Rahman, Qing Tian, Xingang Zhou, Fengzhi Wu**

Plant Soil Environ. 2021, 67(12):721-728

In this study, we investigated the effects of wheat root exudates on soil bacterial communities in the watermelon rhizosphere using quantitative PCR and Illumina MiSeq sequencing. The qPCR results showed that wheat root exudates significantly increased the abundance of total bacteria, *Pseudomonas*, *Bacillus* and *Streptomyces* spp. Illumina MiSeq sequencing results showed that wheat root exudates significantly changed the bacterial community structure and composition. These results indicated that plant root exudates play a role in plant-to-plant...

## **Effect of coexisting metal ions on bio-precipitation of Cu<sup>2+</sup> phosphate by *Rahnella* sp. LRP3 and its stability in soil****Original Paper**

**Mingtang Li, Siqi Liu, Yuqi Wang, Hoaithuong Do, Chunli Zhao**

Plant Soil Environ. 2021, 67(12):729-738

The phosphate precipitation of heavy metal induced by microorganisms plays an important role in immobilising heavy metal in soil. However, there is little knowledge about the effect of coexisting metal ions on the induction of Cu phosphate mineral and its stability. In this paper, the Cu phosphate precipitations, coexisting with Pb<sup>2+</sup> or Ca<sup>2+</sup> induced by strain LRP3, were characterised, and the stabilisation of the induced phosphate precipitates was also studied. The coexistence of Cu with Pb or Ca decreased the removal efficiency of Cu

## **Crop sequence effects on energy efficiency and land demand in a long-term fertilisation trial****Original Paper**

**Gerhard Moitzi, Reinhard W. Neugschwandtner, Hans-Peter Kaul, Helmut Wagenritzl**

Plant Soil Environ. 2021, 67(12):739-746

The effect of crop sequences (CR - continuous winter rye; CropR - three-field crop rotation of winter rye-spring barley-bare fallow) and fertilisation systems (unfertilised control, mineral fertiliser (NPK), farmyard manure (FYM)) on crop yield, energy efficiency indicators and land demand were analysed in a long-term experiment under Pannonian climate conditions. Due to lower fuel consumption in the bare fallow, the total fuel consumption for CropR was 27% lower than in CR. It was for NPK and FYM fertilisation by 29% and 42% higher than in the control. Although the energy output was lower in CropR than CR, the energy use efficiency for grain production...