



2024年第11期总438期

农牧业信息化专题

本期导读

▶ 前沿资讯

1. 法国科技初创公司在世界农业科技创新峰会上亮相
2. 农业技术帮助欧洲马铃薯产业转型
3. 中国科学院地化所建立基于生物传感器的土壤重金属检测系列新方法

▶ 相关专利

1. 物联网土壤分析设备，优化作物选择
2. 一种适于土壤/沉积物酶的检测方法和检测传感器
3. 一种土壤中水溶性氯离子的检测方法

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前沿资讯

1 . French Tech Startups Showcased at World Agritech Innovation Summit (法国科技初创公司在世界农业科技创新峰会上亮相)

简介: As part of The French Tech Mission, a French government administration whose objective is supporting the structuring and growth of the French startup ecosystem, six innovative French AgTech and FoodTech startups will be exhibiting at the World Agri-Tech Innovation Summit this March. These startups present the best France has to offer in AgTech, having been selected after a rigorous application process that examined their solutions in detail.

With products ranging from comestibles (microalgae ingredients, insect-based animal nutrition and plant-based meat alternatives), to biologics and bio-based performance solutions (resilient agricultural biologicals) as well as a robust offering of support services (such as SaaS for post-harvest processes and weather monitoring services) the delegation touches on key themes for the agriculture and food production sector, promising to revolutionize the future of agriculture.

Promoting sustainable value from seed to harvest: conferences & panels

Over the course of the conference, US partners and potential investors will have the opportunity to meet and discuss with the delegation at their booth #GG8. In addition, on Wednesday, March 20th, two of the startups, Sencrop and Javelot will be speaking at a breakout session at 9 a.m. Entitled “How Can Innovative Equipment and Digital Solutions Create Value from Field to Post-Harvest?”, this panel will discuss how new technologies can improve farming productivity while also becoming more eco-friendly.

Alternative proteins and ingredients will also be highlighted with a panel presentation on the startup stage on Thursday, March 21 at 4:05 p.m. featuring Algama and Umiami. Panelists will be discussing “Utilizing Plant-based Meat Substitutes & Microalgae: Alternative Protein Solutions to Strengthen Human Health”.

Investing in the future of food: France 2030 and French Tech programs by The French Tech Mission

The six participating startups are laureates of the France 2030 development plan, a state-funded initiative that aims to transform sectors of excellence in the French economy, particularly in the automotive, aerospace, digital, green industry, biotechnology, culture and healthcare via an investment of 30 billion Euros (33 billion USD) over 5 years. Two billion euros (2.2 billion USD) of the France 2030 plan are specifically designated for investments in more transparent, traceable, and sustainable food production. The startups have been selected for their distinct innovation in this sector, which will help the French and European economy transition to a greener and cleaner future. France is the EU leader in AgTech and FoodTech innovation raising more than 1.3 billion euros (1.4 billion USD) for startups in 2022*.

Five out of six startups are part of French Tech 2030, a unique program by the French Tech Mission which brings together government’s initiatives to support emerging startups that respond to major societal challenges in line with the strategic priorities of the France 2030 plan.

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One startup from the delegation, Innovafeed, belongs to French Tech Next40/120; a government program also powered by the French Tech Mission, dedicated to supporting the 120 most successful French startups with the potential to become world-class leaders.

“The World Agri-Tech Innovation Summit is the perfect event to create meaningful connections with top leaders from the agri-food industry and forge the right partnerships to bring solutions to market. AgTech is a strategic sector and we are proud to bring such a diverse and pioneering delegation of startups which develop groundbreaking innovations. France, thanks to our startups, is at the forefront of the green transition,” says Clara Chappaz, representative for The French Tech Mission.

来源: The French Tech Mission; Global Ag Tech Initiative;

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全文链接:

<http://agri.nais.net.cn/file1/M00/10/3E/Csgk0EGSy46Adc02AAJoNqQyv6A457.pdf>

2 . Agtech Helped Transform Europe’s Potato Industry (农业技术帮助欧洲马铃薯产业转型)

简介: Solynta的Charles Miller在《Agriculture Dive》中写道,对于农民来说,技术是一个关键工具,可以帮助他们遵守新的可持续发展法规,并跟上日益增长的消费者对气候变化采取行动的压力。但正如欧洲马铃薯产业的经验所表明的那样,除非农民参与进来,否则新产品不足以推动变革。马铃薯种植户经历了充满挑战的几年。2022年,一场严重的干旱导致欧盟预计的马铃薯产量大幅下降,降幅高达11%。第二年,异常潮湿的天气严重影响了农作物。而且,和大多数年份一样,马铃薯枯萎病威胁着有机作物和传统作物的生产。尽管面临这些挑战,农民们仍然必须遵守欧洲的“从农场到餐桌”计划,该计划旨在创建一个更可持续、更本地化的食品系统。除其他要求外,它呼吁减少化学品的使用,并转向可持续做法,这就提出了如何维持甚至增加粮食生产的问题。面对这些挑战,我们看到了进化。欧洲马铃薯行业一直在自我改革,只有通过变革管理——即尝试的意愿、对过程的耐心,以及对做事方式必须进化的深刻理解——才有可能实现这一目标。(原标题: Agtech Helped Transform Europe’s Potato Industry. Here’s How.)

来源: Agriculture Dive; Global Ag Tech Initiative;

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<http://agri.nais.net.cn/file1/M00/03/6B/Csgk0WXpfkKAfdzjAAIblseUhCs218.pdf>

3. 中国科学院地化所建立基于生物传感器的土壤重金属检测系列新方法

简介: 传统重金属检测方法依赖大型仪器,需要复杂繁琐的前处理过程、高昂的检测成本和较长的检测周期。同时,传统检测方法面临着灵敏度不高和智能化程度低的问题。因此,亟需建立高灵敏度及智能化重金属检测方法,以弥补传统方法的不足。生物传感器是快速检测方法,具有响应迅速、成本低、灵敏度高及便于携带等优点,可以较好地克服传统检测方法的局限,在重金属简单、快速、高灵敏检测方面颇具应用前景。

中国科学院地球化学研究所环境地球化学国家重点实验室研究员刘承帅团队与广东省科学院生态环境与土壤研究所研究员陈俊华等,建立了以功能核酸为分子识别元件

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的重金属生物传感器，实现了对重金属的超灵敏、智能化快速检测，并构建了土壤有效态重金属检测新方法。

该团队建立了DNA网状纳米结构生物传感器，实现了对土壤重金属的超灵敏检测。科研人员创新性地以双茎环DNA探针为自组装元件。当反应体系存在待检重金属（以铀离子为例），释放的核酸片段可激活DNA组装，经过多重循环的核酸杂交及链置换反应，形成DNA网状纳米结构的荧光生物传感器。该荧光生物传感器对铀离子的检测线性范围为10 pM到1 mM，检测限为2 pM，可实现对土壤样品中痕量铀污染的超灵敏检测。该荧光生物传感器操作简单、响应迅速、信号扩增效率高效，为土壤重金属的超灵敏检测提供了新方法。

该研究建立了分子逻辑门生物传感器，在分子水平上实现了重金属的智能化检测。研究以有效态铅和有效态镉两种重金属为目标物，基于二进制原理，以0和1对重金属进行编码，以功能核酸为重金属分子识别元件，通过核酸并行运算和杂交反应，构建了多种分子逻辑门生物传感器，包括OR、AND、XOR、INHIBIT、半加器、半减器等。在生物传感逻辑运算中，0表示检测体系中不存在有效态铅或镉；1表示检测体系中存在有效态铅或镉。以FAM和Cy5进行双通道荧光标记，根据真值表排布，不同的重金属组合会产生不同的荧光输出信号，从而在分子水平上为重金属的智能化检测提供了一套新的传感体系。

该工作建立了DNA荧光生物传感器，实现了对土壤有效态重金属的免萃取、简单、快速检测。目前，土壤有效态重金属检测方法较多，如BCR法、Maiz三步连续提取方法、Tessier五步连续提取法、DTPA-CaCl₂法等，但适用条件等存在争议。例如，强酸强碱等化学试剂介导的重金属萃取难以反映土壤中有效态重金属的真实含量。同时，这些方法需要连续多步的萃取分离过程，步骤繁琐且耗时较长。因此，探索构建无需消解萃取且可真实反应土壤中有效态重金属含量的快速检测方法具有重要意义。

该团队以生命体基元DNA为有效态重金属识别探针，通过DNA识别、切割以及信号转换，构建了DNA荧光生物传感器，实现了对土壤有效态重金属（铅、镉、铜等）的快速检测。该方法操作简单、无需复杂的连续萃取过程，同时，DNA探针混合即可检测，响应迅速，方便现场快速分析。该荧光生物传感器对有效态铅的检测灵敏度可达0.2 pM，用于土壤样品有效态重金属检测时，与传统DTPA-CaCl₂法相比，误差小于10%，具有高灵敏度和高特异性，可满足复杂样品中有效态重金属检测需求。

相关研究成果分别发表在Analytical Chemistry、Talanta和Science of The Total Environment上。相关技术已申请发明专利。研究工作得到国家重点研发计划、国家自然科学基金和贵州省高水平人才项目等的支持。

（原文标题：地化所建立基于生物传感器的土壤重金属检测系列新方法）

来源：中国科学院；中国科学院地球化学研究所；

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<http://agri.nais.net.cn/file1/M00/10/3E/CsgkOEGS116AHtwBAAV9-tQZxbI719.pdf>

相关专利

1 . IoT soil analysis device for optimal crop selection (物联网土壤分析设备，优化作物选择)

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简介: Soil analysis serves as a crucial tool for optimizing crop production, identifying nutrient deficiencies, and devising strategies to improve soil health. Traditionally, this process involves collecting soil samples from designated locations, sending them to a laboratory for analysis, and waiting for results, leading to potential delays of up to two weeks. By leveraging predefined data and advanced algorithms, the IoT soil analysis device offers insightful recommendations regarding the most suitable crop choices that can thrive in the tested soil. This technology empowers farmers and agricultural experts to make informed decisions, resulting in increased crop yields, adoption of sustainable farming practices, and heightened productivity within the agricultural sector. Its highlighting the device's design, calibration process, and the successful validation of its accuracy in real-world soil analysis scenarios.

来源: 印度专利局;

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全文链接:

<http://agri.nais.net.cn/file1/M00/03/6B/Csgk0WXpcoaATXeqABEpKu8uyi4525.pdf>

2. 一种适于土壤/沉积物酶的检测方法和检测传感器

简介: 本发明涉及聚合物敏感膜离子选择性电极和微孔雾化器的装置,具体说是一种适于土壤/沉积物酶的检测方法和检测传感器。检测方法为将待检测样品与样品中待检测酶底物配制成溶液,将溶液加入至传感器,使待检测酶催化底物在电极上产生特异性响应,进而定性/定量检测样品中的酶活性。传感器由上至下依次为固定盖、微孔雾化器、样品池、丝网印刷电极;而后通过四角的螺丝进行固定。本发明中的沉积物/土壤酶谱传感器具有成本低、灵敏度高、测量时间快、所需样品量小、操作简单、无需样品前处理等优点。该传感器有望作为一种沉积物/土壤酶谱传感器被使用。

来源: 国家知识产权局;

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<http://agri.nais.net.cn/file1/M00/10/3E/Csgk0EGSv -AID2jABQwcI8MZ1k635.pdf>

3. 一种土壤中水溶性氯离子的检测方法

简介: 本发明公开了一种土壤中水溶性氯离子的检测方法,包括以下步骤:配制氯离子标准储备液以及氯离子标准中间液;基于氯离子标准储备液以及氯离子标准中间液配制氯离子标准曲线溶液,并定容;取待测试土壤样品,对待测试土壤样品振荡提取后进行离心处理;取离心处理的产物进行去干扰处理,得到待测试液;采用离子选择电极法对标准曲线溶液和待测试液进行测定,得到待测试土壤样品的电位响应值;设置试样含量计算公式和样品含量计算公式,基于电位响应值、试样含量计算公式和样品含量计算公式计算待测试土壤样品中的氯离子含量;本发明能够高效、快速、准确的测定土壤中水溶性氯离子的含量,同时本方法能够适用于各类土壤样品CI检测。

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