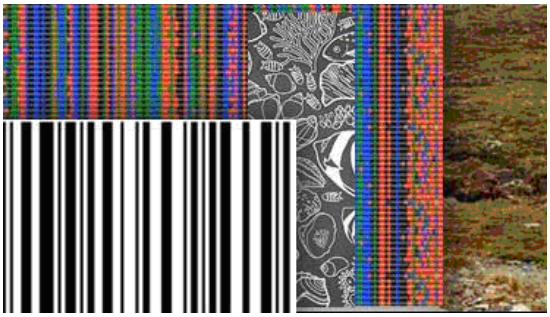

Using DNA metabarcoding to monitor the illegal trade in medicinal plants and protected orchids, and to detect adulterations in food

31.01.2020 University of Ioannina, Department of Biological Applications & Technology

Theme

In eastern Mediterranean countries and Near East, orchids are collected from the wild for the production of salep, a beverage made of dried orchid tubers. This traditional use is widespread and increasing in popularity, and terrestrial orchids are wild harvested from Albania to Iran. Understanding what species are affected by this trade and where they are sourced from is a difficult challenge, as traded tubers lack characteristics for morphology-based identification. In a series of ethnobotanical studies using high-throughput sequencing based molecular identification we shed light on this trade in CITES-listed species and its implications for conservation. Investigations focused on collectors, cross-border traders, market vendors, and salep drink and ice-cream retailers in Greece, Turkey, Iraq and Iran. Understanding the species diversity and provenance of salep orchid tubers enables elucidation of the chain of commercialization of endangered species back to the harvesters and their natural habitats, and allow for targeted efforts to protect or sustainably use wild populations of these orchids.

Though not only orchids are at the spotlight; in general, herbal medicinal products are gaining popularity because of their health attributes and nutritional value. A big portion of the herbs sold in the herbal market are cultivated, harvested and sold in Greece due to its suitable climate, rich endemic plant diversity and cultural importance. However, the growing demand for qualitative herbal medicine and the consumer awareness about their quality render them subject to intentional adulteration. The substitution of costly ingredients with unlabeled fillers of botanical origin or plant materials of inferior quality has been reported in numerous cases. This can lead to a loss of consumer faith and can even pose potential serious health risks to consumers. For example, 71 herbal medicinal products were randomly purchased throughout Greece, and ITS2 metabarcoding was used identify the species in the commercial products, reveal possible adulteration and assess the ability of this method to authenticate these products.

Following the demand for natural and organic origin of products, the need for accurate and reliable methods for plant species identification in nature and in food products has steadily increased during past decades, particularly with the recent food scares and the development of trade and technological progress in food production. Moreover, the development of high added value products based on plants has raised concerns about adulteration. Thus, reliable methods to protect the producer, the company and the customer are needed. Fresh food products without any processing are suitable for many types of analytical or molecular analyses. But as most of foodstuff samples are processed to some extent, DNA is usually altered and fragmented into small fragments.

However, extensive research has been performed and DNA based methods for food authenticity are becoming the methods of choice. These methodologies progress extremely fast; thus, a review on the current state of the art on DNA based methods is useful in order to assess the field. The problems, advantages and disadvantages of the methods are also discussed.

The aim of the event is the information and discussion about the capabilities and benefits of the use of modern molecular techniques, such us DNA barcoding and metabarcoding, for the development of sustainable and robust solutions in

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extremely important current issues, like traceability, certification, quality control and confrontation of the illegal trade of protected or endangered plant species.

Addressed to:
Researchers, students, producers and consumers, general public

Venue and time
University of Ioannina, Department of Biological Applications and Technology, Ioannina, start time: 17:00| end time: 19:30

Language Greek, English

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Program	
17:00	Arrival and registration
17:10	*Welcome and introduction to the meeting* **Prof. John Halley**, Laboratory of Ecology, Department of Biological Applications and Technology, University of Ioannina
17:20	*How can DNA barcoding and metabarcoding help us to monitor illegal trade and aid conservation? Investigating the trade in edible orchids* **Prof. Hugo de Boer**, Natural History Museum, University of Oslo
18:00	*Metabarcoding to trace adulteration in local Greek products* **Bastien Anthoons**, Institute of Applied Biosciences, Centre for Research and Technology, Hellas
18:20	*Genomics and DNA Barcoding approaches for species identification, food authentication and adulteration traceability* (in Greek) **Panagiotis Madesis**, Institute of Applied Biosciences, Centre for Research and Technology, Hellas
18:40	Discussion
19:30	End of meeting

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