Concorso pubblico, per titoli ed esami, con eventuale preselezione, per la copertura di n. 1 posto di personale categoria D - posizione economica 1, area tecnica, tecnico-scientifica ed elaborazione dati, prioritariamente riservato ai volontari delle Forze armate ai sensi del D.lgs. n. 66 del 15 marzo 2010, articoli 678 e 1014, da assumere con rapporto di lavoro subordinato a tempo indeterminato a tempo pieno, presso il Dipartimento di scienze agroalimentari, ambientali e animali (DI4A) dell'Università degli Studi di Udine (2022_PTA_TIND-D-TEC_001)

Ai sensi, per gli effetti e per gli adempimenti previsti dall'art. 19 del D.Lgs. 33/2013, n. 33 *("Riordino della disciplina riguardarne il diritto di accesso civico e gli obblighi di pubblicità, trasparenza e diffusione di informazioni da parte delle pubbliche amministrazioni")* e successive modificazioni e integrazioni, la Commissione, nominata con Provvedimento Dirigenziale n. 298 del 07/06/2022, e così composta:

Presidente	Prof.ssa TONIOLO Rosanna	Prof.ssa Associata – Dipartimento di scienze agroalimentari, ambientali e animali – Università degli Studi di Udine
Componente	Prof. SPANGHERO Mauro	Prof. Ordinario – Dipartimento di scienze agroalimentari, ambientali e animali – Università degli Studi di Udine
Componente	Dott.ssa PIANI Barbara	Cat. D – Area tecnica, tecnico-scientifica ed elaborazione dati – Dipartimento di scienze agroalimentari, ambientali e animali – Università degli Studi di Udine
Segretaria	Dott.ssa VISENTIN Ilaria	Cat. C – Area amministrativa – Dipartimento di scienze agroalimentari, ambientali e animali – Università degli Studi di Udine

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di aver formulato i seguenti quesiti per la prova orale:

QUESITI DELLA BUSTA N. 1

4- Principio di funzionamento della strumentazione FT-NIR.

5- Metodi di valutazione delle prestazioni del sistema GC-MS.

6- Leggere e tradurre il seguente brano:

In the wake of recent dietary trends that emphasise minimally processed functional foods, pumpkin seed oil is becoming one of the leading oils in this market niche. Due to the excellent gastronomic and nutritional properties of pumpkin (Cucurbita pepo L.) seed oil, the global market was valued at approximately 676.58 million USD in 2018, with an estimated growth of 15% from 2019 to 2026. The positive image that pumpkin seed oil enjoys among consumers is due to its various bioactive compounds with specific vitamin, antioxidant and pharmaceutical activity. Pumpkin seed oil is also well known for its distinctive colour, usually described as dark green with strong red fluorescence, which is due to its dichromatic character

QUESITI DELLA BUSTA N. 2

4- Metodi di valutazione delle prestazioni del sistema FT-NIR.

5- Principi di funzionamento della strumentazione GC-MS.

6- Leggere e tradurre il seguente brano:

In the production of pumpkin seed oil, ground pumpkin seeds are mixed with water and salt to form a dough which is then roasted at 110–150 C° and pressed. Due to the low yield of oil pumpkin per hectare, the low yield of seed oil and the high energy requirements and the number of man-hours required

for its production, pumpkin seed oil has a high market price. Therefore, similar to other high value-added products, such as olive oil, honey and wine, pumpkin seed oil can be adulterated during the production process. Adulteration is most commonly done by blending with cheaper refined oils, mostly sunflower and rapeseed oils. In some oil mills, the addition of other vegetable oils has even been traditionally used to facilitate roasting, i.e., to prevent the pumpkin seed dough adhesion to the pan during roasting, adding about 3 L of refined vegetable oil to 10 kg of pumpkin seeds.

QUESITI DELLA BUSTA N. 3

4- Quali sono le parti principali della strumentazione FT-NIR.

5- Potenzialità e limiti della tecnica GC-MS.

6- Leggere e tradurre il seguente brano:

However, regardless of the reasons, any undeclared addition of another oil variety to pumpkin seed oil is considered fraud.
Nowadays, as more and more farmers and entrepreneurs choose to grow oil pumpkin and produce pumpkin seed oil to meet increasing consumer demand, the means of its authentication are also gaining importance. Austrian and Slovenian pumpkin seed oils carry the prestigious European Union quality mark assigned for Protected Geographical Indication (PGI), while Croatian Varazdin pumpkin seed oil is protected at the national level and is currently in the process of being protected on the European level, which requires effective fraud prevention and label protection methods.

QUESITI DELLA BUSTA N. 4

4- Potenzialità e limiti della tecnica FT-NIR.

5- Quali sono le parti principali della strumentazione GC-MS.

6- Leggere e tradurre il seguente brano:

Common analytical parameters that have been proposed by various authors as markers to verify the authenticity of vegetable oils are fatty acids and triglycerides, as well as unsaponifiable compounds, such as sterols, tocopherols and tocotrienols and aliphatic alcohols. However, a fundamental problem in evaluating the authenticity of a particular oil is the establishment of one or more parameters to verify its identity and purity. Ideally, the identifying characteristics should be absent in the pure and present in the adulterated oil, but this is often not the case. Therefore, it is common practice that complete profiles of certain chemical groups in suspect oil samples are determined and compared with the limits established for authentic products.

QUESITI DELLA BUSTA N. 5

4- Operazioni di manutenzione ordinaria e straordinaria della strumentazione FT-NIR.

5- Esempi di applicazione di tecniche GC-MS su matrici a scelta.

6- Leggere e tradurre il seguente brano:

Since the standard method for the determination of sterols is timeconsuming and laborious and also often requires the use of expensive chromatographic methods, new techniques for the authentication of oils are currently being developed. These techniques include vibrational spectroscopy methods, i.e., near-infrared (NIR), Fourier transform infrared (FT-IR), and Raman spectroscopy, which can be applied to verify the authenticity of edible oils and are increasingly used due to their simplicity, speed and ease of sample preparation, are increasingly in use. Among the above methods,

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the NIR method is highlighted because of its efficiency and is, therefore, widely used in the agri-food sector for qualitative and quantitative analyses related to food safety and quality. Moreover, due to its specific needs, this sector requires the development of portable devices that offer fast, simple and non-destructive measurements that can be used in the field, in warehouses or in food quality control (control of changes in the content of certain components, freshness, adulteration, etc.).

QUESITI DELLA BUSTA N. 6

4- Esempi di applicazione di tecniche FT-NIR su matrici a scelta.

5- Operazioni di manutenzione ordinaria e straordinaria della strumentazione GC-MS.

6- Leggere e tradurre il seguente brano:

The aim of this study was to (i) determine specific sterol compounds as adulteration markers in samples declared as pumpkin seed oil and collected from the Croatian market and to (ii) assess their authenticity based on the percentage of individual sterols. Sterol "fingerprints" were determined by gas chromatography coupled with mass spectrometry (GC-MS) of isolated pumpkin seed oil non-glyceride fractions. The same chemical analyses were performed on laboratory-produced pumpkin seed oil and refined sunflower oil to characterise them, i.e., to fully evaluate the properties of pure pumpkin seed oil and possible blends. In addition, due to the extreme complexity and cost of the sterol determination, the spectrum in the NIR region and colourimetric parameters in the CIE-L * a * b * system was determined in order to evaluate the potential of these rapid methods for the detection of pumpkin seed oil adulteration and also to establish their correlation with the chemical adulteration markers.

Si comunica altresì che la candidata Saccà Elena ha estratto, quanto alla prova scritta, la busta n. 1. Dei quesiti non estratti, ovvero le buste n. 2 e n. 3, è stata data lettura.

Udine, 19/07/2022

La Presidente Commissione esaminatrice
Prof.ssa _____

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