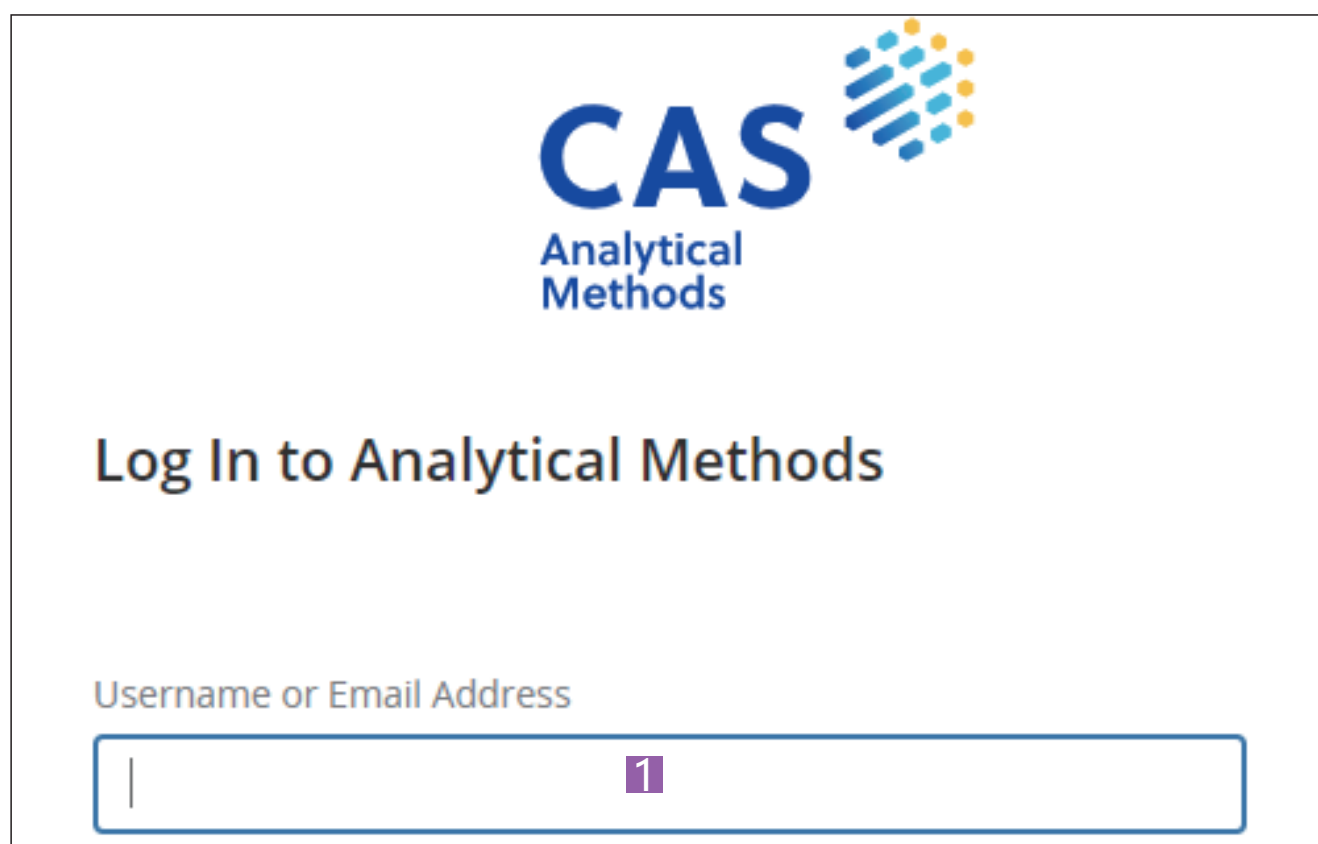



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- Water Analysis: 阴阳离子分析, 元素测定, 痕量元素分析, 废水分析, 生物标记公共卫生分析...
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- Fuels / Geology / Biofuels: 生物燃料分析, 油气分析, 石油产品分析, 煤炭加工...
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OR Method Category ✕

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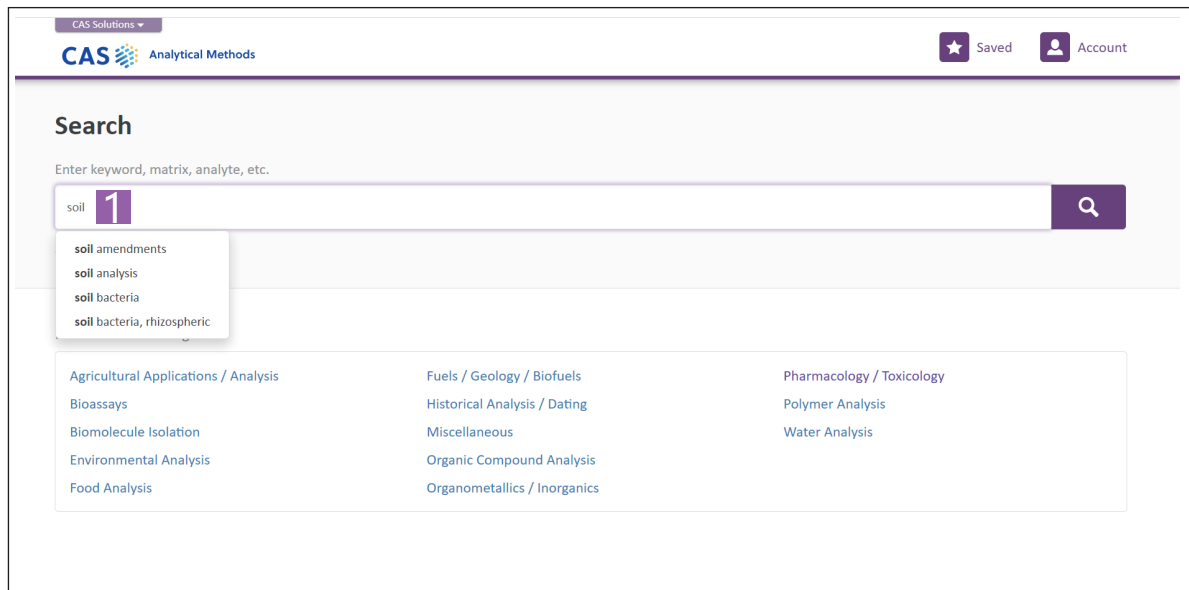
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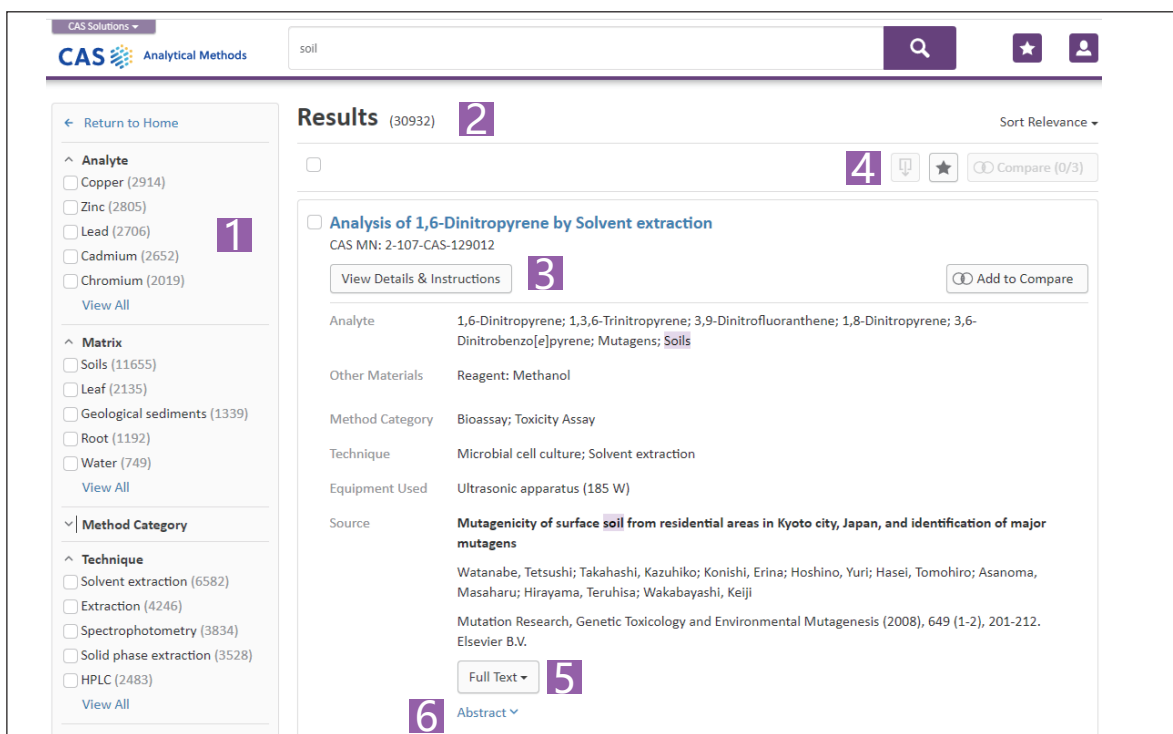
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- Technique
- CAS Method Number
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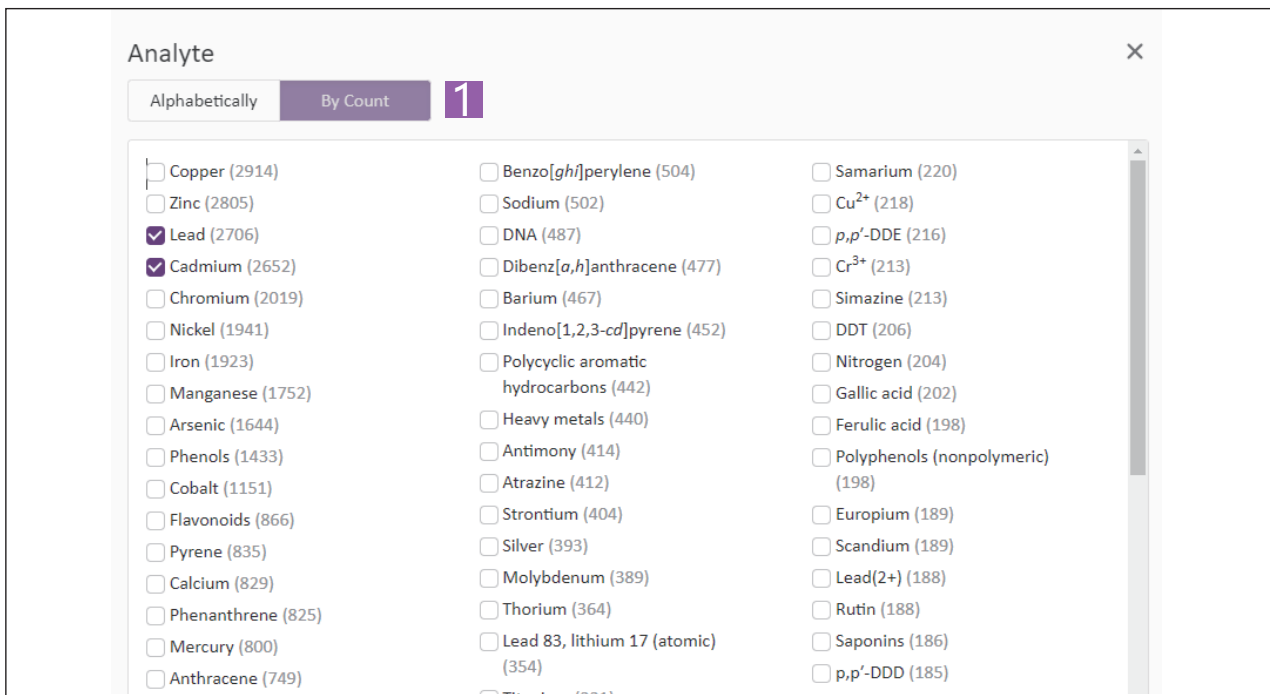
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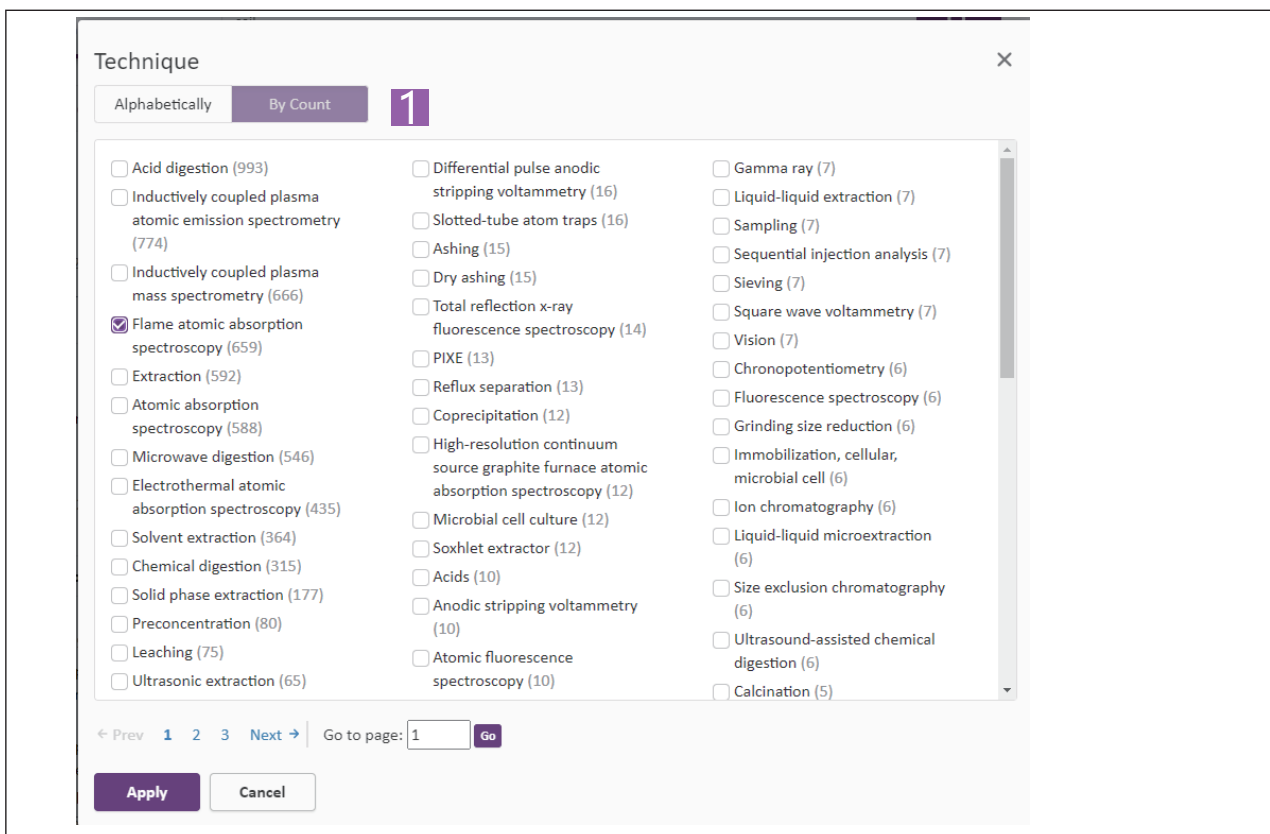
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1 点击技术手段列表，选择技术手段

Analysis of Cadmium in Soils by Electrothermal atomic absorption spectroscopy

CAS MN: 11339-CAS-93451

Method Category: Soil Analysis; Trace Element Analysis

Technique: Flow Injection Analysis; Electrothermal atomic absorption spectroscopy; Microwave digestion; Solid phase extraction

Materials	Role	Image	CAS RN
Cadmium	analyte	View Structure	7440-43-9
Soils	matrix		
0.8 mm i.d. poly(tetrafluoroethylene) (PTFE) tubing	material		
Multi-walled carbon nanotubes (diameter 60-100 nm, length 5-15 μm, purity ≥95%, ash ≤0.2 wt%, specific surface area 40-300 m ² /g, amorphous carbon <3%)	material		
10 mm length of PTFE tubing (2.0 mm i.d., 3.2 mm o.d.)	material		
Mini column	material		
Ferric nitrate	reagent	View Structure	10421-48-4
Iron chloride (FeCl ₃)	reagent	View Structure	7705-08-0
Tris(hydroxymethyl)aminomethane hydrochloride	reagent	View Structure	1185-53-1
Nitric acid	reagent	View Structure	7697-37-2
Hydrochloric acid	reagent	View Structure	7647-01-0
Hydrofluoric acid	reagent	View Structure	7664-39-3
Ethanol	reagent	View Structure	64-17-5
Sodium hydroxide	reagent	View Structure	1310-73-2
Monosodium phosphate	reagent	View Structure	7558-80-7

Source

Improvement on the selectivity and sorption capacity of cadmium by iron loaded carbon nanotubes with detection by electrothermal atomic absorption spectrometry

Zhang, Xiaoxing; Zhang, Lipi; Yang, Ting; Shen, Liming; Chen, Mingli; Wang, Jianhua

Journal of Analytical Atomic Spectrometry (2012), 27 (10), 1680-1687. Royal Society of Chemistry

CODEN: JASPEZ | ISSN: 02679477 | DOI: 10.1039/c2ja30099k

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Abstract <

Multi-walled carbon nanotubes (MWNs) were functionalized by incubating in Fe³⁺ solution for the purpose of improving its selectivity and sorption capacity to cadmium. High resolution transmission electron microscopy, Raman spectroscopy, x-ray diffraction, and surface charge anal. demonstrated that the MWNs were decorated by a layer of iron phosphate. In a neutral medium (pH 6), the iron phosphate coated carbon nanotubes (NFP) offer a much improved sorption capacity of 32.68 mg g⁻¹ for cadmium over 6.72 mg g⁻¹ by bare carbon nanotubes after oxidation. The bare carbon nanotubes generally exhibit non-specific adsorption for various species, while the NFP composites provide very high selectivity to cadmium against complex sample matrix components, i.e., the tolerant limit for coexisting species were 5-100 fold improved. The NFP composites were packed into a mini-column for online selective preconcentration of cadmium with detection by electrothermal at. absorption spectrometry. A 100% sorption was achieved at pH 6, and 50 μL of aqueous mixture of 0.002 mol L⁻¹ H₃PO₄ and 0.1 mol L⁻¹ NH₄NO₃ gives rise to a recovery of 77%. With a sample volume of 1000 μL, an enhancement factor of 31.2 is obtained, along with a detection limit of 1.3 ng L⁻¹ (3σ, n = 11) and a RSD of 2.2% (0.1 μg L⁻¹, n = 11) within a linear calibration range of 0.003-0.2 μg L⁻¹. The procedure is validated by determining cadmium in two certified reference materials (GBW08608 and GBW07404) and environmental water samples.

Equipment Used

Atomic absorption spectrophotometer, WFX-130A, Beijing Rayleigh Analytical Instruments Co., Ltd, China

Cadmium hollow cathode lamp, Beijing Rillips Photoelectricity Factory, China

pH meter, Orion 868, ThermoElectron

Sequential injection system, FIAlab-3000, FIALab instruments, Bellevue, WA, USA

Conditions

Instrument

Drying temperature: 100 °C (ramp time: 10 s; holding time: 20 s) pyrolysis temperature: 300 °C (ramp time: 10 s; holding time: 20 s) atomization temperature: 1600 °C (holding time: 3 s); cleaning temperature: 2000 °C (holding time: 2 s); injection volume: 20 μL

Wavelength: 228.8 nm; current: 3.0 mA; spectral bandpass: 0.4 nm

Instructions

Preparation of iron solution

1. Prepare the stock solution of iron (1000 mg/L) by dissolving 0.3617 g of Fe(NO₃)₃·9H₂O in 50 mL distilled water.
2. Prepare working standards of different concentrations by stepwise dilution of the stock solution.

Preparation of standard solution

1. Prepare stock solution of cadmium (1000 mg/L) by dissolving 0.1016 g of CdCl₂·2.5H₂O in nitric acid (0.1 mol/L).
2. Dilute to 50 mL.
3. Prepare working standards of different concentrations by step-wise dilution of the stock solution.

Purification of MWNs

1. To remove carbonaceous and catalyst impurities on their surface, pretreat the multiwalled carbon nanotubes (MWNs) by soaking 0.5 g of the commercial MWNs in 50 mL ethanol (50%, v/v).
2. Sonicate the mixture for ca. 60 min to wipe off the carbonaceous impurities.
3. Collect the MWNs by centrifugation.
4. Rinse with distilled water.
5. Disperse the MWNs into 50 mL of HCl solution (1%, v/v).
6. Stir for ca. 4 h to remove the residual metallic catalyst.
7. Wash the collected MWNs with distilled water until the pH of the wash-out solution is the same as distilled water.
8. Dry the received MWNs at 100 °C in an oven.

Oxidation of MWNs

1. Take 0.5 g of the purified MWNs in a 500 mL flask.
2. Mix with 200 mL of H₂SO₄/HNO₃ (3:1, v/v).
3. Sonicate for 11 h.
4. Dilute the mixture and wash thoroughly with distilled water.
5. Collect by centrifugation.
6. Dry at 100 °C.

Validation

Linearity Range	0.003-0.2 μg/L
Limit of Detection	1.3 ng/L
Precision	2.2% (RSD) at 0.1 μg/L
Concentration	0.33 ± 0.05 mg/kg (GBW07404), 0.35 ± 0.08 mg/kg (certified value)

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1 分析方法所用材料

2 书目信息

3 原文链接

4 摘要

5 使用仪器

6 实验条件

7 分析方法操作步骤

8 方法有效性

Analysis of Cadmium in Soils by Flame atomic absorption spectroscopy

CAS MN: 1-139-CAS-236465

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1

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Analyte **Lead; Cadmium**

Matrix **Soils**

Other Materials **Reagent: Tungsten carbide; Nitric acid; Perchloric acid; Hydrofluoric acid**
Material: Plastic spatula; Sieve (2 mm); Polyethylene bags; Swing mill; Teflon vessels; Hot plate

Method Category **Soil Analysis; Element Detection**

Technique **Flame atomic absorption spectroscopy; Microwave digestion**

Equipment Used **Flame atomic absorption spectrophotometer**

Source **Cadmium and Lead Distribution in Marine Soil Sediments, Terrestrial Soil, Terrestrial Rock, and Atmospheric Particulate Matter around Split, Croatia**
Buljac, Masa; Bogner, Danijela; Bralic, Marija; Peris, Nenad; Buzuk, Marijo; Brinic, Slobodan; Vladislavic, Nives
Analytical Letters (2014), 47 (11), 1952-1964. Taylor & Francis, Inc.

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Compare Methods

2

3

	1	2	3
Title	Analysis of Lead in Soils by Microwave digestion	Analysis of Copper in Soils by Chemical digestion	Analysis of Cadmium in Soils by Flame atomic absorption spectroscopy
CAS Method Number	1-139-CAS-260826	1-139-CAS-306166	1-139-CAS-236465
Method Category	Soil Analysis; Element Detection	Soil Analysis; Trace Element Analysis	Soil Analysis; Element Detection
Technique	Flame atomic absorption spectroscopy; Microwave digestion	Flame atomic absorption spectroscopy; Chemical digestion	Flame atomic absorption spectroscopy; Microwave digestion
Analyte	Cadmium; Zinc; Lead; Iron	Iron; Lead; Copper; Manganese oxide; Zinc; Cadmium	Cadmium; Lead
Matrix	Soils	Soils	Soils
Other Materials	Aqua regia; Calcium chloride; Sieve (100 µm mesh); Whatman no. 4 filter paper	Perchloric acid; Hydrofluoric acid; Nitric acid	Perchloric acid; Nitric acid; Hydrofluoric acid; Tungsten carbide; Plastic spatula; Sieve (2 mm); Polyethylene bags; Swing mill; View All
Equipment Used	Microwave oven, MDS-2000, CEM; Flame atomic absorption spectrophotometer (FAAS), AA2400F, Varian	Reactors, 2000, PHASE; Flame atomic absorption spectrophotometer (FAAS), Nova6 300, Analytik Jena	Flame atomic absorption spectrophotometer, 3110B, PerkinElmer
Conditions	Instrument: flame; acetylene/air		
Source	Electrochemical EDTA recycling after Soil washing of Pb, Zn and Cd contaminated soil Poocheh, Mulu; Katielic, Damijana; Lestan, View All	Improving the relationship between Soil characteristics and metal bioavailability by using reactive fractions of soil parameters View All	Cadmium and Lead Distribution in Marine Soil Sediments, Terrestrial Soil, Terrestrial Rock, and Atmospheric Particulate Matter View All
Preparation	Collection and processing of Soil sample 1. Collect the Soil samples which has been assessed to more than three View All	Collection of Soil samples 1. Place duplicates of 1.5 kg of unspiked and metal-spiked Soil samples in each View All	Collection of Soil sample 1. Collect Soil from 5 - 15 cm depth View All
Method	Microwave digestion followed by flame atomic absorption spectrophotometry (FAAS) analysis 1. Grind air-dried Soil samples (1 g) in an View All	Wet digestion and detection of Fe, Mn, Co, Cu, Pb and Zn by flame atomic absorption spectrophotometry (FAAS) method View All	Flame atomic absorption spectrophotometry (FAAS) 1. Perform flame atomic absorption View All
Limit of Quantitation	0.1 mg/L Lead, 0.01 mg/L Zn, 0.02 mg/L Cadmium, 0.06 mg/L Iron	0.2 mg/L Copper, 0.5 mg/L Lead, 0.1 mg/L Zn, 0.2 mg/L Cadmium, 0.5 mg/L Iron, 0.2 mg/L Manganese	
Limit of Detection			0.2 µg/g Cadmium
Concentration			0.6 µg/g Soil collected in spring, sample data), Cadmium, 0.7 µg/g Soil collected in fall, sample data), Cadmium, 0.1 µg/g Soil View All
Source	Electrochemical EDTA recycling after Soil washing of Pb, Zn and Cd contaminated soil Poocheh, Mulu; Katielic, Damijana; Lestan, View All	Improving the relationship between Soil characteristics and metal bioavailability by using reactive fractions of soil parameters View All	Cadmium and Lead Distribution in Marine Soil Sediments, Terrestrial Soil, Terrestrial Rock, and Atmospheric Particulate Matter View All
Preparation	Collection and processing of Soil sample 1. Collect the Soil samples which has been assessed to more than three View All	Collection of Soil samples 1. Place duplicates of 1.5 kg of unspiked and metal-spiked Soil samples in each View All	Collection of Soil sample 1. Collect Soil from 5 - 15 cm depth View All
Method	Microwave digestion followed by flame atomic absorption spectrophotometry (FAAS) analysis 1. Grind air-dried Soil samples (1 g) in an View All	Wet digestion and detection of Fe, Mn, Co, Cu, Pb and Zn by flame atomic absorption spectrophotometry (FAAS) method View All	Flame atomic absorption spectrophotometry (FAAS) 1. Perform flame atomic absorption View All
Limit of Quantitation	0.1 mg/L Lead, 0.01 mg/L Zn, 0.02 mg/L Cadmium, 0.06 mg/L Iron	0.2 mg/L Copper, 0.5 mg/L Lead, 0.1 mg/L Zn, 0.2 mg/L Cadmium, 0.5 mg/L Iron, 0.2 mg/L Manganese	
Limit of Detection			0.2 µg/g Cadmium
Concentration			0.6 µg/g Soil collected in spring, sample data), Cadmium, 0.7 µg/g Soil collected in fall, sample data), Cadmium, 0.1 µg/g Soil View All

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天然产物分离

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^ Analyte

Phenols (11417)

Flavonoids (7834) **1**

Polyphenols (nonpolymeric) (2571)

Tannins (2288)

Quercetin (2134)

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^ Matrix

Leaf (8807)

Root (2522)

Stem (2361)

Seed (2059)

Flower (1597)

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Analysis of Tannins in Coriandrum sativum by Extraction
 CAS MN: 1-131-CAS-43974

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Analyte	Tannins
Matrix	Coriandrum sativum
Other Materials	Reagent: Methanol; Sulfuric acid Material: Whatman No. 4 filter paper
Method Category	Natural Product Isolation Analysis
Technique	Spectrophotometry; Extraction
Equipment Used	Spectrophotometer
Source	Chemical composition and antioxidant activity of the coriander cake obtained by extrusion Sriti, Jazia; Bettaieb, Iness; Bachrouch, Olfa; Talou, Thierry; Marzouk, Brahim Arabian Journal of Chemistry, , -. Elsevier B.V.

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CAS MN: 1-131-CAS-102587

Method Category: **Natural Product Isolation Analysis**

Technique: Spectrophotometry; Extraction

1

Materials	Role	Image	CAS RN
Tannins	analyte		
Coriandrum sativum	matrix		
Whatman No. 4 filter paper	material		
Methanol	reagent	View Structure	67-56-1
Sulfuric acid	reagent	View Structure	7664-93-9

2**Source****Chemical composition and antioxidant activity of the coriander cake obtained by extrusion**

Sriti, Jazia; Beltaieb, Iness; Bachrouch, Olf; Talou, Thierry; Marzouk, Brahim

Arabian Journal of Chemistry (2019), 12 (7), 1765 - 1773. Elsevier B.V.

CODEN: AJCRDR | ISSN: 18785352 | DOI: 10.1016/j.arabj.2014.11.043

[Full Text](#)**3****Abstract**

This study was designed to examine the effect of operating conditions on essential oil composition and antioxidant activity of coriander cakes. Twenty-nine components were determined in essential oils, which were mostly alc. monoterpenes. The highest essential oil yields (0.11%) were obtained by the nozzle diameter of 5 mm. The main components of cake essential oil linalool, γ -terpinene, geranyl acetate, linalyl acetate and camphor showed significant variations with different nozzle diameter. The total phenol contents and condensed flavonoid contents varied between different nozzle diameters; the highest values obtained of small diameters (5 and 6 mm). Significant differences were also found in total tannin contents among different nozzle diameters. The total phenol contents decreased significantly ($p < 0.05$) when increased the nozzle diameter to 9 mm and reached 9.11 mg GAE/g. The screening of antioxidant activity of the different coriander cakes using the diphenyl-(2,4,6-trinitrophenyl) iminoazanium radical (DPPH) assay showed an appreciable reduction of the stable radical DPPH, although small nozzle diameter was the most efficient method with an IC_{50} reached of 55 $\mu\text{g}/\text{mL}$ as compared with bigger diameter ($IC_{50} = 88 \mu\text{g}/\text{mL}$). All the extracts had lower β -carotene bleaching activity than that of synthetic antioxidant BHA and BHT. Coriander cake extracts presented a very low reducing power ability ($EC_{50} = 700 \mu\text{g}/\text{mL}$) compared to ascorbic acid ($EC_{50} = 40 \mu\text{g}/\text{mL}$).

4**Equipment Used**

Spectrophotometer

5**Conditions****Instrument**

Wavelength- 500 nm

6**Instructions****Extrusion**

1. Extract the fruits from coriander with single screw press extruder, and collect the cake samples immediately for further analysis.
2. Perform extrusion using a Single-screw (Model OMEGA 20, France) with a motor (0.75 kW, 230 V of maximal tension, 5.1 A of maximal intensity), a screw length of 18 cm, a pitch screw of 1.8 cm, with an internal diameter of 1.4 cm, a channel depth of 0.5 cm and a sleeve of 2.5 cm of internal diameter equipped with a filter-pierced outlet for liquid at the end of the screw and at the surface of the nozzles.
3. Use the filter section of 2 mm in diameter to separate extracted oil.
4. Maintain the feed rate and the screw rotation speed at 15 g/min (0.9 kg/h) and 40 rpm, respectively.
5. Use the nozzles of different diameters (5-6 mm) in the pressing of the coriander seed and the nozzle/screw distance of 3 cm.
6. First run the screw press for 15 min without seed material but with heating via an electrical resistance-heating ring attached around the press barrel, to raise the screw press barrel temperature to the desired value.
7. Adjust the running temperature with a thermocouple.

Extraction

1. Finely grind the air-dried coriander cake with a blade carbide grinding.
2. Extract separately the triplicate subsamples of 2.5 g of each ground sample by stirring with 10 ml of pure methanol for 30 min.
3. Place the extracts for 24 h at 4 °C and filter through a Whatman No. 4 filter paper.
4. Evaporate under vacuum to dryness and store at 4 °C until the analysis.

7**Determination of total condensed tannins content**

1. Add a total of 3 ml of 4% methanol vanillin solution and 1.5 ml of concentrated H_2SO_4 to 50 μl of suitably diluted sample.
2. Incubate the mixture for 15 min.
3. Measure the absorbance at 500 nm against methanol as a blank.
4. Express the amount of total condensed tannins as milligrams of (+)-catechin equivalent per gram of dry weight (mg of CE/g of DW) through the calibration curve with catechin.

8**Validation**

Concentration 3.00 mg CE/g DW

1 实验所用材料**2** 书目信息**3** 摘要**4** 使用的仪器**5** 实验条件**6** 提取、分离步骤详情**7** 产物的表征**8** 方法有效性

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