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Determination of arsenic ion concentration

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ABSTRACT

Arsenic is so toxic to insects, bacteria, and mushrooms that it is used as a preservative in wood. For example, copper and arsenic chromate (CCA), a common preservative in wood preservative treatment, has been the largest consumer of arsenic since the 1950s. But in recent years, with the countries all over the world for the continuous improvement of environmental protection and health requirements, the United States, Japan, the European Union and other countries and regions have banned or restricted use of CCA wood preservatives and CCA processing wood, those who replace is ACQ (tetravalent cuprammonium complex) and CBA (pyrrole boron copper complex) type does not contain arsenic green building materials such as wood preservative, thus arsenic are plunged in the field of wood processing.

At present, arsenic is mainly used as alloy material in copper and lead alloys. In addition, arsenic is also used as a doped material in some semiconductor materials, such as N-type semiconductor materials. As people's health and environmental awareness increases, the use of arsenic in pesticides, herbicides, wood preservatives, pesticides and other aspects is gradually decreasing. Arsenic is also used as an alloy because of its semi-metallic nature. For example, arsenic-lead alloys containing 2 percent arsenic are used in the military industry to make bullets, military poisons, and fireworks. Arsenic-copper alloy made by adding 0.15%-0.5% arsenic to copper can significantly reduce the thermal and electrical conductivity of copper, improve the processing plasticity of oxygen-containing copper, and is often used in the production of supporting screw rods in train combustor and parts in high temperature reduction atmosphere

PROTOCOL CITATION

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Arsenic ion

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GUIDELINES

Before beginning these protocols, please ensure that you are familiar with the measurement modes and settings of your instrument. For all of these calibration measurements, you must use the same plates and volumes that you will use in your experiement. You must also use the same settings that you will use in your experiement. If you do not use the same plates, volumes, and settings, the calibration will not be valid.

Make sure to record all information about your instrument to document your experiment. If your instrument has variable temperature settings, the instrument temperature should be set to room temperature (approximately 20-25 C) for all measurements.

MATERIALS

NAME	CATALOG #	VENDOR
pET24a( ) -orpf-linker-FMT		
pET24a( ) -FMT		
Coomace bright blue		
LB culture		
Centrifuge tube		
kanamycin resistant plate		
IPTG		
spectrophotometer		
ICP-MS		

BEFORE STARTING

Read through this entire protocol carefully before you start your experiment and prepare any materials you may need.

1 Two plasmids of pET, pET24a(+) -orpf-linker-FMT and pET24a(+) -FMT, were transferred to a kanamycin resistant plate and cultured overnight.

2 A single colony was selected and inoculated into LB Culture (containing kanamycin) for overnight Culture.

3 The overnight cultured bacterial solution was diluted 1:100 and inoculated into LB Culture (including kanamycin).

4 Until OD600 reached 0.6-0.8. IPTG was added to make the concentration 1mM, low temperature at 26 ° C, and induced overnight at 160rpm.

5 A small amount of the overnight induced bacterial liquid was taken and its OD600 value was measured with a spectrophotometer.

6 Then 2ml of the overnight induced bacterial liquid was taken and centrifuged to collect the bacteria. The bacteria were washed three times with PBS, the supernatant was discarded, and 100ul 2× Lording was added to denaturate at high temperature for five minutes.

7 SDS-PAGE was prepared, 30UL of denatured bacterial liquid was taken as sample running glue, and the running glue could be stopped when the protein was completely running down.

8 Dye the glue containing protein with Coomace bright blue for 15 minutes, and the dye solution can be recycled after use.

9 The eluent was used overnight and the results were observed the next day.

10 All the induced bacteria were centrifuged overnight, and the bacterial precipitation was collected. After washing with PBS for three times, the bacteria were centrifuged, and the dry weight of the two bacteria was adjusted to be as consistent as possible.

11 The samples were resuspended with PBS and divided into 15mL centrifuge tubes. Each tube contained 6ml bacterial liquid. As3+ was added to the tubes to make the final concentrations of 1uM, 5uM, 15min and 45min.

12 Remove impurities using a 0.22um filter.

13 Samples were collected for the determination of arsenic concentration using atomic absorption spectrometry or ICP-MS to determine the concentration of arsenic ions in the superplasm.