



Li and 42 Kinds of Elements (Draft for Comments) and Drafting Instructions

《化妆品、牙膏中锂等43种元素的检验方法
(征求意见稿)》及起草说明

National Institutes for Food and Drug Control

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Attachment 6

Li and 42 Kinds of Elements (Draft for Comments)

1 Scope

This method specifies the determination of content of Li and 42 kinds of elements in cosmetics and toothpastes using inductively coupled plasma mass spectrometry.

This method applies to the determination of Li and 42 kinds of elements in cosmetics and toothpastes.

The 43 elements referred to in this method include lithium (Li), beryllium (Be), boron (B), scandium (Sc), vanadium (V), chromium (Cr), manganese (Mn), cobalt (Co), nickel (Ni), copper (Cu), arsenic (As), selenium (Se), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr), silver (Ag), cadmium (Cd), indium (In), tin (Sn), antimony (Sb), tellurium (Te), cesium (Cs), barium (Ba), lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), lutetium (Lu), mercury (Hg), thallium (Tl), lead (Pb), bismuth (Bi), and thorium (Th).

2 Method Summary

After acid digestion treatment to form a solution, the sample, in the form of an aerosol, enters a high-temperature radio frequency plasma with argon as the matrix through a pneumatic atomizer. It undergoes evaporation, dissociation, atomization, ionization and other processes, and then is converted into positively charged ions. These ions are collected by an ion acquisition system and enter a mass spectrometer which separates the ions based on their mass-to-charge ratios. The mass spectrometer integration area is proportional to the number of ions entering the mass spectrometer. This means that the concentration of each element to be tested is directly proportional to the signal intensity CPS generated by the element. Comparative quantification is performed with the standard series.

Table 1 shows the lower limits and minimum concentrations of quantification of this method when 0.2 g of a sample is taken and the volume after dilution is 50 mL.

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附件 6

化妆品、牙膏中锂等 43 种元素的检验方法 (征求意见稿)

Li and 42 Kinds of Elements (Draft for Comments)

1 范围

本方法规定了电感耦合等离子体质谱法测定化妆品、牙膏中锂等 43 种元素的含量。

本方法适用于化妆品、牙膏中锂等 43 种元素的测定。

本方法所指的 43 种元素为锂 (Li)、铍 (Be)、硼 (B)、钪 (Sc)、钒 (V)、铬 (Cr)、锰 (Mn)、钴 (Co)、镍 (Ni)、铜 (Cu)、砷 (As)、硒 (Se)、铷 (Rb)、锶 (Sr)、钇 (Y)、锆 (Zr)、银 (Ag)、镉 (Cd)、铟 (In)、锡 (Sn)、锑 (Sb)、碲 (Te)、铯 (Cs)、钡 (Ba)、镧 (La)、铈 (Ce)、镨 (Pr)、钕 (Nd)、钐 (Sm)、铕 (Eu)、钆 (Gd)、铽 (Tb)、镝 (Dy)、钬 (Ho)、铒 (Er)、铥 (Tm)、镱 (Yb)、镥 (Lu)、汞 (Hg)、铊 (Tl)、铅 (Pb)、铋 (Bi)、钍 (Th)。

2 方法提要

样品经酸消解处理成溶液后,经气动雾化器以气溶胶的形式进入氩气为基质的高温射频等离子体中,经过蒸发、解离、原子化、电离等过程,转化为带正电荷的正离子,经离子采集系统进入质谱仪,质谱仪根据质荷比进行分离,质谱积分面积与进入质谱仪中的离子数成正比。即待测元素浓度与各元素产生的信号强度 CPS 成正比,与标准系列比较定量。

若取 0.2g 样品,定容体积至 50mL,本方法定量下限和最低定量浓度见表 1。

表 1 各元素的检出限、定量下限、检出浓度和最低定量浓度

元素	检测限 ($\mu\text{g/L}$)	最低检出浓度 (mg/kg)	定量限 ($\mu\text{g/L}$)	最低定量浓度 ($\mu\text{g/kg}$)
锂 (Li)	0.2	0.05	0.6	0.15
铍 (Be)	0.2	0.05	0.6	0.15
硼 (B)	1	0.25	3	0.75
钪 (Sc)	0.06	0.015	0.18	0.045
钒 (V)	0.1	0.025	0.3	0.075



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