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Speciation analysis and fractionation of manganese – a review

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Highlights

- Significance, application and role of manganese
- Application of analytical methods for manganese speciation in different materials
- Direct and indirect techniques for manganese speciation and fractionation
- Manganese speciation/fractionation in soils, sediments, air, aerosols, water, plants and animals

Abstract

Manganese as an essential element is required by organisms from simple bacteria to plants, animals and human being. The identification and determination of organic or inorganic manganese forms is important from many points of view, such as their bioavailability or bioactivity. A review of the use of different analytical methods, which allow manganese speciation and fractionation in various type of matrix such as: soils, sediments, air, aerosols, water, plants, animals and polluted environmental samples is given in this article. The presented approaches assume mainly the use of indirect techniques from simple ones like extraction, through multistep procedures to more complex such as hyphenated techniques. Direct analysis of manganese species is also possible but unfortunately only in some cases and for selected samples.

Significance of manganese speciation and fractionation in different areas of life and difficulties in performing such analysis, makes them still a challenge.

Key words

manganese, speciation, determination, fractionation, water, plants, biological material

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