



Investigation of toxic metals content of parsley (*petroselinum crispum*) obtained from local farms in Baz Kia Gorab region (Lahijan city, north of Iran)

Milad Sheydaei^{a,*} Pegah Ghiasvandnia^b, Milad Edraki^c, Melika Sheidaie^d

^aFaculty of Polymer Engineering, Sahand University of Technology, P.O. Box 51335-1996, Tabriz, Iran

^bDepartment of Chemical Engineering, Technical Faculty, Lahijan Branch, Islamic Azad University, Lahijan, Iran

^cPolymer Department, Technical Faculty, South Tehran Branch, Islamic Azad University, Tehran, Iran

^dDepartment of chemistry, Farzanegan Talented High School, Rasht, Iran

ARTICLE INFO

Article history:

Received 24 July 2022

Received in revised form 21 August 2022

Accepted 7 September 2022

Available online 11 September 2022

Keywords:

Heavy metals
 Parsley
 Plants

ABSTRACT

Heavy metals are one of the problems that have arisen for humans with the development of societies. Heavy metals are toxic and can cause many problems and affect health. In this study, the content of toxic metals such as arsenic (As), cadmium (Cd), lead (Pb), and mercury (Hg) in parsley (*petroselinum crispum*) prepared from local farms in Baz Kia Gorab region (Lahijan city, north of Iran) were investigated. For this purpose, parsley was obtained from three local farms and the content of toxic metals was evaluated by a flame atomic absorption spectrophotometer. The results showed that the levels of these metals were higher than the standard.

1. Introduction

The rapid evolution of technology, economic development, climate change, excessive consumption of natural resources and rapid urbanization have caused the environment to be exposed to many types of toxins and pollution [1,2]. Every year, plastics, herbicides, insecticides, fungicides, waste burning and industrial untreated wastewater cause water, soil and plant pollution, and these pollutions can exist in the environment for a long time and have harmful effects [3-35]. Meanwhile, heavy metals can be considered at the top of the list of environmental toxins. The risk of heavy metals pollution are increasing and they harm human health by accumulating in water, soil, plants and through transmission in the food chain [36]. Heavy metals such as As, Cd, Pb, Hg, nickel, cobalt, and iron are among the most important environmental pollutants in areas with high anthropogenic pressure [37]. Heavy metals in higher concentrations prevent plant growth and production, which acts as stress for plants, which ultimately has an adverse effect on flora, fauna, and adjoining areas [38]. For example, it has been reported that Pb and Cd cause a delay in germination, induce membrane damage, mineral leakage, and also prevent root elongation and chlorophyll production [39-41]. Some of these heavy metals have

bioaccumulation, they can accumulate through absorption at the primary producer level and then through consumption at the consumer levels in the ecological food chain [42]. In biological systems, these metals can damage mitochondria, lysosomes, deoxyribonucleic acid, proteins, carbohydrates, nuclei, etc., and may cause cell cycle variation, carcinogenesis, or apoptosis [43]. Parsley (see Figure 1) is native to the Mediterranean region but is widely cultivated throughout the world [44].



Figure 1. Parsley (*petroselinum crispum*).

* Corresponding author. Tel.: +989211868265; e-mail: mi_sheydaei@sut.ac.ir