



Detection of chemical contamination of some herbal slimming available in local markets

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ABSTRACT

Contamination by metals were investigated in this study for herbal slimming which have been widely used in our Iraqi community, Arsenic (As), lead (Pb), cadmium (Cd), Nickel (Ni), iron (Fe) and copper (Cu), were determined using flame atomic absorption spectrophotometry. Experiment samples were divided to two groups, first group (G1) included five packet samples of herbal were collected from pharmacy and moles in Baghdad, second group (G2) included unpacked five samples of herbal that taken from local markets and spices shops. Results showed that G2 was more contaminated than G1, and there were significant differences ($0.05 > p$) for contamination by heavy metals between samples of G1 and G2. It has also been conducting an exploratory or a questionnaire study of a sample of people who deal with these herbs and put several questions about the way of taking the herbs, a place to buy these herbs and knowing about the risks of these herbs. Results appeared that 30% of people prefers taking samples from G1 but 70% prefers G2 because they are cheaper and easier to buy, also 40% of people were worry for the risks of these herbs while 60% don't because of less understanding of their dangers. This study suggest that we must give more interest in dealing with these herbals and take it from specific and trusted places, adding no one should take it without prescription.

INTRODUCTION

Metals elements are naturally-occurring components of the earth's crust. Distribution of heavy metals is not uniform, for example soils may contain higher amounts of chemicals, either due to natural processes or to pollution factors (1). Different plants/herbs and animal parts have been used since ages to treat various illness (2). The use of these herbs plants grown and evolved over centuries (3). Currently slimming herbs are widely used in the developing countries as a prime health care system (4). Efficacy and quality control of such products to be an important concern from certain global health authorities such as the World Health Organization (WHO) and Food and Drug Administration (FDA) (5). Herbal/ Traditional medicine (TM) must be used cautiously; some TM products may cause negative health impact and even toxicity due to many reasons such as the adulteration with conventional medicine and contamination with heavy metals and other toxic substances (6). Attention must also be given to the specific form of some heavy metals since health risks are sometimes associated with, or heightened for one form more than others. Each of these can be found in an elemental state or combined with other elements, like inorganic arsenic is greater risk than organic forms (7). The herbs are used in food and medicine as anti-neoplasms microscopic, but it is contaminated with biologically during their growth, collection and operations manufactured and distributed, including pathogenic bacteria, fungi, toxic molds and yeasts, chemical contaminant compounds and heavy metals which leads to an increase health risks to humans from food poisoning and other pathological conditions unhealthy, therefore these plants must be diagnosed before consumption and displayed in local markets. (8), (9), (10), (11).

The aim of this study is to clarify the seriousness of pollution, some of Chemical pollutants such as certain heavy metals in some herbal medicinal plants used for slimming purposes and



available in local markets and compared there levels with recommended levels in global organizations.

Materials and METHODS

1. Samples collecting

Ten samples of slimming herbs were collected from many locations (markets in Baghdad), also samples were divided to two groups first group G1 included five pocket samples of herbal were collected from pharmacy and moles in Baghdad ,second group (G2) included unpacked five samples of herbs that taken from local markets and spices shops or hawkers on sidewalk from Baghdad areas and roads.

number of sample	G1(packed sampls from pharmacy and moles)	Number of sample	G2(unpacked samples from local markets and spices shops).
1	Al hadder Herbalists	1	Fat-srbal (capsule)
2	Zain zohorat	2	Un pocket (powder)
3	Herbal slimming	3	Green tea+ cumin +lemon (powder)
4	Green tea	4	Ginger +lemon +cumin + sage+ menthol (powder)
5	Oil slimming	5	Un known powder

2. Preparing samples for testing

1. Weigh 10 grams of each model and dried in a drying oven for 8 hours at a temperature of 80 ° C.
2. Incinerate form in the burning oven for 5 hours at a temperature of 500 ° C and weighed after cooling.
3. Digestion solution attends (3 volumes HCl : 1 volume HNO₃).
4. Added (10 ml) of the digestion solution to ash and heated on a hot plate less than an hour to rising vapors and complements the size limit with distilled water (50 ml) solution is then filtered and supernatant is taken.
5. Examine the heavy elements by Atomic Absorption.

3. Determination by a Flame Atomic Absorption Spectrophotometer (AA7000)

Metals in Samples were determined using Flame Atomic Absorption Spectrometer kind of Shimadzu Corporation Model AA-7000 in laboratory of Market Research and Consumer Protection Center / University of Baghdad.

4. Statical Analysis

SAS-Statistical Analysis System (2010 the statistical program) is used to study the effect of different factors in the studied traits by least significant difference test (LSD) and compared with the moral differences between the test averages. (12)



5. Questionnaire Design

Poll investigation was done for 60 people there age (20-50) years who are actually using these herbals, depending on six important questions shown in table (1), then answers were collected and analyzed.

% the sample results = (no. of the sample\100) * 100

Table (1) questions made for people that taking slimming herbals

n.	Questions	yes	no	nots
1	Do you take sliming herbs with medical advice?			
2	Do you feel they are treating you?			
3	Do you buy herbs from malls and pharmacy?			
4	Do you buy herbs from local markets and shops			
5	Do you take these herbs for long time (more than one year)?			
6	Have you read or heard that these herbs are dangerous?			
7	We need for medical and scientific trusted informations about herbs and slimming herbs in our markets.			

Results and discussion

Table (2) shows that the samples of G1 were contaminated with heavy metals and elements and there are a significant differences with the value ($P < 0.05$) the concentrations of (Cu, Fe, Ni, Cd, Pb) and (As) in sample 1 Al hadder Herbalists were (1.003, 7.870, 0.040, 0.002, 0.013)ppm and (0.001)ppb respectively and in sample 2 Zain zohorat were (1.132, 10.301, 0.010, 0.005, 0.018) ppm and (0.000)ppb respectively and in sample 3 the herbal slimming were (0.728, 15.932, 0.082, 0.013, 0.191)ppm and (0.000)ppb respectively and in sample 4 Green tea were (2.553, 10.656, 0.250, 0.006, 0.120)ppm and (0.010)ppb respectively finely in sample 5 Oil slimming were (0.601, 9.301, 0.002, 0.003, 0.001)ppm and (0.020)ppb respectively.

In table (3) the samples of G2 were contaminated with heavy metals and elements and there is a significant differences with the value ($P < 0.05$) the concentrations of (Cu, Fe, Ni, Cd, Pb and As) in sample 1 the Fat-srbal capsule were (2.484, 10.801, 2.601, 0.071, 1.220)ppm and (0.011)ppb and in sample 2 the Un pocket powder were (5.890, 52.303, 5.877, 0.703, 3.033)ppm and (0.105)ppb and in sample 3 (Green tea+ cumin +lemon) were (3.117, 12.031, 2.186, 0.099, 0.441)ppm and (0.093)ppb and in sample 4 (Ginger +lemon +cumin + sage + menthol) were (2.736, 15.550, 3.030, 0.505, 0.641)ppm and (0.008)ppb at last sample 5 the Un known powder concentration were (6.305, 39.225, 4.403, 0.677, 3.312)ppm and (0.143)ppb.

The results indicated that the group G1 is cleaner and more suitable and less contaminated than G2, also it appear that all minerals levels within the permissible limits, as recommended concentration of herbs by the World Health Organization (13), and this study was in agreement with many studies. (14), (15). The reason for the high level of (Pb, Cd and Fe) in sample 3 from G1 is from the contamination of plants parts that used in processes and



we can see that highest levels of (Ni and Cu) are in sample 4 that could be because of workers dealing at primary or later steps in the processing of the sample. Sample 5 showed high level of (As) that because As concentrated in oils for its ability of condensation in high temperature.

In G2 there is a similar results between sample 2 and 5 and that the high level of (As, Pb, Fe and Cu) in sample 5 also in sample 2 the levels of (Cd and Ni) are also approximate due to it adjacent to the roads and sites full of automobiles as well as industrial activities in Baghdad (16). All these herbs studied possess a value of ($P < 0.05$) and is within the range allowed by the World Health Organization limits and Food and Agriculture Organization (15). According to Haider and others (14), the highest natural content of elements in herbs ($\mu\text{gm} / \text{g dry weight}$) as follows: 0.5 cadmium, copper 20, iron 50, nickel 200. These are considered herbs of important medicinal plants being used in the treatment of many diseases, but these plants contain a pre-existing elements in the soil, water, air and some of these plants shall not bear the high levels of these elements and is contaminated with heavy metals, which in turn accumulate in the members of the Human body over time and can lead to health damage and metabolic disorders (17).

The exploratory or a questionnaire study of 60 samples of people who deal with these herbs and put several questions about the way of taking the herbs, a place to buy these herbs and knowing about the risks of these herbs. Results appeared that 30% of people prefers taking samples from G1 but 70% prefers G2 because they are cheaper and easier coming, also 40% of people have attention for the risks of these herbs while 60% don't because of less understanding of their danger. These results provide us to give more interest in dealing with these herbals and take it from specific and trusted places, adding no one should take it without prescription.

Accumulation of heavy metals in plants is one of the most serious environmental concerns, not because of the phytotoxicity of many of the metals, but also because they transfer heavy metal pollutants from soil into the food chain, and cause adverse health effects in humans body. (18), (19), (20).

Table (2) The concentration of contaminant metals by (ppb for (As) and ppm for the others) in samples of group G1 (the pocked samples taking from malls and pharmacy)

n.	The slimming herbal	As(ppb)	Pb(ppm)	Cd(ppm)	Ni(ppm)	Fe(ppm)	Cu(ppm)
1	Al hadder Herbalists	0.001	0.013	0.002	0.040	7.870	1.003
2	Zain zohorat	0.000	0.018	0.005	0.010	10.301	1.132
3	Herbal slimming	0.000	0.191	0.013	0.082	15.932	0.728
4	Green tea	0.010	0.120	0.006	0.250	10.656	2.553
5	Oil slimming	0.020	0.001	0.003	0.002	9.301	0.601
	LSD	0.020 NS	0.074 *	0.011 NS	0.077 *	2.158 *	0.841 *

* ($P < 0.05$)



Table(3) The concentration of contaminant metals by (ppb for (As) and ppm for the others) in samples of group G2 (the un pocked samples taking from local markets and spies shops).

n.	The slimming herbal	As (ppb)	Pb (ppm)	Cd (ppm)	Ni (ppm)	Fe (ppm)	Cu (ppm)
1	Fat-srbal (capsule)	0.011	1.220	0.071	2.601	10.801	2.484
2	Un pocket (powder)	0.105	3.033	0.703	5.877	52.303	5.890
3	Green tea+ cumin +lemon (powder)	0.093	0.441	0.099	2.186	12.031	3.117
4	Ginger +lemon +cumin + sage + menthol (powder)	0.008	0.641	0.505	3.030	15.550	2.736
5	Un known powder	0.143	3.312	0.677	5.403	39.225	6.305
	LSD	0.066 *	0.863 *	0.351 *	1.446 *	4.521 *	2.063 *

* (P<0.05)

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