

## Determine the concentration of aluminum component in the deodorant samples

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**Abstract:** This study included the Aluminum levels in (16) samples of antiperspirants, that from different origins in local markets (Baghdad). The Aluminum concentration was estimating using Atomic Absorption Spectrometer. The results shown that the ranges of concentration of Aluminum in samples between (108-336ppm) and the rate of the percentage of aluminum in these samples (5-36) these data shown that six sampled higher than the (FDA) without a prescription as the Food & Drug Administration (FDA) allowed the percentage of aluminum in antiperspirants between (1%-25%) without prescription and (25%-40%) with prescription.

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**Key word:** Aluminum, Antiperspirants, Atomic Absorption spectrometer, sweat.

### 1. Introduction

Sweating is an important physiological process to maintain body temperature and sweating can cause unpleasant odors especially in the underarm area for many reason. for that used antiperspirant to reduce and control of sweat especially people who suffered (hyperhidrosis)(1). Antiperspirant is chemical that temporarily plugs the sweat ducts to prevent forming perspiring or reduces the sweating process and also reduce odor (2). Its consisting of salts of Aluminum active component such as Aluminum chloride or Aluminum –Zirconium Tetra chlorohydrate and with other excipients used such as Glycine, glycerol stearate, acetyl alcohol (3). Antiperspirants classified as cosmetic product and also as drugs by the united states food and drug administration (FDA) and similar to drugs the (FDA) there is a permissible percentage of Aluminum allowed in Antiperspirants and standard percentage 1-25% without prescription and 20-40% percentage for prescription and the actual quantity differ from brand to brand (4). As heavy metal, Aluminum is a toxic metal and known to have a genotoxic profile scientific evidence shows that high doses of aluminum have neurotoxic effects on human and embryotoxic effects in animal (5) studies the long term to low level absorption of aluminum exposure could play a role in the increasing incidence of breast cancer (6), some scientists have proposed that aluminum salts in underarm antiperspirant may be related to breast cancer which are applied frequently and left on the skin near the breast may be absorbed by the skin and cause estrogen-link effects and estrogen has ability to promote the growth of breast cancer cells (7,8) also studies have shown the absorption of aluminum by skin causes neurological and increasing the risk of Alzheimer s disease (9,10).

Atomic absorption spectrometer has been used to determine the concentration the aluminum metal levels in this study.

### 2. Material and Methods

Samples were collected from local market (Baghdad) these samples were digested as in (11), 2 ml of each sample was digested using 10 ml of concentrated Aqua Regia (concentrated HNO<sub>3</sub> and concentration HCl in ratio 1:3) then the mixture was evaporated until the brown fumes disappeared, cool the sample and transferre into a 25ml volumetric flask and the volume was adjusted to mark with deionized water. The concentration of samples were determined by using atomic absorption spectrophotometer model7000 using an aluminum hollow cathode lamp.

### 3. Results and Desiccation

In this study, the concentration and percentage of aluminum metal in 16 samples of antiperspirants from different origins (different brands ) were studied and compared with the ( FDA) allowed limit of aluminum metal in antiperspirant without a prescription as shown in table (1), there are 6 samples with higher aluminum percentage and these samples can be used after consulting a doctor. there are many reports and researches provide the risk of aluminum intake in human from food and drink and also from cooking utensils, cans and foils but the risk of aluminum from antiperspirants need more studies and researches to provide scientific evidence of the relationship between aluminum antiperspirant intake or absorption through skin and the health effects or diseases, there is a lack of these evidences. For that, it's advised to use antiperspirants free-aluminum because of aluminum risk.

Table (1) Concentration &amp; Percentage of Aluminum in Antiperspirants

SAMPLE NO.	Original of manufacture	Al Concentration ppm	of Al %
1	Iraq	226	29
2	Germany	108	10
3	China	244	10
4	China	333	33
5	Germany	155	8
6	Thailand	236	36
7	Morocco	150	30
8	Germany	Nil	0
9	Taiwan	212	15
10	Taiwan	233	15
11	Lebanon	234	30
12	Iraq	267	25
13	China	227	36
14	Thailand	224	5
15	Egypt	302	12
16	Turkey	201	8

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