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# DETERMINATION OF THE CONTENT OF CHEMICAL ELEMENTS IN A MIXTURE OF MANDARIN PEEL AND PEARL

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**Abstract**

In this article, we used inductively coupled plasma optical emission spectrometry to determine the chemical element content of a mixture of mandarin peel and dried mint leaves and analyzed the results. It was found that the macro- and microelement content was high: potassium 139 mg, calcium 128.8 mg, magnesium 68.4 mg, and phosphorus 16.4 mg.

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## INTRODUCTION.

Mandarin peel infusions and mint leaf drinks are folk medicine. They're infusions that treat upper respiratory tract diseases and have proven really useful in softening phlegm. For example, two medium-sized mandarins can comfortably meet your daily vitamin C requirement to fight viral infections. Vitamin C not only enhances immunity but also stimulates the reformation of blood vessel walls [1]. This can be particularly beneficial for women presenting with varicose veins. Mint leaves are packed with phytonutrients in them with antioxidant properties: They protect cells from damage. Anti-inflammatory elements in mint leaves help reduce chronic inflammation. Mint leaves are 50% of daily recommended daily vitamin A intake and protect cells against injury. And this too lowers the number of long-term diseases like heart disease, diabetes and certain cancers. They're also heavy on B vitamins, essential oils, flavonoids, Vitamins A and C, organic acids, retinol and mineral salts. Among them we find that the constituent parts of Mandarin peel and mint not only help in suppressing coughs, but also increase metabolism [2]. The overall objective of the study was to estimate the chemical composition of mandarin peel and mint and the macro- and micro-element contents using inductively coupled plasma optical emission spectrometry.

## RESEARCH RESULTS.

This was performed in recognition of macro- and microelements and results are displayed in Table 1.

**Table 1.**

**Amount of macro- and microelements in 100g of mandarin peel and mint, in mg.**

| Li | Be | B | Na | Mg | Al | Si | P | S |
|---|---|---|---|---|---|---|---|---|
| 0.025 | 0.007 | 0.024 | 1.277 | **64.25** | 2.160 | 0.63 | **16.04** | 0.000 |
| | | | | | | | | |
| K | Ca | Ti | V | Cr | Mn | Fe | Co | Ni |
| **139.0** | **128.8** | 0.021 | 0.034 | 0.066 | 0.460 | 2.7 | 0.000 | 0.027 |
| | | | | | | | | |
| Cu | Zn | Ga | Ge | As | Se | Rb | Sr | Zr |
| 0.025 | 0.000 | 0.000 | 0.001 | 0.086 | 0.011 | 0.010 | 0.052 | 0.002 |
| | | | | | | | | |
| Nb | Mo | Ag | Cd | In | Sn | Sb | Cs | Ba |
| 0.001 | 0.002 | 0.003 | 0.004 | 0.000 | 0.003 | 0.003 | 0.046 | 0.053 |
| | | | | | | | | |
| Ta | W | Re | Hg | Tl | Pb | Bi | U | |
| 0.001 | 0.001 | 0.000 | 0.002 | 0.003 | 0.001 | 0.003 | 0.001 | |

The daily requirement for potassium is about 3-6 g. The body's daily intake of sodium and potassium should be in a 2:1 ratio. If that ratio is disturbed, this can develop into tissue metabolic disorganization, appetite disturbance, and swelling in certain vital organs. The more potassium the body absorbs, the more sodium is expelled. Sufficient potassium intake helps to decrease the accumulation of sodium salts in blood vessels, hence potassium-rich medications are used. It is necessary for the cardiovascular system [3]. Adults need 800 mg calcium, and children and elderly individuals require 1000-1200 mg. In adults, insufficient calcium will bring on irritability and fatigue, but in children it can lead to rickets, delayed eruption of milk teeth, and impaired bone development. For calcium to be properly absorbed, the body needs phosphorus, plus vitamins D, C, and B9 [4]. Phosphorus exists in living cells in the form of ortho- and pyrophosphoric acids and is a component of nucleotides, nucleic acids, phospholipids, coenzymes, and enzymes. Human bones are produced with hydroxylapatite of the formula 3Ca3(PO4)2·Ca(OH)2. Tooth enamel is formed from fluorapatite. It is necessary for the establishment of the skeleton. The metabolism of phosphorus compounds is performed primarily by the liver in humans and animals. Phosphorus compounds are specifically regulated by hormones and vitamin D [5]. The daily requirement for magnesium is about 400 mg. A shortage of magnesium impairs blood pressure, blood sugar levels, increases irritability, and causes muscle spasms. A person's sensitivity to external stimuli is reduced by magnesium.



Figure 1. a). Mint leaf; b). General view of the mandarin fruit.

**EXPERIMENTAL.** A 1 g pre-dried ground sample with an accuracy of 0.001 g (Navigatortm, OHAUS®) was placed in a porcelain crucible. The specimen was ashed in a muffle furnace (Nabertherm, Germany) using the dry ashing process. Initially, the temperature was increased to 500 °C, heated at a rate of 100 °C/hour to 550 °C and then held at 550 °C for 5 hours. Then, 6 ml of 70% HNO3 and 2 ml of 60% $H_2O_2$ (both ICP-MS grade) were added to the resulting ash. After adding the mixture to the hot plate in a fume hood, it was allowed to heat slowly until no white fumes were formed. This cooled solution was transferred into a 100 ml polypropylene volumetric flask and diluted to the mark with ultra-pure water. This solution was filtered using a syringe filter and was analyzed.

**CONCLUSION.** In summary, mandarin peel and mint leaves are high in vitamins and minerals and are known to increase human immunity. Our analysis found that they are abundantly enriched in potassium, calcium, phosphorus and magnesium. The compounds that contain these elements are very essential for human health [7]. The importance of these elements for human health is immense. Potassium is extensively found in products for the prevention and treatment of cardiovascular diseases. Calcium has been used as a medication to alleviate irritability, fatigue and, in children, rickets, delayed eruption of milk teeth, and disorders of bone development. Skeletal system is developed on the foundation of phosphorus [8]. Magnesium mitigates hypersensitivity to external stimuli. These elements in sufficient quantities illustrate the value that mandarin peel and mint leaves can provide. The aim: based on these findings, we can prepare food additives from mandarin peel and mint leaves for prevention and treatment of numerous diseases.

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