DETERMINATION OF PHENOLIC COMPOUNDS IN "AS-BOG'IM" AND "AS-QUVVAT" FOOD SUPPLEMENTS

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Abstract

The present study is devoted to the quantitative determination of phenolic compounds in "AS-BOG'IM" and "AS-QUVVAT" food supplements using High-Performance Liquid Chromatography (HPLC). Phenolic compounds are biologically active substances known for their strong antioxidant and anti-inflammatory properties. They play a crucial role in maintaining human health by supporting cardiovascular function, enhancing immune response, promoting cellular regeneration, and reducing oxidative stress.

The analysis revealed that "AS-QUVVAT" contains high amounts of salicylic acid (36.753 mg/100 g), quercetin (27.263 mg/100 g), and apigenin (88.300 mg/100 g). In contrast, "AS-BOG'IM" is rich in kaempferol (55.263 mg/100 g), quercetin (14.583 mg/100 g), and rutin (14.770 mg/100 g). These compounds are known to regulate inflammatory processes, modulate immune cell activity, and protect cells from oxidative damage.

The findings indicate that both supplements are valuable sources of natural phenolic compounds with significant pharmacological potential. However, excessive intake of phenolic compounds may lead to toxic effects; therefore, their controlled consumption is essential.

Keywords: phenolic compounds, antioxidants, metabolism, immune system, inflammation, flavonoids, HPLC.

Introduction

Phenolic compounds are a large group of organic substances characterized by the presence of a phenol (C_6H_5OH) structure. They occur widely in nature, especially in plants such as fruits, vegetables, and herbs. Many phenolic compounds, including flavonoids and tannins, exhibit strong antioxidant activity, protecting cells from oxidative damage caused by free radicals.

These compounds are essential for human health due to their ability to reduce inflammation, improve cardiovascular function, and enhance immune system activity. They also contribute to the prevention of chronic diseases such as cancer and atherosclerosis. However, at high concentrations, certain phenolic compounds may exhibit toxic effects, highlighting the importance of proper dosage and regulation.

Materials and Methods

Phenolic compounds were analyzed using an HPLC system (Shimadzu LC-40 Nexera Lite, Japan). Standard substances included gallic acid, salicylic acid, rutin, quercetin, apigenin, and kaempferol. Samples were prepared through ethanol extraction followed by ultrasonic treatment at 60°C for 20 minutes.

Chromatographic separation was performed on a reversed-phase C18 column using a gradient mobile phase consisting of acetonitrile and 0.5% aqueous acetic acid. Detection was carried out at 300 nm, and quantitative analysis was based on peak area measurements.

Results and Discussion

The obtained chromatographic data demonstrated significant differences in the phenolic profiles of the two supplements.

- **"AS-QUVVAT"** showed high levels of:
  - Apigenin – 88.300 mg/100 g
  - Salicylic acid – 36.753 mg/100 g
  - Quercetin – 27.263 mg/100 g
- **"AS-BOG'IM"** showed high levels of:
  - Kaempferol – 55.263 mg/100 g
  - Quercetin – 14.583 mg/100 g
  - Rutin – 14.770 mg/100 g

Salicylic acid was found to inhibit prostaglandin synthesis, reducing inflammation and modulating immune responses. Quercetin exhibited strong antioxidant activity, protecting cells from oxidative stress and supporting immune cell function. Apigenin demonstrated anti-inflammatory and antiviral properties, while kaempferol contributed to reducing oxidative stress and improving metabolic balance. Rutin showed both antioxidant and immunomodulatory effects.

Conclusion

The study confirms that “AS-QUVVAT” and “AS-BOG‘IM” food supplements are rich in biologically active phenolic compounds with significant health benefits. These compounds exhibit antioxidant, anti-inflammatory, and immunomodulatory effects, making them promising candidates for functional nutrition and preventive medicine.

At the same time, careful consideration of dosage is necessary due to the potential toxicity of phenolic compounds at high concentrations. Further research is recommended to optimize their safe and effective use in food supplements and therapeutic applications.

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