Commentary
Volume 13:05, 2023

Journal of Bioprocessing & Biotechniques

ISSN: 2155-9821 Open Access

Bioavailability Assessment of Soymilk Isoflavones Using Biotransformation Techniques

Gariebel Luis*

Department of Biotechnology, State University of Campinas (UNICAMP), Campinas, Brazil

Introduction

Isoflavones are naturally occurring compounds found primarily in leguminous plants, with soybeans being one of the richest sources. These phytochemicals have gained significant attention due to their potential health benefits, particularly in the context of hormone-related conditions, such as menopause and certain types of cancer. However, the bioavailability of isoflavones from soy-based products, such as soymilk, is a subject of ongoing research. This article delves into the concept of bioavailability assessment and the application of biotransformation techniques to understand the uptake and utilization of soymilk isoflavones in the human body. Isoflavones are a subclass of flavonoids, a group of polyphenolic compounds widely distributed in the plant kingdom. Soybeans and soy-based products contain three main isoflavones: genistein, daidzein, and glycitein. These compounds have structural similarities to the human hormone estrogen, and as a result, they are often referred to as phytoestrogens [1].

The potential health benefits associated with isoflavones have generated a considerable amount of research interest. Isoflavones have been suggested to alleviate menopausal symptoms, such as hot flashes and night sweats, due to their estrogen-like properties. Some studies indicate that isoflavones may improve cardiovascular health by reducing LDL cholesterol levels and enhancing endothelial function. Isoflavones have been investigated for their potential to reduce the risk of hormone-related cancers, such as breast and prostate cancer.These compounds might help in the preservation of bone density, reducing the risk of osteoporosis.Bioavailability refers to the proportion of a nutrient or bioactive compound that is absorbed and utilized by the body following ingestion. In the context of isoflavones, assessing their bioavailability is essential to understand how effectively these compounds can confer their potential health benefits. The presence of isoflavones in soy-based foods, like soymilk, often occurs in conjunction with other compounds. The interactions within the food matrix can affect the absorption of isoflavones. The processing method used to prepare soy-based products can alter the structure of isoflavones, affecting their bioavailability.

The gut microbiota plays a crucial role in the biotransformation of isoflavones. Different individuals have different gut microbiota profiles, which can influence isoflavone metabolism. People vary in their ability to absorb and metabolize isoflavones. Factors like age, genetics, and health status can contribute to this variability. To measure the bioavailability of isoflavones, various techniques are employed. Measuring the concentration of isoflavones and their metabolites in the bloodstream after consumption is a direct way to assess bioavailability [2]. Assessing the levels of isoflavone metabolites in urine provides information on their absorption and metabolism. These studies involve analyzing the metabolic transformation of isoflavones in the body, often utilizing biotransformation techniques. Biotransformation techniques involve the use of biological systems, such as enzymes, cell cultures, or gut microbiota, to study the metabolism of a compound. In the context of isoflavones, biotransformation studies can provide valuable insights into their bioavailability and how they are metabolized within the human body. In vitro studies are conducted outside of a living organism and typically involve the use of isolated enzymes or cell cultures. These studies can provide controlled conditions to assess the biotransformation of isoflavones.

Description

In these experiments, microsomes, subcellular fractions containing enzymes involved in drug metabolism, are used to simulate the metabolic transformations of isoflavones that occur in the liver. Various cell lines, including hepatocytes and intestinal cells, can be used to investigate the metabolism of isoflavones within different tissues. In vivo studies involve living organisms, typically animal models, and sometimes human participants, to study the metabolism of isoflavones in a more physiologically relevant context. These studies can provide insights into the bioavailability of isoflavones in a more complex system. Some common in vivo biotransformation techniques .Animal models, such as rodents and non-human primates, can be used to investigate the in vivo metabolism of isoflavones following dietary exposure. Controlled human trials can provide valuable data on how isoflavones are metabolized in the human body, shedding light on bioavailability and potential health effects. Biotransformation studies have yielded significant findings regarding the bioavailability of isoflavones from soymilk and their metabolic fate within the body. The gut microbiota plays a pivotal role in the biotransformation of isoflavones. In the colon, these compounds are metabolized by specific gut bacteria into various metabolites, including equol and O-desmethylangolens [3-5]. These metabolites exhibit different bioactivities and are believed to contribute to the health effects associated with isoflavones.

Biotransformation studies have highlighted the substantial interindividual variability in isoflavone metabolism. Not all individuals can convert daidzein into equol, and this has important implications for the potential health benefits of isoflavones, as equol has been associated with certain health effects, such as improved bone health and menopausal symptom relief. The bioavailability of isoflavones can be influenced by the food matrix in which they are consumed. Studies have shown that the co-ingestion of soy isoflavones with other nutrients or compounds can affect their absorption and metabolism.

Conclusion

Food processing methods can alter the structure of isoflavones, affecting their bioavailability. Isoflavones are a class of phytoestrogens found in various plant-based foods, with soybeans being one of the richest sources. The primary isoflavones in soybeans are genistein, daidzein, and glycitein. These compounds are structurally similar to the hormone estrogen, allowing them to bind to estrogen receptors in the body. This resemblance to estrogen makes isoflavones particularly interesting, as they can exert both estrogenic and anti-estrogenic effects, depending on various factors. Soy-based products, such as soymilk, are popular choices for individuals seeking plant-based protein sources. In addition to being a protein-rich alternative, soymilk provides a significant source of isoflavones, primarily genistein and daidzein. As

***Address for Correspondence:** Gariebel Luis, Department of Biotechnology, State University of Campinas (UNICAMP), Campinas, Brazil; E-mail: gariebelluis35@gmail.com*

Received: 28 August 2023, Manuscript No. jbpbt-23-116669; **Editor Assigned:** 30 August 2023, PreQC No. P-116669; **Reviewed:** 12 September 2023, QC No. Q-116669; **Revised:** 19 September 2023, Manuscript No. R-116669; **Published:** 28 September 2023, DOI: 10.37421/2155-9821.2023.13.590

such, understanding the bioavailability of isoflavones in soymilk is critical in evaluating their potential health benefits.

Acknowledgement

None.

Conflict of Interest

There is no conflict of interest by author.

References

1. Ribeiro, Ana Elisa, Naice Eleidiane Santana Monteiro, Anna Valéria Gueldini de Moraesb and Lucia Helena Costa-Paiva, et al. "Can the use of probiotics in association with isoflavone improve the symptoms of genitourinary syndrome of menopause? Results from a randomized controlled trial." *Menopause* 26 (2019): 643-652.
2. De Queirós, Lívia Dias, Juliana Alves Macedo and Gabriela Alves Macedo. "A new biotechnological process to enhance the soymilk bioactivity." *Food Biotechnol* 25 (2016): 763-770.
3. Hiramatsu, Erika Yumi, Amanda Rejane Alves de Ávila, Vanize Martins Gênova and Lívia Dias de Queirós, et al. "Biotransformation processes in soymilk isoflavones to enhance anti-inflammatory potential in intestinal cellular model." *J Food Biochem* 44 (2020): e13149.
4. De Queirós, Lívia Dias, Amanda Rejane Alves de Ávila, Andressa Vianna Botaro and Danielle Branta Lopes Chirotto, et al. "Combined isoflavones biotransformation increases the bioactive and antioxidant capacity of soymilk." *Appl Microbiol Biotechnol* 104 (2020): 10019-10031.
5. Williams, C. F., G. E. Walton, L. Jiang and S. Plummer, et al. "Comparative analysis of intestinal tract models." *Annu Rev Food Sci Technol* 6 (2015): 329-350.

How to cite this article: Luis, Gariebel. "Bioavailability Assessment of Soymilk Isoflavones Using Biotransformation Techniques." *J Bioprocess Biotech* 13 (2023): 590.