

## Article

# A Simple and Reliable Method for the Determination of Isorhapontigenin in Murine Biological Matrices: Application in a Tissue Distribution Study

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## Abstract

Isorhapontigenin (*trans*-3,5,4'-trihydroxy-3'-methoxystilbene; ISO), a dietary derivative of resveratrol (*trans*-3,5,4'-trihydroxystilbene; RES), exhibits diverse health-promoting properties. To facilitate its potential development as a nutraceutical, a simple and reliable high-performance liquid chromatography (HPLC) method was developed and validated for the quantification of ISO in various murine biological matrices. Chromatographic separation was achieved with a reversed-phase HPLC column through a 17 min gradient delivery of a mixture of acetonitrile and formic acid (0.1% *v/v*) at a flow rate of 1.5 mL/min at 50 °C. Quantification was performed using ultraviolet (UV) detection at 325 nm, with a lower limit of quantification (LLOQ) of 15 ng/mL in both plasma and tissue homogenate samples. The method demonstrated excellent selectivity, accuracy, and precision, and ISO remained stable under the tested conditions. This method was subsequently employed to investigate the tissue distribution of ISO in mice following oral administration at a dose of 200 µmol/kg (equivalent to 51.7 mg/kg). ISO was rapidly absorbed and extensively distributed across major pharmacologically relevant organs. Despite its limited aqueous solubility, its oral absorption was not significantly compromised. Given its oral bioavailability and broad tissue distribution, ISO represents a promising candidate for further nutraceutical development.

**Keywords:** isorhapontigenin; resveratrol; nutraceutical; bioavailability; biodistribution



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## 1. Introduction

Resveratrol (*trans*-3,5,4'-trihydroxystilbene; RES; Figure 1), one of the most well-known nutraceuticals, occurs naturally in dietary sources such as grapevine, red wine, cranberry, blueberry, bilberry, peanut, and various herbs [1–3]. Since the turn of the millennium, RES has attracted considerable attention in the biomedical research community due to its reported potential benefits in managing a wide range of medical conditions, including Alzheimer's disease, cancer, cardiovascular diseases, chronic kidney disease, diabetes, nonalcoholic fatty liver disease, obesity, and metabolic syndrome. Increasing interest is also being directed toward its naturally occurring dietary derivatives [4].

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## **Table of Contents Introduction Of A Reliable Method For Determination Of**

1. Understanding the eBook Introduction Of A Reliable Method For Determination Of
  - The Rise of Digital Reading Introduction Of A Reliable Method For Determination Of
  - Advantages of eBooks Over Traditional Books
2. Identifying Introduction Of A Reliable Method For Determination Of
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Introduction Of A Reliable Method For Determination Of
  - User-Friendly Interface
4. Exploring eBook Recommendations from Introduction Of A Reliable Method For Determination Of
  - Personalized Recommendations

- Introduction Of A Reliable Method For Determination Of User Reviews and Ratings
- Introduction Of A Reliable Method For Determination Of and Bestseller Lists
- 5. Accessing Introduction Of A Reliable Method For Determination Of Free and Paid eBooks
  - Introduction Of A Reliable Method For Determination Of Public Domain eBooks
  - Introduction Of A Reliable Method For Determination Of eBook Subscription Services
  - Introduction Of A Reliable Method For Determination Of Budget-Friendly Options
- 6. Navigating Introduction Of A Reliable Method For Determination Of eBook Formats
  - ePub, PDF, MOBI, and More
  - Introduction Of A Reliable Method For Determination Of Compatibility with Devices
  - Introduction Of A Reliable Method For Determination Of Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Introduction Of A Reliable Method For Determination Of
  - Highlighting and Note-Taking Introduction Of A Reliable Method For Determination Of
  - Interactive Elements Introduction Of A Reliable Method For Determination Of
- 8. Staying Engaged with Introduction Of A Reliable Method For Determination Of
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Introduction Of A Reliable Method For Determination Of
- 9. Balancing eBooks and Physical Books Introduction Of A Reliable Method For Determination Of
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Introduction Of A Reliable Method For Determination Of
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Introduction Of A Reliable Method For Determination Of
  - Setting Reading Goals Introduction Of A Reliable Method For Determination Of
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Introduction Of A Reliable Method For Determination Of
  - Fact-Checking eBook Content of Introduction Of A Reliable Method For Determination Of

- Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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