

Antioxidant activity in endophytic fungi isolated from *Gynostemma pentaphyllum* Makino

SHANG Fei^{1,*}, WANG Chunlin^{1,2}, WANG Hui^{1,2}

¹College of Life Science and Technology, Longdong University, Qingyang 745000, Gansu

²College of Agriculture and Forestry, Longdong University, Qingyang 745000, Gansu

Abstract: *Gynostemma pentaphyllum* Makino is a well known edible and medicinal plant in oriental countries, its dominant active constituents are mainly Gypenosides(GP). Endophytic fungi with antioxidant activity were screened and identified from *Gynostemma pentaphyllum*, and *Gynostemma pentaphyllum* saponin (GP) was used as host. A total of 10 strains of endophytic fungi were isolated from the root of healthy, living, and symptomless tissues of *Gynostemma pentaphyllum* Makino. The extract from a strain (G4) showed antioxidant activity and had the same RF value in TLC, because the retention time of real *Gynostemma pentaphyllum* saponin (GP) and its extract was the same as that of natural *Gynostemma pentaphyllum* (GP) in HPLC. So the strain G4 of endophytic fungus appears to produce the same components as its host.

1 Introduction

Gynostemma pentaphyllum Makino is a well known edible and medicinal plant in oriental countries^[1-3], and is known as "Jiao-Gu-Lan" in China, "Cha-Satan" in Thailand, and "Amachazuru" in Japan^[3]. Recently, *Gynostemma pentaphyllum* Makino has attracted great attention owing to its anti-tumor activities^[4], immunomodulatory effect^[5], anti-gastric ulcer effect, treating hyperlipidemia, and anti-oxidant properties^[6], and has been described as having minimal toxicity^[7]. Therefore, the *G. pentaphyllum* green tea is presently promoted in China and is sold in Europe as an herbal tea which is "advantageous to one's health and beauty"^[8-9]. The presence of saponins and flavonoids in *G. pentaphyllum* as functional components is believed to be responsible for this health-enhancing effect. Because of the similarity in bioactive components to ginseng root, *G. pentaphyllum* was named as "second ginseng".

Endophytes are a kind of inadequately studied microorganisms, which are rich and reliable sources of biological activities and new chemical compounds, they have the potential to be developed in a variety of medical, agricultural and industrial fields. Fungal endophytes are also considered to be repositories of new secondary metabolites, some of which have beneficial biological activities. Recent studies have shown that fungal endophytes are ubiquitous in plant species^[10].

The aim of the present study is to select and identify endophytic fungus from *Gynostemma pentaphyllum* Makino which displays antioxidant activity and produces the same component of Gypenosides (GP) as their host.

2 Materials and methods

2.1 Collection of plant material

The materials were collected from the campus of Shaanxi Normal University, xi'an, Shaanxi, China in 2010 March. After plant selection, disease free parts of the roots were cut with the help of a sterile scalpel and placed in sterile plastic bags. All the samples were immediately brought to the laboratory for further process.

2.2 Isolation of endophytic fungi

Samples of fresh root of *Gynostemma pentaphyllum* Makino was thoroughly washed using distilled water, followed by 75% ethanol for 5 min and 2.5% sodium hypochlorite for 7 min to accomplish surface sterilization, then subsequently rinsed in sterile demineralized water. Small pieces of inner tissues were placed on potato dextrose agar (diced potatoes, 300g/l, dextrose,20g/l, agar,20g/l) supplemented with antibiotic streptomycin (50µg/ml) and penicillium (50µg/ml) in petri plates and incubated at 28°C until the fungal was grown out. The pure culture were obtained using routine microbiological methods and stored at 4°C.

2.3 Pretreatment of separated fungal fermentation broth

All the endophytic fungi were cultivated in 200ml PDB for 7d at 28°C, and each fermentation broths were centrifugalized at 5000r/min for 30min to separate

*angei526@163.com, *wangchunl2005@126.com, *hy0850@qq.com

Antioxidant Activity Of Endophytic Fungi Isolated From

Lingjun Ying



Antioxidant Activity Of Endophytic Fungi Isolated From:

Immerse yourself in the artistry of words with Experience Art with its expressive creation, **Antioxidant Activity Of Endophytic Fungi Isolated From** . This ebook, presented in a PDF format (*), is a masterpiece that goes beyond conventional storytelling. Indulge your senses in prose, poetry, and knowledge. Download now to let the beauty of literature and artistry envelop your mind in a unique and expressive way.

https://wwwnew.greenfirefarms.com/results/virtual-library/Download_PDFS/Concrete%20Pipe%20Design%20Rev%201978.pdf

Table of Contents Antioxidant Activity Of Endophytic Fungi Isolated From

1. Understanding the eBook Antioxidant Activity Of Endophytic Fungi Isolated From
 - The Rise of Digital Reading Antioxidant Activity Of Endophytic Fungi Isolated From
 - Advantages of eBooks Over Traditional Books
2. Identifying Antioxidant Activity Of Endophytic Fungi Isolated From
 - 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 Antioxidant Activity Of Endophytic Fungi Isolated From
 - User-Friendly Interface
4. Exploring eBook Recommendations from Antioxidant Activity Of Endophytic Fungi Isolated From
 - Personalized Recommendations
 - Antioxidant Activity Of Endophytic Fungi Isolated From User Reviews and Ratings
 - Antioxidant Activity Of Endophytic Fungi Isolated From and Bestseller Lists
5. Accessing Antioxidant Activity Of Endophytic Fungi Isolated From Free and Paid eBooks
 - Antioxidant Activity Of Endophytic Fungi Isolated From Public Domain eBooks
 - Antioxidant Activity Of Endophytic Fungi Isolated From eBook Subscription Services

- Antioxidant Activity Of Endophytic Fungi Isolated From Budget-Friendly Options
- 6. Navigating Antioxidant Activity Of Endophytic Fungi Isolated From eBook Formats
 - ePub, PDF, MOBI, and More
 - Antioxidant Activity Of Endophytic Fungi Isolated From Compatibility with Devices
 - Antioxidant Activity Of Endophytic Fungi Isolated From Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Antioxidant Activity Of Endophytic Fungi Isolated From
 - Highlighting and Note-Taking Antioxidant Activity Of Endophytic Fungi Isolated From
 - Interactive Elements Antioxidant Activity Of Endophytic Fungi Isolated From
- 8. Staying Engaged with Antioxidant Activity Of Endophytic Fungi Isolated From
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Antioxidant Activity Of Endophytic Fungi Isolated From
- 9. Balancing eBooks and Physical Books Antioxidant Activity Of Endophytic Fungi Isolated From
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Antioxidant Activity Of Endophytic Fungi Isolated From
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Antioxidant Activity Of Endophytic Fungi Isolated From
 - Setting Reading Goals Antioxidant Activity Of Endophytic Fungi Isolated From
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Antioxidant Activity Of Endophytic Fungi Isolated From
 - Fact-Checking eBook Content of Antioxidant Activity Of Endophytic Fungi Isolated From
 - 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

Antioxidant Activity Of Endophytic Fungi Isolated From Introduction

Antioxidant Activity Of Endophytic Fungi Isolated From Offers over 60,000 free eBooks, including many classics that are in the public domain. Open Library: Provides access to over 1 million free eBooks, including classic literature and contemporary works. Antioxidant Activity Of Endophytic Fungi Isolated From Offers a vast collection of books, some of which are available for free as PDF downloads, particularly older books in the public domain. Antioxidant Activity Of Endophytic Fungi Isolated From : This website hosts a vast collection of scientific articles, books, and textbooks. While it operates in a legal gray area due to copyright issues, its a popular resource for finding various publications. Internet Archive for Antioxidant Activity Of Endophytic Fungi Isolated From : Has an extensive collection of digital content, including books, articles, videos, and more. It has a massive library of free downloadable books. Free-eBooks Antioxidant Activity Of Endophytic Fungi Isolated From Offers a diverse range of free eBooks across various genres. Antioxidant Activity Of Endophytic Fungi Isolated From Focuses mainly on educational books, textbooks, and business books. It offers free PDF downloads for educational purposes. Antioxidant Activity Of Endophytic Fungi Isolated From Provides a large selection of free eBooks in different genres, which are available for download in various formats, including PDF. Finding specific Antioxidant Activity Of Endophytic Fungi Isolated From, especially related to Antioxidant Activity Of Endophytic Fungi Isolated From, might be challenging as theyre often artistic creations rather than practical blueprints. However, you can explore the following steps to search for or create your own

Online Searches: Look for websites, forums, or blogs dedicated to Antioxidant Activity Of Endophytic Fungi Isolated From, Sometimes enthusiasts share their designs or concepts in PDF format. Books and Magazines Some Antioxidant Activity Of Endophytic Fungi Isolated From books or magazines might include. Look for these in online stores or libraries. Remember that while Antioxidant Activity Of Endophytic Fungi Isolated From, sharing copyrighted material without permission is not legal. Always ensure youre either creating your own or obtaining them from legitimate sources that allow sharing and downloading. Library Check if your local library offers eBook lending services. Many libraries have digital catalogs where you can borrow Antioxidant Activity Of Endophytic Fungi Isolated From eBooks for free, including popular titles. Online Retailers: Websites like Amazon, Google Books, or Apple Books often sell eBooks. Sometimes, authors or publishers offer promotions or free periods for certain books. Authors Website Occasionally, authors provide excerpts or short stories for free on their websites. While this might not be the Antioxidant Activity Of Endophytic Fungi Isolated From full book , it can give you a taste of the authors writing style. Subscription Services Platforms like Kindle Unlimited or Scribd offer subscription-based access to a wide range of Antioxidant Activity Of Endophytic Fungi Isolated From eBooks, including some popular titles.

FAQs About Antioxidant Activity Of Endophytic Fungi Isolated From Books

1. Where can I buy Antioxidant Activity Of Endophytic Fungi Isolated From books? Bookstores: Physical bookstores like Barnes & Noble, Waterstones, and independent local stores. Online Retailers: Amazon, Book Depository, and various online bookstores offer a wide range of books in physical and digital formats.
2. What are the different book formats available? Hardcover: Sturdy and durable, usually more expensive. Paperback: Cheaper, lighter, and more portable than hardcovers. E-books: Digital books available for e-readers like Kindle or software like Apple Books, Kindle, and Google Play Books.
3. How do I choose a Antioxidant Activity Of Endophytic Fungi Isolated From book to read? Genres: Consider the genre you enjoy (fiction, non-fiction, mystery, sci-fi, etc.). Recommendations: Ask friends, join book clubs, or explore online reviews and recommendations. Author: If you like a particular author, you might enjoy more of their work.
4. How do I take care of Antioxidant Activity Of Endophytic Fungi Isolated From books? Storage: Keep them away from direct sunlight and in a dry environment. Handling: Avoid folding pages, use bookmarks, and handle them with clean hands. Cleaning: Gently dust the covers and pages occasionally.
5. Can I borrow books without buying them? Public Libraries: Local libraries offer a wide range of books for borrowing. Book Swaps: Community book exchanges or online platforms where people exchange books.
6. How can I track my reading progress or manage my book collection? Book Tracking Apps: Goodreads, LibraryThing, and Book Catalogue are popular apps for tracking your reading progress and managing book collections. Spreadsheets: You can create your own spreadsheet to track books read, ratings, and other details.
7. What are Antioxidant Activity Of Endophytic Fungi Isolated From audiobooks, and where can I find them? Audiobooks: Audio recordings of books, perfect for listening while commuting or multitasking. Platforms: Audible, LibriVox, and Google Play Books offer a wide selection of audiobooks.
8. How do I support authors or the book industry? Buy Books: Purchase books from authors or independent bookstores. Reviews: Leave reviews on platforms like Goodreads or Amazon. Promotion: Share your favorite books on social media or recommend them to friends.
9. Are there book clubs or reading communities I can join? Local Clubs: Check for local book clubs in libraries or community centers. Online Communities: Platforms like Goodreads have virtual book clubs and discussion groups.
10. Can I read Antioxidant Activity Of Endophytic Fungi Isolated From books for free? Public Domain Books: Many classic books are available for free as they're in the public domain. Free E-books: Some websites offer free e-books legally, like Project Gutenberg or Open Library.

Find Antioxidant Activity Of Endophytic Fungi Isolated From :

[concrete pipe design rev 1978](#)

conceptual physics chapter assessment answers

[commemorative souvenir booklet ad form](#)

contemporary labor economics 9th edition

constituency influence in parliament researchgate

comparative animal biochemistry 1st edition

computer hardware problems and solution ebicos

concise encyclopedia of pragmatics floxii

complete dictionary of english and hebrew first names

comptia cloud certification study guide exam cv0-001 certification press by stammer nate published by mcgraw hill osborne

media 1st first edition 2013 paperback

communicate what you mean a concise advanced grammar

[comic books avatar the last airbender and legend of korra](#)

[composite materials in maritime structures volume 2 practical considerations cambridge ocean technology series](#)

[conta digital agipag conta em banco](#)

como orar por seus filhos

Antioxidant Activity Of Endophytic Fungi Isolated From :

Meaning in Language: An Introduction to Semantics and ... This book provides a comprehensive introduction to the ways in which meaning is conveyed in language, covering not only semantic matters but also topics ... Meaning in Language - Paperback - Alan Cruse A comprehensive introduction to the ways in which meaning is conveyed in language. Alan Cruse covers semantic matters, but also deals with topics that are ... An Introduction to Semantics and Pragmatics by A Cruse · 2004 · Cited by 4167 — A comprehensive introduction to the ways in which meaning is conveyed in language. Alan Cruse covers semantic matters, but also deals with topics that are ... Meaning in Language - Alan Cruse This book provides a comprehensive introduction to the ways in which meaning is conveyed in language, covering not only semantic matters but also topics ... An introduction to semantics and pragmatics. Third edition Aug 30, 2022 — This book provides an introduction to the study of meaning in human language, from a linguistic perspective. It covers a fairly broad range ... DA Cruse - an introduction to semantics and pragmatics by DA Cruse · 2004 · Cited by 4167 — A comprehensive introduction to the ways in

which meaning is conveyed in language. Alan Cruse covers semantic matters, but also deals with topics that are ... An Introduction to Semantics and Pragmatics (Oxford ... This book provides a comprehensive introduction to the ways in which meaning is conveyed in language, covering not only semantic matters but also topics ... Meaning in Language - Project MUSE by H Ji · 2002 — Meaning in language: An introduction to semantics and pragmatics. By Alan Cruse. Oxford & New York: Oxford University Press, 2000. Pp. xii, 424. Paper \$24.95. (PDF) 99626614-Meaning-in-Language-an-Introduction-to ... Creating, exchanging, and interpreting meaning is ingrained in human nature since prehistoric times. Language is the most sophisticated medium of communication. Meaning in Language: An Introduction to Semantics and ... Meaning in Language: An Introduction to Semantics and Pragmatics ... This book provides a comprehensive introduction to the ways in which meaning is conveyed in ... Briggs and Stratton 42A707-2238-E1 Parts ... Briggs and Stratton 42A707-2238-E1 Exploded View parts lookup by model. Complete exploded views of all the major manufacturers. It is EASY and FREE. Briggs and Stratton 42A707-2238-E1 Engine Parts Fix your 42A707-2238-E1 Engine today! We offer OEM parts, detailed model diagrams, symptom-based repair help, and video tutorials to make repairs easy. 42A707-2238-E1 Briggs and Stratton Engine - Overview A complete guide to your 42A707-2238-E1 Briggs and Stratton Engine at PartSelect. We have model diagrams, OEM parts, symptom-based repair help, ... 42A707-2238-E1 - Briggs & Stratton Vertical Engine Repair parts and diagrams for 42A707-2238-E1 - Briggs & Stratton Vertical Engine. 42A707-2238-E1 Briggs and Stratton Engine 42A707-2238-E1 Briggs and Stratton Engine Parts and Accessories. Largest Selection, Best Prices, Free Shipping Available at PartsWarehouse.com. Briggs and Stratton 42A707 - Engine Specs The Briggs and Stratton 42A707 is a 694 cc (42.35 cu-in) two-cylinder air-cooled four-stroke internal combustion gasoline engine, manufactured by Briggs and ... Briggs and Stratton 42A707-2653-E1 Parts ... Briggs and Stratton 42A707-2653-E1 Exploded View parts lookup by model. Complete exploded views of all the major manufacturers. It is EASY and FREE. Briggs & Stratton Small Engine 42A707/2238-E1 ... Find the right Briggs & Stratton Small Engine Model 42A707/2238-E1 replacement parts for your repair. Filter results by part category, part title and lawn mower ... Briggs 42a707 for sale BRIGGS & STRATTON 18.5HP OPPOSED TWIN GOOD RUNNING ENGINE MOTOR 42A707. Pre-Owned. German Vocabulary for English Speakers - 7000 words ... This book is intended to help you learn, memorize, and review over 7000 commonly used German words. Recommended as additional support material to any language ... German vocabulary for English speakers - 7000 words T&P BOOKS VOCABULARIES are intended to help you learn, memorize and review foreign words. This bilingual dictionary contains over 7000 commonly used words ... German vocabulary for English speakers - 7000 words 7000-WORD ENGLISH-GERMAN VOCABULARY. The knowledge of approximately 7000 words makes it possible to understand authentic German texts. German vocabulary for English speakers - 7000 words ... 7000-WORD ENGLISH-GERMAN VOCABULARY. The knowledge of approximately 7000 words makes it possible to understand authentic German texts. German Vocabulary for English Speakers Cover for "German vocabulary for

English speakers - 7000 words". German vocabulary for English speakers - 7000 words Buy the book German vocabulary for English speakers - 7000 words by andrey taranov at Indigo. German vocabulary for English speakers - 7000 words | Libristo - EU Looking for German vocabulary for English speakers - 7000 words by: Andrey Taranov? Shop at a trusted shop at affordable prices. 30-day return policy! German vocabulary for English speakers - 7000 words German vocabulary for English speakers - 7000 words - American English Collection 127 (Paperback) ; Publisher: T&p Books ; ISBN: 9781780713144 ; Weight: 209 g German vocabulary for English speakers - 5000 words ... Aug 1, 2012 — German vocabulary for English speakers - 5000 words (Paperback) ... Our German collection includes also vocabularies of 3000, 7000 and 9000 words. German vocabulary for English speakers - 7000 words German vocabulary for English speakers - 7000 words · Allgemein, unspezialisiert · Wörterbücher · Lexika · Nachschlagewerke · Fremdsprachige Wörterbücher.