

藥學科技(二)報告：Sci-finder

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檢索主題：Synthesis of Riboflavin

一、查詢結果：

1. Iron assimilation and transcription factor controlled synthesis of riboflavin in plants

By: Vorwieger, A.; Gryczka, C.; Czihal, A.; Douchkov, D.; Tiedemann, J.; Mock, H.-P.; Jakoby, M.; Weisshaar, B.; Saalbach, I.; Baeumlein, H.

Source: Planta, Volume: 226, Issue: 1, Pages: 147-158, Journal, 2007, CODEN: PLANAB, ISSN: 0032-0935, DOI: 10.1007/s00425-006-0476-9

Company/Organization: Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany, 06466

Accession Number: 2007:530760, CAN 147:230842, CAPLUS

Publisher: Springer

Language: English

Abstract

Iron homeostasis is vital for many cellular processes and requires a precise regulation. Several iron efficient plants respond to iron starvation with the excretion of riboflavin and other flavins. Basic helix-loop-helix transcription factors (TF) are involved in the regulation of many developmental processes, including iron assimilation. Here we describe the isolation and characterization of two Arabidopsis bHLH TF genes, which are strongly induced under iron starvation. Their heterologous ectopic expression causes constitutive, iron starvation independent excretion of riboflavin. The results show that both bHLH TFs represent an essential component of the regulatory pathway connecting iron deficiency perception and riboflavin excretion and might act as integrators of various stress reactions.

Indexing

Plant Biochemistry (Section 11-2)

Section cross-reference(s): 3

Concepts

[Protein motifs](#)

bHLH; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues

[Biological transport](#)

excretion; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues

[Basic helix-loop-helix transcription factors](#)

gene bHLH38 and bHLH39; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues
Biological study, unclassified; Biological study

[Tumor, plant](#)

hairy root; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues

[Stress, plant](#)

nutrient deficiency, iron; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues

[Protein sequences](#)

of transcription factor bHLH domains; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues

[Arabidopsis thaliana](#)

[Leaf](#)

[Seedling](#)

transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues

Substances

[7439-89-6](#) Iron, biological studies

homeostasis; transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues
Biological study, unclassified; Biological study

[83-88-5](#) Riboflavin, biological studies

transcription factors involved in regulatory pathway connecting iron deficiency-induced synthesis and excretion of riboflavin in plant tissues
Biological study, unclassified; Biological study

Supplementary Terms

iron; deficiency; assimilation; bHLH; transcription; factor; riboflavin; excretion; plant;

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2. Synthesis of riboflavin 5' phosphate sodium (vitamin B2 derivative)

By: Bhattacharya, T. K.; Mondal, P.

Source: Journal of the Institution of Engineers (India), Chemical Engineering Division, Volume: 84, Issue: March, Pages: 47-49, Journal, 2004, CODEN: JECEAF, ISSN: 0020-3351

Company/Organization: Department of Chemical Technology, Calcutta University, Kolkata, India, 700 009

Accession Number: 2004:1072723, CAN 143:153621, CAPLUS

Publisher: Institution of Engineers (India)

Language: English

Abstract

Riboflavin has been converted to phosphated ester, riboflavin 5'-phosphate sodium, by the phosphorylation of riboflavin with pyro-phosphoric acid in three steps reaction. The yield is 80.5% of the theor. value and assay shows 84.5% purity in the product. The water soly. has been increased to 112 mg/mL at 27°C.

Indexing

Carbohydrates (Section 33-7)

Concepts

Phosphorylation

synthesis of riboflavin 5'-phosphate sodium via phosphorylation

Substances

[83-88-5](#) Riboflavin, reactions

[7664-38-2](#) Orthophosphoric acid, reactions

synthesis of riboflavin 5'-phosphate sodium via phosphorylation

Reactant; Reactant or reagent

[2466-09-3P](#) Pyrophosphoric acid

synthesis of riboflavin 5'-phosphate sodium via phosphorylation

Reactant; Synthetic preparation; Preparation; Reactant or reagent

[130-40-5P](#) Riboflavin 5'-phosphate sodium

synthesis of riboflavin 5'-phosphate sodium via phosphorylation

Synthetic preparation; Preparation

Supplementary Terms

riboflavin; phosphate; sodium; prepn; phosphorylation;

Citations

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3. Biosynthesis of riboflavin. Single turnover kinetic analysis of GTP cyclohydrolase II

By: Schramek, Nicholas; Bracher, Andreas; Bacher, Adelbert

Source: Journal of Biological Chemistry, Volume: 276, Issue: 47, Pages:

44157-44162, Journal, 2001, CODEN: JBCHA3, ISSN: 0021-9258, DOI:

10.1074/jbc.M107306200

Company/Organization: Technische Universitat Munchen, Garching, Germany, D-85747

Accession Number: 2001:869476, CAN 136:130675, CAPLUS

Publisher: American Society for Biochemistry and Molecular Biology

Language: English

Abstract

GTP cyclohydrolase II catalyzes the conversion of GTP into a mixt. of

2,5-diamino-6-ribosylamino-4(3H)-pyrimidinone 5'-

phosphate (Compd. 2), formate, and pyrophosphate. Moreover, GMP was recently shown to be formed as a minor

product. The major product (Compd. 2) serves as the first committed intermediate in the biosynthesis of the vitamin riboflavin. Numerous pathogenic microorganisms are absolutely dependent on endogenous synthesis of riboflavin. The enzymes of this pathway are therefore potential drug targets, and mechanistic studies appear relevant for development of bactericidal inhibitors. Pre-steady state quenched flow anal. of GTP cyclohydrolase II shows the rate-detg. step to be located at the beginning of the reaction sequence catalyzed by the enzyme. Thus, GTP is consumed at a rate const. of 0.064 s^{-1} , and the reaction product, Compd. 2, is formed at an apparent rate const. of 0.062 s^{-1} . Stopped flow expts. monitored by multiwavelength photometry are well in line with these data. 2-Amino-5-formylamino-6-ribosylamino-4(3H)-pyrimidinone triphosphate can serve as substrate for GTP cyclohydrolase II but does not fulfill the criteria for a kinetically competent intermediate. A hypothetical reaction mechanism involves the slow formation of a phosphoguanosyl deriv. of the enzyme under release of pyrophosphate. The covalently bound phosphoguanosyl moiety is proposed to undergo rapid hydrolytic release of formate from the imidazole ring and/or hydrolytic cleavage of the phosphodiester bond.

Indexing

Enzymes (Section 7-4)

Concepts

Enzyme kinetics

single turnover kinetic anal. of GTP cyclohydrolase II

Substances

[56214-35-8](#) GTP cyclohydrolase II

single turnover kinetic anal. of GTP cyclohydrolase II

Biological study, unclassified; Physical, engineering or chemical process; Physical process; Biological study; Process

[86-01-1](#) 5'-GTP

[27089-32-3](#)

[73477-63-1](#)

substrate; single turnover kinetic anal. of GTP cyclohydrolase II

Biological study, unclassified; Biological study

Supplementary Terms

GTP; cyclohydrolase; II; single; turnover; kinetics; riboflavin; biosynthesis;

Citations

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4. Synthesis of riboflavin tetrapropanoate by solid superacid sulphate ion on zirconium dioxide

By: Zhao, Jinglian; Zhang, Zhoumei

Source: Xi'an Jiaotong Daxue Xuebao, Volume: 34, Issue: 6, Pages: 80-84, Journal, 2000, CODEN: HCTPDW, ISSN: 0253-987X

Company/Organization: Xi'an Jiaotong University, Xi'an, Peop. Rep. China, 710049

Accession Number: 2000:575300, CAN 133:237734, CAPLUS

Publisher: Xi'an Jiaotong Daxue Xuebao Bianjibu

Language: Chinese

Abstract

The riboflavin tetrapropanoate was prepd. with 78.3% yield starting from riboflavin and propionic anhydride. The solid superacid sulfate ion on zirconium dioxide is used as a catalyst. It was found that the catalyst activity was the highest when zirconium oxychloride·8 H₂O immersed in 1 mol/L sulfuric acid for 24 h and baked 3 h at 600 degree. The factors influencing the yield of the esterification of riboflavin and propionic anhydride are discussed. Optimum conditions for reaction involve that riboflavin and propionic anhydride is 1:40 (molar ratio), mass of catalyst is 4.7% of the total system mass, reaction temp. is 85 degree, and reaction time is 3 h.

Indexing

Biomolecules and Their Synthetic Analogs (Section 26-8)

Substances

[1309-37-1](#) Iron oxide (Fe₂O₃), uses

[1314-23-4](#) Zirconium oxide (ZrO₂), uses

[7664-93-9D](#) Sulfuric acid, uses, TiO₂, ZrO₂, or Fe₂O₃ supported

[13463-67-7](#) Titanium oxide, uses

synthesis of riboflavin tetrapropanoate by solid superacid sulfate ion on zirconium dioxide

Catalyst use; Uses

[83-88-5](#) Riboflavin, reactions

[123-62-6](#) Propionic anhydride

synthesis of riboflavin tetrapropanoate by solid superacid sulfate ion on zirconium dioxide

Reactant; Reactant or reagent

[7652-80-4P](#)

synthesis of riboflavin tetrapropanoate by solid superacid sulfate ion on zirconium dioxide

Synthetic preparation; Preparation

Supplementary Terms

riboflavin; propanoate; prepn; catalysis; solid; superacid; sulfate; ion; zirconium; dioxide; support; catalyst;

5. Enzymic synthesis of riboflavin and FMN specifically labeled with carbon-14 in the xylene ring

By: Sedlmaier, Helmut; Mueller, Franz; Keller, Paul J.; Bacher, Adelbert

Source: Zeitschrift fuer Naturforschung, C: Journal of Biosciences, Volume: 42, Issue: 4, Pages: 425-9, Journal, 1987, CODEN: ZNCBDA, ISSN: 0341-0382

Company/Organization: Tech. Univ. Muenchen, Garching, Fed. Rep. Ger., D-8046

Accession Number: 1987:530408, CAN 107:130408, CAPLUS

Language: English

Abstract

The condensation of 3-hydroximino-2-butanone (I) with 5-amino-6-ribitylamino-2,4(1H,3H)-pyrimidinedione (II) yields 6,7-dimethyl-8-ribityllumazine (III). At slightly alk. pH, the CO group of I reacts preferentially with the 5-amino group of II (regioselectivity, 4:1). Under acidic conditions, the reaction occurs with higher yield and marginal regioselectivity of opposite direction (1:1.4). Appropriately ¹³C-labeled samples of I give III labeled at C-6a, C-6, C-7 or C-7a. [6a,7a-¹³C₂]III was prepd. by condensation of II with [1,4-¹³C₂]diacetyl. The lumazines III were converted to riboflavin by the enzyme, riboflavin synthase, with almost quant. yield.

By this procedure, any C-atom of the carbocyclic moiety of riboflavin can be selectively labeled with ¹³C at high abundance. Phosphorylation yields the resp. ¹³C-labeled riboflavin 5'-phosphate (FMN) samples.

Indexing

Biochemical Methods (Section 9-14)

Section cross-reference(s): 33

Substances

[107-12-0](#) Propionitrile

Grignard reaction of, with carbon-13-labeled Me magnesium iodide

Reactant; Reactant or reagent

[4227-95-6](#)

Grignard reaction with propionitrile or methylation by

Analytical study

[57-71-6](#)

condensation of, with aminoribitylaminopyrimidinedione

Analytical study

[23424-28-4](#)

conversion to carbon-13-labeled acetyl chloride

Analytical study

[9075-82-5](#) Riboflavin synthase

in carbon-13-labeled riboflavin synthesis

Analytical study

[110326-21-1P](#)

[110326-22-2P](#)

[110345-12-5P](#)

[110345-13-6P](#)

prepn. and condensation with aminoribitylaminopyrimidinedione

Preparation

[17014-74-3P](#)

prepn. and condensation with hydroximinobutanone

Preparation

[110326-29-9P](#)

prepn. and hydrolysis of

Reactant; Preparation; Reactant or reagent

[110326-23-3P](#)

[110326-24-4P](#)

[110326-25-5P](#)

[110345-17-0P](#)

[110345-18-1P](#)

prepn. and phosphorylation of

Synthetic preparation; Preparation

[110326-26-6P](#)

[110326-27-7P](#)

[110326-28-8P](#)

prepn. and reaction with Et nitrite

Reactant; Synthetic preparation; Preparation; Reactant or reagent

[1520-57-6P](#)

prepn. and reaction with Et zinc iodide or esterification

Reactant; Synthetic preparation; Preparation; Reactant or reagent

[110345-14-7P](#)

[110345-15-8P](#)

[110345-16-9P](#)

[110370-42-8P](#)

prepn. and reaction with riboflavin synthase

Reactant; Synthetic preparation; Preparation; Reactant or reagent

[58735-82-3P](#)

prepn. and reaction with trimethylchlorosilane in presence of sodium

Reactant; Synthetic preparation; Preparation; Reactant or reagent

[110326-30-2P](#)

[110326-31-3P](#)

[110345-19-2P](#)

[110345-20-5P](#)

[110345-21-6P](#)

prepn. of

Preparation

[109-95-5](#) Ethyl nitrite

reaction of, with carbon-13-labeled butanone

Reactant; Reactant or reagent

[52918-39-5](#)

[75599-13-2](#)

redn. of

Reactant; Reactant or reagent

Supplementary Terms

enzyme; riboflavin; synthesis; carbon; 13; riboflavin; prepn; enzyme;

二、使用心得：

Scifinder 是個找論文很方便的網站，打入關鍵字就會有很多筆資料可供查閱。打入兩個或以上的關鍵字時，搜尋出的結果還會依照相關性做分類，可以避免找到不相干的資料。

而收錄在這網站的論文，都會先經過編輯，當我們點進去資料，看到的不是一大篇很長的文章，而是網站撰寫者看過論文後寫出來的摘要。這樣閱讀起來也很方便，很容易掌握到這篇論文所要闡述的論點，如果有需要看全文的話，也有提供查閱全文的服務。找到資料後可以轉檔存下來，也可以轉成很多不同格式的檔。

搜尋一化合物的反應時，可以看到發明者是用什麼原料做反應，而產率有幾%，如果不知道這原料是怎麼合成的，可以一步一步往回推，還可以把這些查詢到的反應式編輯，再轉檔存入電腦。

Scifinder 可以讓搜尋者更容易找到想要的資訊，不會找出跟關鍵字不相干的結果，使用起來也很方便，資料庫也夠大，很適合做學術研究需要找資料時使用。