全国中文核心期刊
中国科技核心期刊
中国农业核心期刊
RCCSE中国核心学术期刊
中国科学引文数据库（CSCD）期刊
CAB International 收录期刊
美国《生物学文摘》收录期刊
美国《化学文摘》（CA）收录期刊

«上一篇 (DArticle.aspx?type=view&id=201101032)
下一篇 (DArticle.aspx?type=view&id=201101034)

PDF下载 (pdfdow.aspx?Sid=201101033)
+分享 (http://www.jiathis.com/share?uid=1541069)

微信公众号：大豆科学

[1]蔡 燕,方 云,夏咏梅.大豆脂氧酶的热失活动力学与其二级结构的圆二色谱表现[J].大豆科学,2011,30(01):150-152.
[doi:10.11861/j.issn.1000-9841.2011.01.0150]
CAI Yan,FANG Yun,XIA Yong-mei.Thermal Inactivation of Soybean Lipoxygenase and Its Secondary Structure Performance of Circular Dichroism Specctroscopy[J].Soybean Science,2011,30(01):150-152.
[doi:10.11861/j.issn.1000-9841.2011.01.0150]

点击复制

大豆脂氧酶的热失活动力学与其二级结构的圆二色谱表现

《大豆科学》 [ISSN:1000-9841 /CN:23-1227/S] 卷： 第30卷 期数： 2011年01期 页码： 150-152 栏目：
出版日期： 2011-02-25

Title: Thermal Inactivation of Soybean Lipoxygenase and Its Secondary Structure Performance of Circular Dichroism Specctroscopy

文章编号： 1000-9841（2011）01-0150-03

作者： 蔡 燕 (KeySearch.aspx?type=Name&Sel=蔡 燕)； 方 云 (KeySearch.aspx?type=Name&Sel=方 云)； 夏咏梅 (KeySearch.aspx?type=Name&Sel=夏咏梅)
江南大学 食品科学与技术国家重点实验室，化学与材料工程学院，江苏 无锡 214122

Author(s): CAI Yan (KeySearch.aspx?type=Name&Sel=CAI Yan)； FANG Yun (KeySearch.aspx?type=Name&Sel=FANG Yun)； XIA Yong-mei (KeySearch.aspx?type=Name&Sel=XIA Yong-mei)
State Key Laboratory of Food Science and Technology, School of Chemical and Material Engineering, Jiangnan University, Wuxi 214122, Jiangsu, China

关键词： 大豆脂氧酶 (KeySearch.aspx?type=KeyWord&Sel=大豆脂氧酶)； 失活动力学 (KeySearch.aspx?type=KeyWord&Sel=失活动力学)； 圆二色谱 (KeySearch.aspx?type=KeyWord&Sel=圆二色谱)； 二级结构 (KeySearch.aspx?type=KeyWord&Sel=二级结构)

Keywords: Soybean lipoxygenase (KeySearch.aspx?type=KeyWord&Sel=Soybean lipoxygenase)； Inactivation kinetics (KeySearch.aspx?type=KeyWord&Sel=Inactivation kinetics)； Circular dichroism (KeySearch.aspx?type=KeyWord&Sel=Circular dichroism)； Secondary structures (KeySearch.aspx?type=KeyWord&Sel=Secondary structures)

分类号： S565.1

DOI: 10.11861/j.issn.1000-9841.2011.01.0150 (http://dx.doi.org/10.11861/j.issn.1000-9841.2011.01.0150)

文献标志码： A

摘要： 应用大豆脂氧酶的变温圆二色谱图研究了大豆脂氧酶(LOX)的热失活与二级结构变化过程。结果表明：在50~65℃条件下，10 min内，LOX的酶活随热处理时间延长而下降，其热失活过程遵循一级动力学，活化能Ea值为217 kJ·mol^{-1}。在相同的热处理条件下，LOX中二级结构α-螺旋和β-折叠的相对含量均在20%左右浮动，不符合一级反应动力学，二级结构的变化并非LOX失活的主要原因。

Abstract: The inactivation and secondary structure variation of soybean lipoxygenase(LOX) during heating process was studied with circular dichroism(CD) spectroscopy. The quantitative secondary structures of LOX at various temperatures were obtained. At 50~65 ℃, LOX activity has a sharp drop with the time prolonging. Thermal inactivation of LOX could be described by a first order kinetic model, and activation energy Ea was further calculated to be 217 kJ·mol^{-1}. During the heating process, the contents of α-helix and β-sheet were both floating at 20%, indicated that the change of secondary structure of LOX was not the main reason for the loss of their activities.

参考文献/References:

[1]Gardner H W. Lipoxygenase as a versatile biocatalyst[J]. Journal of the American Oil Chemists' Society, 1996, 73: 1347-1357.
[2]Minor W, Steczko J, Bolin J T, et al. Crystallographic determination of the active site iron and its ligands in soybean lipoxygenase-1[J]. Biochemistry, 1993, 32: 6320-6323.
[3]Pelton J T, McLean L R. Review of spectroscopic methods for analysis of protein secondary structure[J]. Analytical Biochemistry, 2000, 277: 167-176.
[4]Kelly S M, Jess T J, Price N C. Review of how to study proteins by circular dichroism[J]. Biochimica et Biophysica Acta: Proteins Proteomics, 2005, 1751: 119-139.
[5]Greenfield N J. Analysis of circular dichroism data[J]. Methods Enzymology, 2004, 383: 282-291.
[6]Surrey K. Spectrophotometric method for determination of lipoxygenase activity[J]. Plant Physiology, 1964, 39: 65-70.
[7]Whitmore L, Wallace B A. DICHROWEB, an online server for protein secondary structure analyses from circular data[J]. Nucleic Acids Research, 1994, 32: 668-673.
[8]Indrawati, Van Loey A, Ludikhuyze L, et al. Pressure-temperature inactivation of lipoxygenase in green peas (Pisum sativum): a kinetic study[J]. Journal of Food Science, 2001, 66: 686-693.
[9]Indrawti I, Ludikhuyze L, van Loey A, et al. Lipoxygenase inactivation in green beans (Phaseolus vulgarisL.) due to high pressure treatment at subzero and elevated temperatures[J]. Journal of Agricultural and Food Chemistry, 2000, 48: 1850-1855.
[10]Rodrigo D, Jolie R, Van Loey A, et al. Thermal and high pressure stability of tomato lipoxygenase and hydroperoxide lyase[J]. Journal of Food Engineering, 2007, 79: 423-427.

[11]Bustoa M D, Owusu Apentenb R K, Robinsonb D S, et al. Kinetics of thermal inactivation of pea seed lipoxygenase and the effect of additives on their thermostability[J]. Food Chemistry, 1999, 65: 323-329.
[12]Anthon G E, Barret D M. Thermal inactivation of lipoxygenase and hydroperoxytrienoic acid lyase in tomatoes [J]. Food Chemistry, 2003, 81: 275-279.
[13]Ludwig P, Tordi M, Colosimo A. Circular dichroism on the lipoxygenase from reteculocytes[J]. Biochimica et Biophysica Acta, 1986, 830: 136-139.
[14]Tsou C L. Kinetics of substrate reaction during irreversible modification of enzyme activity[J]. Advances in Enzymology and Related Areas of Molecular Biology, 1988, 61: 381-436.
[15]Tsou C L. Conformational flexibility of enzyme active sites[J]. Science, 1993, 262: 380-381.
[16]Tsou C L. Location of the active sites of some enzymes in limited and flexible molecular regions[J]. Trends in Biochemical Sciences, 1986, 11: 427-429.

相似文献/References:

[1]蔡燕,方云,孟君.大豆脂氧酶催化亚油酸氢过氧化反应产物的漂白特性[J]. (darticle.aspx?type=view&id=200702024)大豆科学,2007,26(02):235.[doi:10.3969/j.issn.1000-9841.2007.02.024]
CAI Yan,FANG Yun,MENG Jun.THE BLEACHING PERFORMANCE OF THE PRODUCT OBTAINED FROM HYDROPEROXIDATION OF LINOLEIC ACID CATALYZED BY SOYBEEN-LIPOXYGENASE[J].Soybean Science,2007,26(01):235.[doi:10.3969/j.issn.1000-9841.2007.02.024]

备注/Memo 基金项目：江南大学创新团队基金资助项目(2008CXTD01)。
第一作者简介：蔡燕(1983-)，女，博士，研究方向为酶催化。E-mail: caiyan821110@126.com。
通讯作者：夏咏梅（1965-），女，博士，教授，从事酶催化和精细化学品合成等方面的研究。E-mail: ymxia@126.com。

更新日期/Last Update: 2014-09-11