

所显示出的抗氧化效果也不尽相同,所以对任何一种抗氧化剂的评估都与试验体系紧密相关,单一的体系往往很难全面体现其生物学意义,需要多种体系相互补充,来研究其在不同体系的真实效应。本研究通过多种体外化学模拟体系证明了洋葱黄酮类化合物的确具有较强的抗氧化活性,但其确切的抗氧化机理还不是很清楚,有待于今后进一步研究。

#### 4 结 论

洋葱黄酮类化合物对亚油酸过氧化、油脂过氧化以及脱氧核糖氧化损伤均具有良好的抑制作用,能明显抑制  $H_2O_2$  诱导的红细胞氧化溶血反应和大鼠肝组织匀浆脂质过氧化反应的发生,表明洋葱黄酮类化合物具有很强的体外抗氧化活性,作为天然抗氧化剂具有很好的开发潜力,在食品、医药领域有广泛的应用前景,值得进一步研究开发。

#### 参 考 文 献

- 1 孙守义,王文亮,王守经,等. 洋葱的保健作用及其开发前景[J]. 农产品加工·学刊,2008,(1):93~94
- 2 黎乃维,赵玉平,杨建荣,等. 水浸提法提取洋葱黄酮类化

- 合物的工艺条件研究[J]. 食品科技 2007,(3):110~113
- 3 王 辉,李景明,马 钊,等. 洋葱中含硫化合物的生理功效[J]. 食品工业科技,2005,26(5):187~189
- 4 孙墨珑,宋湛谦,方桂珍. 核桃楸总黄酮的提取工艺[J]. 东北林业大学学报,2006,34(1):38~39
- 5 Gülcin I, Oktay M, Kirecci E, et al. Screening of antioxidant and antimicrobial activities of anise (*Pimpinella anisum* L.) seed extracts[J]. Food Chemistry, 2003, 83 (3):371~382.
- 6 阎高峰,叶小利,袁吕江,等. 天然抗氧化剂木犀草素抗氧化活性的研究[J]. 食品与发酵工业,2005,31(8):27~29
- 7 吕晓玲,朱惠丽,姜平平,等. 紫苏提取物抗氧化活性体外实验研究[J]. 中国食品添加剂,2003,(5):22~25
- 8 刘培勋,高小荣,徐文清,等. 银耳碱提多糖抗氧化活性的研究[J]. 中药药理与临床,2005,21(4):35~37
- 9 张振明,葛 斌,许爱霞,等. 太子参醇提取物对大鼠组织和红细胞的抗氧化活性[J]. 第四军医大学学报,2005,26(22):2062~2064
- 10 曹如燕,徐学明. 猪血球蛋白蛋白酶水解物抗氧化活性的研究[J]. 食品与发酵工业,2006,32(12):15~18
- 11 阳冠明,叶司原. 山萘酚对红细胞自氧化的影响[J]. 中国药理学通报,1999,15(5):460~461

## Studies on Antioxidant Activity of Onion Flavonoids *in vitro* Chemical Systems

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**ABSTRACT** The antioxidant activity of onion flavonoids was investigated by measuring its inhibition effects on peroxidation of linoleic acid and oil, and oxidation of 2'-deoxyribose, as well as their protective effects on hemolysis of red cells induced by  $H_2O_2$  and lipid peroxidation of rat liver homogenate. The results showed that the onion flavonoids did not only significantly inhibit the peroxidation of linoleic acid, linoleic esters, and oxidation of 2'-deoxyribose, but also restrained remarkably on the hemolysis of red cells induced by  $H_2O_2$  and lipid peroxidation homogenate rat liver. Due to its strong *in vitro* antioxidant ability, onion flavonoids has a high potential to be used as natural antioxidant in the future.

**Key words** onion, flavonoids, antioxidant activity

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### 金威啤酒淡季推新品

深圳金威啤酒有限公司推出新装“精品2008”,进一步优化工艺,强化产品的质量和品质追求,为消费者打造更加健康、安全、绿色的产品,力促此产品成为都市休闲消费的中坚。

10度“精品2008”采用优质原料和德国先进技术酿造,从原料选购、工艺优化,质量检验以及品种纯度、酿酒性能、啤酒口味等方面,均确保产品健康安全,让消费者在品味纯正清爽的“精品2008”的同时,领略到金威啤酒的关爱、责任和诚信。

此外,为满足广大消费者健康时尚的个性需求,“精品2008”在瓶型及包装上进行了创新,600mL绿瓶动感清新,融入了健康、绿色、时尚的流行元素,是广大年轻消费者追求健康生活方式的首选啤酒。

- 23 Horie M, Ishiyama Y, Fujihira-Ueki Y, et al. Inhibition of the adherence of *Escherichia coli* strains to basement membrane by *Lactobacillus crispatus* expressing an S-layer[J]. Appl Environ Microb, 2007, 92:396~403
- 24 Hynonen U, Westerlund-Wikstrom B, Palva A, et al. Fibronectin-binding function in the SlpA surface protein of *Lactobacillus brevis* [J]. Bacteriol, 2002, 184: 3360 ~ 3367
- 25 Monica Gatti, Lia Rossetti, Maria Emanuela Fornasari, et al. Heterogeneity of Putative Surface Layer Proteins in *Lactobacillus helveticus* [J]. Appl Environ Microbiol, 2005; 71: 582~71: 588

## The Function of Lactobacillus Surface Layer Proteins and Its Application in Microecological Agent

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**ABSTRACT** Surface layers that are composed of crystalline arrays of proteinaceous subunits present as the outermost component of cell wall in several species of the genus *Lactobacillus*, as well as in many other bacteria and Archaea. These proteins form a periodic ordered structure with oblique, square or hexagonal type symmetry. It is currently believed that these structures are formed due to entropy-driven self-assembly of the protein subunits, which are attached by non-covalent interactions. The typical characteristics that distinguish *Lactobacillus* S-layer proteins from other surface layer proteins are small size and predictable high pI value. Several *Lactobacillus* possess multiple surface layer protein genes can be differentially or simultaneously expressed. Three methods for the isolation of *Lactobacillus* surface layer proteins were discussed later. The use of *Lactobacillus* surface layer proteins in probiotics microecological agent was also discussed.

**Key words** *Lactobacillus*, S-layers, S-layers' gene, S-layers' Isolation, microecological agent

市场动态

### 休闲食品市场前景广阔

在各种休闲食品中,一半以上的家庭曾经购买膨化食品,其次是饼干类食品。除此之外,口香糖和干果类休闲食品受到各类家庭的喜爱。同时,由于干果食品具有悠久的食用历史和丰富的营养,也受到了许多家庭的喜爱。它们不再是孩子们的专利,成人尤其是年轻女性已成为主流消费人群。休闲食品已经成为越来越多家庭的生活必需品。儿童、白领阶层已经成为休闲食品的消费主力,也是各种新产品消费的推动者,对价格的接受能力也较强。而一些老年消费者,由于消费习惯的不同,购买的多是一些传统的品种。

随着人们生活水平的不断提高,原来以温饱型为主体的休闲食品消费格局,逐渐向风味型、营养型、享受型甚至功能型的方向转化。尤其随着市场的不断扩大,休闲类食品市场开始快速发展。

随着休闲食品消费的繁荣,更多的人已将着眼点放在了健康和营养方面。现在的休闲食品生产厂商正在宣传休闲食品可以成为健康平衡膳食的一部分——低热量、低脂肪、低糖的休闲食品是今后新品开发的主流。随着休闲食品行业的发展以及人们生活水平的提高,休闲食品开始贴近人们的生活。

近年来,休闲食品市场规模呈几何级的速度增长,高出食品市场平均增长率 20 个百分点。但面对世界经济的一体化,目前休闲食品市场却略显底气不足,面临着严峻的挑战。业内人士指出,随着休闲食品产业规模的扩大,一些有实力、有品牌的优势企业必将占据垄断地位,形成企业优势和地域优势,从而使红火的休闲食品市场走向规范。虽然,休闲食品市场日益红火,但是,流通渠道单一,目前购买休闲食品的场所主要是超市及便利店,其次是大卖场、食品店、杂货店等。搭建新的营销平台,增强企业自主营销意识,成为休闲食品产业发展新的需求。休闲食品是具有旺盛生命力的产品,有着广阔的市场和巨大的发展潜力。同时,由于食品行业已经进入完全竞争阶段,企业利润日趋平均化,行业整合、市场细分即将完成,因此,休闲食品企业应抓住机遇,扬长避短,通过新产品开发、品牌建设和市场拓展,通过差异化战略,走出一条快速、健康、可持续发展的道路。

## Optimization of Extraction Technique of Polysaccharides from Fermentation Powder of *Inonotus obliquus*

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**ABSTRACT** The optimum conditions for the extraction of polysaccharides from fermentation powder of *Inonotus obliquus* were determined by using response surface methodology (RSM). A three-level Box-Behnken factorial design was used to investigate the effects of three independent variables, namely extraction temperature, extraction time and liquid-solid ratio on the response, the yield of polysaccharides. The independent variables were coded at three levels and their actual values were selected on the basis of preliminary experimental results. Results showed that the generated regression models adequately explained the data variation and significantly represented the actual relationship between the independent variables and responses. An extraction temperature of 83°C, an extraction time of 2.2 h and a liquid-solid ratio of 33.3 were found to be optimal for polysaccharides extraction from fermentation powder of *Inonotus obliquus*. By means of additional experiments, the adequacy of this model was conformed. The monosaccharide components of polysaccharides extracted under optimum condition were arabinose 0.53%, mannose 0.48%, glucose 10.75% and galactose 2.44%. Moreover, there were acidic polysaccharides in the products and the glycosidic bonds were  $\alpha$ -types mainly.

**Key words** *Inonotus obliquus*, polysaccharides, extraction, response surface methodology (RSM)

行业  
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### 诺维信酶发酵基地落户太仓

诺维信昨日宣布,全球最大的第二代酶制剂工厂在江苏太仓正式投产。诺维信全球执行副总裁 Peder Holk Nielsen 在接受《第一财经日报》采访时表示,这将是全球最大的酶发酵生产设施。

第一代的生物燃料技术就是玉米生产乙醇的工艺,而由于粮食价格的大面积反弹,玉米乙醇此前已经被发改委紧急叫停。但事实上,目前玉米乙醇的生产成本仍低于纤维素乙醇,玉米乙醇的生产成本大约是 1.5 美元/加仑;而纤维素乙醇,也就是第二代燃料乙醇,生产成本大约是 3~4.5 美元/加仑。

由于玉米乙醇的主要原料是淀粉,所以就酶制剂的成本而言,目前为 4~6 美分/加仑,而目前的纤维素乙醇,其酶制剂的成本仍然高达 70 美分/加仑,要达到理想状态的 30 美分/加仑,还需要至少几年的时间。

长期研究生物燃料的中国地质大学教授张晓第认为,第二代燃料乙醇的生产成本与第一代燃料乙醇持平之日,就是整个生物质能源产业大发展之时。

如何降低成本使得纤维素乙醇可以大规模商业化生产是个世界性的课题。尽管酶在整个第二代生物燃料中的成本较高,但由于第二代生物燃料的原料较第一代的玉米原料成本大为减少,所以,未来几年有望解决成本的平衡问题。

此前,中国的目标是到 2010 年将燃料乙醇的产量翻番,达到每年 300 万 t,满足全国运输业 5% 的燃油需求。

市场  
动态

### 欧洲发明褶皱纸盒葡萄酒防护包装

欧洲包装制造商 Smurfit Kappa 集团发明了一种持久耐用的葡萄酒邮购包装“Protektapak”,该包装能确保葡萄酒在邮递途中,抵御恶劣的环境,免遭破坏。

新包装采用褶皱纸盒设计,取代原有的不环保、高成本的聚苯乙烯材料。Smurfit Kappa 销售主管保罗·卡希尔说:“Smurfit 设计团队集体努力创造出这种新型葡萄酒防护包装,产品已经过强力测试,能够为葡萄酒提供必要的保护。”