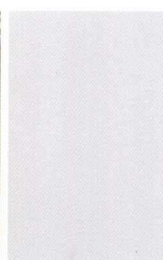


森林食品

产地环境 质量安全

The Producing Area's Environment and
Quality Safety of Forest Food

江 波 吕爱华 钟哲科 等  著
姜培坤 柴振林 尚素微



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内容提要

ABSTRACT

本书由自 2002 年国家林业局决定在浙江省开展森林食品相关试点工作至今 10 余年间先后开展的 1 个美国布莱蒙基金项目、2 个国家自然科学基金项目、2 个浙江省重大科技项目、5 个国家林业局科技项目、4 个浙江省自然科学基金项目、3 个浙江省政府与中国林业科学研究院科技合作项目、3 个浙江省农业标准化重点研究项目等 21 个项目的研究成果编著而成。

全书共分 4 篇，包括“森林食品”概念的提出和产业发展过程、土壤退化原因及修复技术体系的构建、森林食品质量安全评价和综合控制技术的研究、森林食品标准体系、监管体系和基地认定体系等的建设。本书可供林学、生态学、环境科学、植物学、农学等有关学科的教学、科研、生产人员和相关管理部门的决策人员参考。

前言

FOREWORDS

食品质量与安全问题,越来越引起社会的广泛关注。引发食品质量安全的因素,包括自然与人为两个方面,其中生态环境,即水、土、气、生等方面的污染,是导致农产品质量下降的重要根源。党的十八大明确提出要加强生态文明建设,坚持以人为本,保障和改善民生。增加“生态产品”,提高林农收入,尊重自然,维护生态平衡,发展森林食品,保障健康安全,以生态文明和民生需求引领现代林业发展。2003年,浙江成为全国生态省建设第5个试点省,2010年出台了《关于推进生态文明建设的决定》。加快建设“森林浙江”,大力发展森林食品产业既是建设生态文明、挖掘生态潜力、激发生态活力和彰显生态魅力的有效载体,也是浙江“生态立省”战略和建设现代化生态省的重要举措。

森林食品是指来自良好的森林生态环境,遵循可持续经营原则,具有安全、生态、优质和营养特性的食用林产品及其初级加工产品。森林食品具有5个明显的特征:①地域性,来自于良好的森林环境;②系统性,生长于完整的森林生态系统;③持续性,产品是在不破坏系统的环境下获取的;④多样性,资源是多种多样的;⑤不可替代性,具有珍稀资源的特点,蕴含了丰富的森林文化。因此,森林食品深受广大消费者青睐,产业发展越来越快。食用笋、山核桃、香榧、杨梅等浙江地方特色产品引领了森林食品产业的快速发展,2001年以来,全省森林食品产值以平均13.5%的速度增长,近两年增长率更是高达20%以上。2011年浙江省林业产业总产值达3 154.8亿元,其中森林食品产业产值538.2亿元。推进农业“两区”建设以来,通过实施兴林富民示范工程、千万亩竹林改造工程和木本粮油提升工程,开展规模化、集约化经营,加快了林业产业集聚和产业带建设,规划到2015年,全省将建成竹林、油茶、山地干鲜果等为重点的现代林业园区300个,其中,综合区50个、主导产业示范区70个、特色精品园180个,森林食品产业发展到了前所未有的机遇期。

森林食品营养丰富、味道鲜美、市场需求量大,广大林农片面追求高产出、高收入,连年实施早产高效栽培技术,如大量施用化肥、不合理的抚育方式、有机材料覆盖、过分依赖农药防治有害生物等等,以达到早产丰产、反季节栽培的目的。虽然取得了显著的经济效益,但不合理的耕作制度,造成了大面积森林提前退化、土壤酶活性异常、土壤质量蜕化、单产持续下降、森林生态系统恶化、土壤重金属含量升高、农药残留增多及质量安全隐患加剧等问题。因此,针对产地退化和质量安全两大问题,应用现代技术手段,全面系统地开展森林食品产地生态修复与质量安全控制技术研究,

解决制约森林食品产业发展与生态环境保护之间的矛盾,提出一系列行之有效的技术措施和手段,已成为当前浙江森林食品发展最重要的任务。

本书以2002~2012年期间先后开展的“竹质生物炭对森林土壤碳汇及其微生态环境的影响”(国家自然科学基金,项目编号:31070545)、“强度经营经济林土壤水溶性有机氮的演变特征及其调控机制”(国家自然科学基金,项目编号:30671203)、“林业生态工程构建—生态系统修复关键技术研究及示范”(浙江省重大科技项目,项目编号:2004C12031)、“五千万亩生态经济型公益林建设关键技术和集成示范”(浙江省重大科技项目,项目编号2005C12026)、“多效持续腐殖肥生产工艺及应用技术引进”(国家林业局948项目,项目编号:2002-49)、“森林食品规范化生产技术开发”(国家林业局重点科技项目,项目编号:2005-12)、“森林食品产地环境质量安全评价及控制关键技术研究”(浙江省、中国林科院科技合作项目,项目编号:2007SY13)等1个美国布莱蒙基金、2个国家自然科学基金、2个省重大科技项目、5个国家林业局科技项目、4个省自然科学基金、3个省政府与中国林科院科技合作项目、3个省农业标准化重点研究项目等21个项目的研究成果编著而成。

十多年来,浙江省林科院会同浙江省林产品质量检测站、国家林业局竹子研究开发中心、浙江农林大学、黄岩区林特局果树站及试验示范基地所在的各市县林业主管部门、生产经营单位联合攻关,重点开展了包括“森林食品”概念的提出和产业发展过程,土壤退化原因及修复技术体系的研建,森林食品质量安全评价和综合控制技术的研究,森林食品标准体系、监管体系和基地认定体系等的标准化体系建设等方面的研究。本书既有基础理论上的拓展,又有实用新材料和模式技术的推广,必将在林业生态产业建设中发挥重要作用,具有非常广阔的应用前景。

本书著者特别说明,第5章土壤退化成因分析主要由浙江农林大学姜培坤、徐秋芳和吴家森编著;第6章土壤退化修复技术中新型生物炭肥料主要由国家林业局竹子研究开发中心钟哲科、杨慧敏编著;黄岩区林特局果树技术推广总站黄茜斌、刘高平编写了第8章8.2.3病虫害控制中单树罗慢经营技术;浙江省林产品质量检测站杨柳、朱杰丽主要参与了第7章森林食品质量安全评价、第9章检验检测方法的编写,吴翠蓉、蒋步云和郑俊旦主要参与了第4章土壤元素背景值及环境质量、第8章质量安全综合控制技术的编写;浙江省林业厅科技处曹件生主要参与了第4篇标准化体系的编写。

本专著中涉及的一些问题有待进一步深入研究。由于时间仓促,水平有限,书中错漏和不妥之处难免,衷心希望同行专家和广大读者批评指正。

江 波

二〇一二年十二月三十日

China has recently been facing with serious issues of food safety and quality. Causes of these issues are nature and human. The major reason of declining in the quality of agricultural products is ecological environment, including water, soil, air, and other aspects of pollution. The 18th CPC National Congress put forward strengthening the construction of ecological civilization, adhering to the people-oriented, safeguarding and improving people's livelihood. Increase the "eco-products", raise forest farmers' income, respect the nature, maintain ecological balance, develop forest food, ensure health safety, needs, lead the development of modern forestry based on ecological civilization and people's livelihood. In 2003, Zhejiang became the fifth national pilot province for eco-province construction and issued "The decision on promoting ecological civilization construction" in 2010. Speeding up the construction of "Forests in Zhejiang" and developing forest food industry are not only the effective carrier to construct ecological civilization, develop potential, stimulate activity and demonstrate charm, but also an important measure for Zhejiang "Ecological Province" strategy and the construction of modern ecological province.

Forest food means food coming from good forest ecological environment with safety, quality, ecological, nutritional quality of edible forest products and primary processed products, following the principle of sustainability. Forest food has five significant features: ① Locality, from good forest environment. ② Systematic, grow in the forest ecosystem with integrity. ③ Persistent, product is obtained without destroying the system environment. ④ Diversity, resource is varied. ⑤ Irreplaceable, it has the characteristics of rare resources and rich culture implication of the forest. Therefore, forest food favored by the vast number of consumers and industry was developing more and more quickly. Edible shoots, Pecan, *Torreya grandis*, Waxberry and Zhejiang local special products lead the rapid development of forest food industry. Since 2001, the province's forest food production value of average growth rate to 13.5%, recent two years the growth rate is up to more than 20%. In 2011 the total output value of forestry industry in Zhejiang province reached 315.48 billion yuan and among them, the forest food industry output value reached 53.82 billion yuan. Since advancing the construction of agriculture "two areas", through the implementation of demonstration projects, making people rich and thousands of acres of bamboo forest transformation project, woody grain and oil upgrading project,

carried out large-scale, intensive management, to speed up the forestry industry agglomeration and industrial zone construction. The province will build 300 modern forestry parks emphasized on bamboo forest, camellia and mountain dry fruit in 2015. There will be 50 comprehensive districts, 70 leading industries demonstration zone and 180 special boutique parks. The development of forest food industry has encountered unprecedented opportunities.

Forest food has rich nutrition, delicious taste and high market demanding. The majority of farmers pursued one-sided high output, high income and implemented premature efficient cultivation techniques for years, such as vast application chemical fertilizer, unreasonable tending method, organic material covering, excessive dependence on pesticides to control pest and so on, in order to achieve yield premature, reverse season cultivation objective. Although it has achieved remarkable economic benefits, the unreasonable farming system, resulting in large areas of forest to degradation, soil enzyme activity, soil quality deterioration of abnormal ecdysis, yields continued to decline, forest ecological system worsened, soil heavy metal content increased, pesticide residues increased and more and more quality security risks intensified. Therefore, in view of two problems of degradation and the quality and safety, the application of modern technology, comprehensive system to carry out research on ecological restoration and the quality and safety control of forest food, to address the constraints of the contradiction between development of forest food industry and protection the ecological environment, and puts forward a series of effective technical measures and means, has become the most important task in Zhejiang forest food development.

The book has been compiled by the materials of achievement of 21 projects including one American cloth lemon, two country funds National Natural Science Foundation, two major science and technology projects, five State Bureau of forestry science and technology projects, four provincial natural science fund, three the provincial government and the technology cooperation projects with Chinese Academy of Forestry Science, three provincial agricultural standardization key research projects. These materials make up of “the bamboo charcoal on forest soil carbon sequestration and microbial ecological environment” (National Nature Science Fund, project number: 31070545), “the strength of economic forest soil water-soluble organic nitrogen evolution and regulation” (National Nature Science Fund, project number: 30671203), “the forestry ecological engineering construction and ecosystem restoration of key technology research and demonstration” (Zhejiang province of major scientific and technological projects, project number: 2004C12031), “fifty million acres of ecological economic forest construction of key technology research and integrated demonstration” (Zhejiang province of major scientific and technological projects, project number: 2005C12026), “effect of humic fertilizer production technology and application of continuous introduction of technology” (948 of the state forestry project, project number: 2002 - 49), “forest food standardization production technology development” (the key science and technology projects, the State Forestry Administration, project number: 2005 - 12), “forest food producing environmental quality assessment and control of key technology research” (Zhejiang Province, Chinese Academy of

forestry science and technology cooperation projects, project number: 2007SY13).

For more than 10 years, Zhejiang forestry Academy jointly with Zhejiang Forestry Product Quality Testing Station, the China National Bamboo Research and Development Center, Zhejiang agriculture and Forestry University, Huangyan District Bureau of forest fruit station and experimental demonstration base of the city and County Forestry Department, production and business units of joint research, have focused on the proposed including “forest food” concept and the process of industrial development, soil degradation research system and repair technology, food quality and safety evaluation of forest and integrated control technology, study on the forest food standard system, supervision system and the base identification system and standardization system construction. The book not only has expanded the theoretical basis, but also put forward practical new materials and technology, and it will play an important role in forestry ecological construction industry, and have very broad application prospects.

The authors are here to specify: the fifth chapter (analysis of soil degradation causes) was compiled by Jiang Peikun, Xu Qiufang and Wu Jiasen from Zhejiang Agriculture and Forestry University, the sixth chapter (soil degradation model of biological carbon fertilizer repair technology) was mainly composed of Zhong Zheke and Yang Huimin from the China National Bamboo Research and Development Center, Chapter 8.2.3 has been referenced from Huang Qianbin and Liu Gaoping in Huangyan fruit technology promotion terminus area forest bureau wrote pest control in single tree, mantle management technology, Yang Liu and Zhu Jieli (Zhejiang Forestry Product Quality Testing Station) participated in the seventh chapter (the forest of food quality and safety evaluation), the ninth chapter of inspection method, Wu Cui-rong, Jiang Buyun, Zheng Jundan mainly wrote in soil element background value and environmental quality of the fourth chapter and the eighth chapter quality safety comprehensive control technology, Cao Jiansheng from department of science and technology in Zhejiang province forestry hall wrote the fourth articles of the standardized system.

Some problems relating to the monograph need further studies. There might be some mistakes and inadequacies in the book due to time constraint and author's limitation. We sincerely hope the experts and readers' criticism and correct.

Jiang Bo
December 30, 2012

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