# Current Situations and Countermeasures of Organic Tobacco Development

**GENG Rui-mei[1], LI Yan-dong[2], CHEN Xiu-zhai[2], WEN Liang[2], LIU Yong[2], CAO Chang-dai[3], LUO Cheng-gang[1]***

1. State Key Laboratory of Tobacco Genetic Improvement and Biotechnology & State Laboratory of Tobacco Genetic Breeding in Tobacco Industry, Tobacco Research Institute of Chinese Academy of Agricultural Sciences, Qingdao 266101, China; 2. Mengyin County Branch of Linyi Tobacco Co., Ltd., Linyi 276200, China; 3. Shandong Rizhao Tobacco Co., Ltd., Rizhao 276800, China

**Abstract** Current situations of organic tobacco development at both home and abroad, indicating that organic tobacco is one of the innovation directions for sustainable, healthy, environmental protection and low carbon development of modern tobacco industry. On the basis of foreign cultivation technical system for organic agriculture, the cultivation technical system for organic tobacco is summed up as follows: first, keep the diversity and continuity of space and time; second, ensure closeness of nutrient cycle; third, improve self-regulatory system and protection ability of crops. Then, the development trend of organic tobacco is analyzed and corresponding measures are put forward: establish production base and assessment system for organic tobacco; establish technical system for production of organic tobacco; establish and perfect evaluation system for management, production and supervision of organic tobacco; strengthen popularization of production and concept of organic tobacco; improve management of organic tobacco purchase, industry commerce handover, and redrying.

**Key words** Organic tobacco, Current situations, Countermeasures, China

In 1972, the International Federation of Organic Agriculture Movements (IFOAM) was founded. It is committed to rescuing agricultural ecological environment and promoting healthy and safe foods. The organic agriculture advocated by IFOAM is an advanced stage of agricultural development, and it incorporates agricultural economic system into material cycle of natural ecological system. Organic agriculture is an agricultural production system that eliminates the use of synthetically produced fertilizers, pesticides, growth regulators, and livestock feed additives in accordance with certain organic agricultural production standards in agricultural production. This system follows natural laws and ecological principles, and adopts sustainable agricultural technologies to coordinate the relation between crop farming and animal husbandry, promote ecological balance, and protect biological diversity and sustainable utilization of resources. The organic agricultural production includes society, economy and environment three elements, which are not mutually exclusive, but are strategic and rational integration[1-2]. In the world, regions of well developed organic agriculture concentrate on Oceania, Europe and Latin America. In reliance on scientific and technological advantages, such developed countries as the United States, Australia, Germany, and Japan fully utilize advanced scientific and technological results to promote development of organic agriculture. They have formed capital and technology intensive organic agricultural development model. India, Thailand, Brazil and African countries rely on rich labor forces and establish labor intensive organic agricultural development model. Argentina, Brazil and some European countries take full advantage of local natural conditions and have found natural resource intensive organic agricultural development model[3-4].

Developing organic agriculture can reduce the pressure on environment and is favorable to restoration of ecological environment. It is possible to reduce environmental pollution, improve quality of agricultural products and guarantee safety of agricultural products through reducing the use of fertilizers and pesticides. The organic agriculture belongs to labor intensive industry, so development of organic agriculture can increase jobs and provide jobs for rural labor forces. Besides, organic agriculture conforms to international market demand. It can increase export and bring excellent economic benefits for farmers. Also, it has great potential in alleviating climate change and developing low-carbon agricultural economy[5-6].

Since China's entry to WTO, the tobacco market is increasingly internationalized and foreign tobacco has directly started participating in competition of domestic market. Foreign tobacco has high quality and safety, but the price is similar to that of domestic tobacco. This leads to import volume of China's tobacco increasing year by year, and consequently exerts a great influence on domestic tobacco production. Furthermore, the formal effectiveness of *Framework Convention on Tobacco Control* in 2005 will certainly push forward the tobacco control movement and attract more and more people to care about smoking and health. Thus, the development and production of organic tobacco will become an inevitable trend[7-9].

## 1 Current situations of development of organic tobacco both at home and abroad

The tobacco belongs to agricultural products that are con-

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* Corresponding author. E-mail: ctsqz@163.net

sumed in form of smoking, and its quality and safety are under the influence of chemical pesticides and inorganic fertilizers. Along with improvement of people's living standard, cigarette consumers also hope there being cigarettes that conforming to organic food standard. In 1990s, the production of organic tobacco emerged along with development of organic agriculture and it shows a growing trend. At present, organic tobacco is mainly produced in America, Canada, Germany and Brazil.

In 2001, an independent cut tobacco producer Proto started to produce 100% organic cut tobacco and became the first company that eliminates the use of insecticide and fertilizer in tobacco production. Meanwhile, products they produced are free of any chemicals. They process tobacco to cut tobacco without expansion treatment. From processing to final product, the entire process for either cigarette, rolling tobacco or pipe tobacco is free of any additive that is not granted with organic product certificate. The rolling paper and glue also are certified. Besides, the state-of-the-art tobacco drying technology is used to minimize the content of carcinogenic substances. Now, in upper Tiber valley of northern Italy, several hundred of $hm^2$ organic tobaccos are planted, and Romanian Proto tobacco factory will turn them into cut tobaccos.

Santa Fe Natural Tobacco Company purchased by the United States started to sign buying and selling agreements with North Carolina, South Carolina, Kentucky, Virginia, Tennessee, and Ohio states from 1997. By now, it has established purchase and sales relation with over 43 organic tobacco producers. At present, the total amount of organic tobacco this company purchases from America has grown to 186.14 tons in 2001 from 40.86 tons in 1999. American Sotoya Ceremonial Tobacco Company is a wholesaler mainly engaged in selling organic and natural tobaccos. Its products include Virginia, Kentucky, MYO, and RYO organic tobaccos with market mainly in North America and annual sales amount up to one million US dollars. In October of 2002, the United States Department of Agriculture (USDA) implemented the standard of National Organic Program (NOP).

In Canada, three companies are involved with organic tobacco, and Original Tobacco Company NC is the first company that has obtained the selling license of organic tobacco. In autumn of 2005, Mother Earth Tobacco Company began to sell its first Ceremonial Tobacco, which is produced by 100% organic tobacco. According to *Act Respecting Reserved Designations and Added-Value Claims* (L. R. Q., chap itre A2 22.03), Quebec government founded OCPP/Pro-Cert Canada Inc., with the purpose of protecting source-based, special or characteristic related production modes and special product certificates, as well as validity of certified products and time limit of products. Its operation mainly involves such countries as Bulgaria, Cuba, Canada, Serbia, America, *etc.*

YUMA Company takes 5 years to popularize the production of organic tobacco and becomes an enterprise that produces organic cigarettes totally using organic tobaccos. Tobacco department of Indian tobacco company dispatches a central committee formed by 3 members to Mysore areas to carry out demonstration project of tobacco farmers in the hope of promoting quality of tobaccos exported from there. The company focuses on developing "safe" tobaccos by organic planting method[10-11].

In China, Department of Science and Education of the State Tobacco Monopoly Administration put forward the research and development of "harmless" tobacco in 2001. One year later, Dali Prefecture proposed the research and development of "green tobacco", and in 2007, it launched the special project for characteristic tobacco development. In 2008, the State Tobacco Monopoly Administration took the harmless tobacco project as the key research project for national tobacco industry, which marks official launch of research and development of organic and green tobaccos in China[12]. In 2007, the material department of China Tobacco Yunnan Industrial Company and Binchuan Tobacco Subcompany made a preliminary exploration of organic tobacco production in Lawu Township of Binchuan County, which is the first time in China. The purpose of this exploration is to assess environment conditions of organic tobacco production and pesticide and heavy metal residue in organic tobacco and to provide reference for scaled production of organic tobacco and its application in cigarette industry. It is an energetic measure for building brand image of strong "Two Cigarettes" province, enhancing market competitiveness of Yunnan's high-grade cigarette brands, and promoting sustainable development of Yunnan's "Two Cigarettes". In 2008, China Tobacco Yunnan Industrial Company established the project *Research and Development of Characteristic and Green Tobacco and Technical Standard for Its Production*. This marks official launch of research and development of organic and green tobacco in China. This project is carried out at two levels separately in China Tobacco Yunnan Industrial Company and the subordinate Hongta Group and Hongyun and Honghe Group and tobacco bases of their corresponding prefecture (city). The project will research and develop environmental assessment system for organic and green tobacco; technical standards for production and processing of organic and green tobaccos; quality standard of organic and green tobaccos; relevant certification and packaging of organic and green tobaccos and the industrial availability evaluation of tobaccos[10]. Soon, tobacco companies and industrial companies in Shandong, Guizhou, Sichuan and Anhui start researching and developing organic tobaccos one after another.

## 2 Research of planting technical system for organic tobacco

Focusing on environmental assessment of organic tobacco, many tobacco scientific research departments carry out a lot of related researches in tobacco production technology and quality evaluation of organic tobacco. North Carolina State University combines traditional tobacco production and carries out much scientific research work and puts forward many technical measures suitable for production of organic tobacco. They have carried out the research in certification of nitrogen fertilizer substitute used for organic tobacco, transplanting test of organic tobacco seedling, and field evaluation after cultivation of organ-

ic tobacco. Central Tobacco Research Institute (CTRI) of Hunsur in southern Indian Karnataka issued research results of organic tobacco: contents of nicotine, tar and carbon monoxide are less in organic tobacco; it is possible to produce cigarette products through organic farm; color of organic tobacco is lighter than common tobacco, making the tobacco quality higher and more stable. However, some researchers point out that, compared with common tobaccos, the reduction of harmful substance in organic tobaccos is based on production reduction of 35%. Therefore, how to make up the gap of output between organic tobacco and common tobacco is one of the current major researches points. Besides, type of flue-cured tobaccos is a key research point. Researchers expect that new generation tobacco not only can keep such advantages of organic tobacco as low nicotine, low tar and tobacco-specific nitrosamine (TSNA), but also can build a bridge between organic tobacco and common tobacco[13]. The characteristic research of organic ecological tobacco quality in Guizhou indicates that there are differences of appearance quality, conventional chemical compositions and sense quality between organic ecological tobacco and common tobacco. The luster and oil content of organic ecological tobacco are better than common tobacco; the total sugar and reducing sugar are higher and total alkaloid and total nitrogen content are lower in organic ecological tobacco than in common tobacco; and major chemical compositions in organic ecological tobacco are proper and have coordinated proportion. Therefore, we can believe that organic ecological tobacco can obtain better quality than common tobacco. In addition, researches have found that potassium content in organic ecological tobacco is slightly lower than common tobacco. Thus, further researches should be carried out in raising the potassium content in organic ecological tobacco, and improving quality and availability of organic ecological tobacco[14].

To achieve the organic tobacco production, we must follow requirements of organic foods and properly solve problems of seed selection, cultivation, soil fostering and fertilizer application, disease, insect, pest and grass prevention and control under the condition of obtaining seeds without using genetic engineering, and eliminating the use of chemical fertilizers, herbicides, and insecticides[15]. Besides, to realize technical system for organic tobacco production, every country establishes and develops its own planting model and relevant technology. The planting system includes soil management, crop zoning and cultivation management. At the same time of improving soil quality and achieving sustainable use of soil, it is expected to guarantee stable yield, so as to raise economic benefits. Furthermore, it is required to establish overall production arrangement and management system suitable for production activities on the basis of local production realities and market demands, and to guarantee production as per organic agricultural production standard.

With reference to foreign organic agricultural planting technical system, the organic tobacco planting system should include three points. (1) It is required to keep the diversity and continuity of space and time. To protect soil and stable growth of agricultural products and long time of vegetation coverage, there shall be proper layout and intercropping and rotation system in the same area, and at the same time, there should be areas reserved to ensure stable and diverse product supply. Coexistence of many types of crops can increase photosynthesis time and area for field crops, increase the yield per unit area, provide suitable survival environment for beneficial insects of natural enemies of pests, and can enhance the stability of agricultural production system. (2) It is required to ensure closeness of nutrient cycle. In organic agriculture, it usually maintains soil fertility through keeping closed cycle of nutrient, energy, water and waste within the system, and fosters soil through collecting organic manure from organic animal husbandry and cultivation in agricultural ecological system, or maintains soil fertility through proper soil cultivation and farming activities (such as fallow, crop rotation, *etc*). All of these reduce the reliance on external environment. (3) It is required to improve self-regulatory system and protection ability of crops. Intercropping, interplanting and mixed planting of different crops and types are helpful for controlling plant diseases and insect pests, and also favorable for controlling growth of weeds. To minimize plant diseases and insect pests in agricultural production system, it needs adopting proper cultivation technologies, such as increase of coverage, adjustment of sowing time and mature period, and utilization of high resisting types, plant insecticides and vermifuges[16].

## 3 Advantages and countermeasures for organic tobacco development

**3.1 Development trend** Firstly, traditional agricultural has a long history in China. It has accumulated rich experience in intensive and meticulous farming, combination of utilization and maintenance, and combination of agriculture and animal husbandry, which is also quintessence of organic agriculture. Secondly, China has regional advantages. Agricultural ecological landscape is diverse and production conditions are quite different. In remote mountain areas or poverty-stricken areas, farmers seldom use or completely not use chemical fertilizers, pesticides, which provides favorable foundation for development of organic agriculture. Thirdly, the organic agricultural production is a labor intensive industry, while there are numerous labor forces in rural areas, so it is favorable for development of organic foods, and can provide jobs for surplus rural labor force. Fourthly, since China's entry to WTO, the export of agricultural products is subject to restriction of Green Trade Barrier. The development of organic food can integrate with the world and exploit international market. Besides, people's living standards in China are constantly improving and people's awareness of environment is increasing, the domestic market of organic food will have a great development potential. All of these provide solid foundation and broad prospect for development of organic ecological tobacco in China[13].

**3.2 Countermeasures**

**3.2.1** Establish production base and assessment system for organic tobacco. Currently, there is no relevant standard for organ-

ic tobacco in China, and the national standard *Organic Product* only has general provisions on specifications and requirements for environmental conditions of crop planting and organic product processing, but without relevant product quality standard. The production of organic tobacco should refer to relevant national standards, draw on experience of quality standards of other organic products, and start with construction of organic tobacco production base, to have a systematic research of tobacco production technology, explore the formulation of relevant standards and production procedures, and establish production base and assessment system for organic tobacco[12].

**3.2.2** Establish technical system for production of organic tobacco. Firstly, it is required to introduce the concept of low carbon circular economy, research technical system for standardized production of organic tobacco, carry out type selection test, and enhance the screening of disease-resistant and high quality product. Secondly, we should build the organic planting system. Thirdly, it is required to strengthen the research in forecast, prevention and control of tobacco disease and pest, and popularize biological and physical technologies for prevention and control of disease and pest. Fourthly, it is proposed to adopt organic fertilizer application technology and fully implement healthy cultivation. Fifthly, it is recommended to enhance innovation of production organization management model, establish one-stop performance appraisal management system and scientific contract responsibility system, and constantly improve organic tobacco production system.

**3.2.3** Establish and perfect evaluation system for management, production and supervision of organic tobacco. It is required to establish and perfect auxiliary standards and management specifications, such as *Management Methods* and *Rules for Implementation of Organic Tobacco Production*, *Technical Standard System for Production of Organic Tobacco*, *and Quality Safety and Assessment Standard for Organic Tobacco*, and to perfect management certification, production control and supervision assessment systems[17-18].

**3.2.4** Strengthen popularization of production and concept of organic tobacco. It is proposed to raise ecological, environmental protection and organic awareness of tobacco producers and managers through propagation and education. At the same time, we should enhance the training effort and energetically popularize technologies for organic tobacco production, to train a good many agricultural scientific and technological backbones and farmers. Besides, we can take typical guidance, technical assistance and production demonstration measures to heighten tobacco farmers' ability and consciousness of getting rich by science and technology, and to speed up the popularization of harmless tobacco production technologies.

**3.2.5** Improve management of organic tobacco purchase, industry commerce handover, and redrying. Compared with traditional tobacco, the production of organic tobacco is more time-consuming. Especially, it increases the labor intensity in disease and pest prevention and control and restrain-germinating. Therefore, to ensure that tobacco farmers plant in accordance with proper standard, we must raise the purchase price of organic tobacco. In addition, we should standardize the management of classification, industry and commerce handover and redrying of organic tobacco. There are at least three types in development of organic cigarettes. The first is organic cigarette: this product uses 100% certified organic tobacco as raw material with proper additive to form specific feature of cigarette products. The second is ecological cigarette: this product uses common tobacco as raw material and its formula is totally free of any additive. Organic ecological cigarette: this product uses 100% certified organic tobacco as raw material and its formula is completely free of any additive. Different cigarettes have different requirements for tobacco raw materials, so it is required to select in accordance with raw material requirements, packaging design and style of each type of cigarette[13-15].

## 4 Conclusions

Organic tobacco is one of the innovation directions for sustainable, healthy, environmental protection and low carbon development of modern tobacco industry, and will certainly win great popularity among consumers. However, since the organic tobacco production features high labor intensity and high technical requirements for production environment and technology, and there are certain natural, social and economic risks, we must combine local realities from a long-term and high quality view point. We may develop organic tobacco at proper time in proper area, to constantly deepen and flexibly apply ideas of organic agriculture. Also, we should solve key technological problems in organic tobacco production and accumulate operation and management experience, so as to make better plan and guide production, sales and utilization of organic tobacco, and to ensure healthy and harmonious development of organic tobacco.

## *References*

[1] GAO ZN. Protecting eco-environment and developing organic farming [J]. Rural Eco-Environment, 2001, 17(2): 1-4. (in Chinese).
[2] LEGUN K. Cultivating institutions: organic agriculture and integrative economic choice[J]. Society & Natural Resources, 2011(24): 455-468.
[3] RAYNOLDS LT. The globalization of organic agro-food networks[J]. World Development, 2004, 32(5): 725-743.
[4] TIAN CY. Investigate on factor endowment and mode of development of organic agriculture[J]. Contemporary Eco-Agriculture, 2010(S1): 128-130. (in Chinese).
[5] WU B. Development present situation and countermeasures of organic agriculture[J]. Oriental Enterprise Culture, 2010(4): 67-68. (in Chinese).
[6] ZOU CY. Low carbon agricultural economy development analysis[J]. Industrial economy, 2011(2): 146. (in Chinese).
[7] XIE XB. To develop Green leaf tobacco production, to promote the sustainable and healthy development of tobacco industry[J]. Agriculture & Technology, 2004, 24(4): 47-48. (in Chinese).
[8] WANG YT, CHENG DF. Green is the guarantee of human life and the survival-pollution-free tobacco leaf production technology[J]. Science & Technology Progress and Policy, 2002, 6: 178-179. (in Chinese).
[9] WANG YT, CHENG DF. On production technology of environmental pollution-free tobacco[J]. Tobacco Science & Technology, 2001 (12): 3-5. (in Chinese).

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Smooth completion of resettlement is a precondition of smooth implementation of the project. Resettlement needs cooperation of relevant departments. For example, if the construction of resettlement residential areas lags behind, it will directly lead to interruption of resettlement works, and the progress of project will be severely affected. Therefore, it is required to enhance the communication and coordination with relevant planning department, timely find out the implementation of plan, and promptly adjust resettlement measures, to ensure smooth completion of resettlement.

## *References*

[1] HE CL. World bank policy on involuntary relocation and how to prepare resettlement plannings[J]. Hunan Hydro & Power, 2004(5): 52 –54. (in Chinese).
[2] SHI JH. Study on appraisal procedure and index system of sustainable development of resettlement areas of ecological migration based on the model of pressure – state – response[J]. Northwest Population Journal, 2010(4): 31 –35. (in Chinese).
[3] SUO DZ. Studay about ecological migration of Sanjiangyuan area and harmony development of urbanization[J]. Journal of Qinghai Normal University: Philosophy and Social Science Edition, 2009(2): 6 –9. (in Chinese).
[4] ZHAO HL, CHEN XW, JIANG Y, Eco – industrial development model migrants follow – up study: national nature reserve as an example to Sanjiangyuan[J]. Ecological Economy, 2009(7): 105 –108. (in Chinese).
[5] ZHOU AG, YUAN LY. Scientific work to build the mechanism of China's rural land acquisition[J]. Truth Seeking, 2008(1): 92 –94. (in Chinese).
[6] TAN XL. Status of land acquisition and the reasons of conflicts—taking Guangzhou city as an example[J]. Economic Research Guide, 2010(6): 58 –59. (in Chinese).
[7] ZHOU J, SHI GQ, LI JY. Public participation in the land acquisition and house demolition for urban development—setting an airport expansion project as an example[J]. Technoeconomics & Management Research, 2010(1): 73 –76. (in Chinese).
[8] WANG F, ZHAO LY. Survey on the land acquisition demolition resident satisfaction in China[J]. Anhui Agricul Tural Sciences, 2010, 38(2): 584 –587. (in Chinese).

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[10] GUO YQ, ZHANG GX, MA JX, *et al*. Organic tobacco production [J]. Southwest China Journal of Agricultural Sciences, 2009, 22(6): 1793 –1798. (in Chinese).
[11] ZHU HJ. The present situation and development tendency of organic tobacco research[J]. Anhui Agricultural Science Bulletin, 2009, 15(3): 128 –183. (in Chinese).
[12] MA JX, WANG HY, CHANG J, *et al*. Preliminary studies on evaluation of environmental condition for organic tobacco production[J]. 2008, 21(5): 1256 –1261. (in Chinese).
[13] MA K, YANG H, WANG YP, *et al*. Research progress and prospect on organic ecological tobacco[J]. Guizhou Agricultural Sciences, 2011, 39(1): 69 –72. (in Chinese).
[14] YANG JM, WANG YP. Guizhou organic ecological quality of tobacco leaves research report[J]. Culture with Planting, 2010(2): 19 –21. (in Chinese).
[15] LONG W, TIAN JS, XU XQ, *et al*. Brief discussion of organic tobacco production bases construction and technique system[J]. Tianjin Agricultural Sciences, 2010, 16(6): 48 –51. (in Chinese).
[16] LIU X, MENG FX, GUO L, *et al*. Technological systems for organic agriculture in advanced countries and their inspiration on us[J]. World Agriculture, 2006(4): 16 –17. (in Chinese).
[17] LI YQ, WANG FL, GONG DX. Problems, advantages, and countermeasures of pollution – free tobacco production in China[J]. Chinese Tobacco Science, 2009, 30(3): 54 –57. (in Chinese).
[18] HAN HD, LIN YH, LIU MX. Study about the exchange and development between Fujian and Taiwan about organic agriculture in the background of low – carbon agriculture[J]. Chinese Agricultural Science Bulletin, 2011, 27(2): 452 –457. (in Chinese).