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Personnel Cultivation Program for Innovative and Entrepreneurial Biopharmaceutical Discipline under the Credit System

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Abstract Biopharmaceutical discipline is an interdisciplinary subject with strong comprehensiveness and wide coverage. Under the background of credit system, it is an important task for application-oriented undergraduate colleges and universities to optimize the cultivation program for innovative and entrepreneurial bio-pharmaceutical professionals. According to the characteristics of biopharmaceutical discipline, Binzhou University biopharmaceutical teaching and research office, based on the social demand for biopharmaceutical discipline talents, defined the principle of optimizing the cultivation of innovative and entrepreneurial biopharmaceutical discipline talents, and constructed the cultivation program of innovative and entrepreneurial biopharmaceutical discipline talents under the credit system. The development of this cultivation program is expected to build a new mode for cultivating high-level biopharmaceutical professionals with strong innovative spirit and entrepreneurial potential.

Key words Credit system, Innovation and entrepreneurship education, Biopharmaceutical discipline, Personnel cultivation program

1 Introduction

Currently, with the rapid development of biopharmaceutical industry, it has become the most important aspect in the field of biotechnology application, and biopharmaceutical industry has been recognized as one of the most promising industries in the 21st century. *Made in China 2025* pushes forward biopharmaceutical and strategic emerging enterprises^[1]. Rapid development of biopharmaceutical industry requires a large number of high-quality professionals, so it is particularly important to cultivate high-quality biopharmaceutical professionals at present. "Meritorious is the only way to success, and the cause of business is board." Innovation and entrepreneurship into professional education is an important part of the cultivation of higher talents in the construction of an innovative country in China. The essence of innovation entrepreneurship is a kind of educational system and practice, which is oriented to the society and the market economy^[2]. *Basic Requirements for Entrepreneurship Educational in Ordinary Undergraduate School (for Trial Implementation)* issued by the Ministry of Education in 2012 clearly pointed out that carrying out entrepreneurship education in ordinary institutions of higher learning is to serve the country to accelerate the transformation of the model of economic development. The strategic measures to build an innovative

and powerful country in human resources were an important ways to deepen the reform of higher education, improve the quality of personnel cultivation and promote the all-round development of college students. It was also an important way to implement innovation to promote employment, and important measures to promote full employment of higher graduates^[3]. On May 13, 2015, the General Office of the State Council issued *The Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in College and Universities*, which clearly pointed out that deepening the reform of innovation and entrepreneurship education in institutions of higher learning was a strategy that drives the development of innovation and the urgent need to promote the promotion of economic efficiency was an important measures to promote the comprehensive reform of higher education and to promote the employment of graduates with higher quality^[4]. On April 8, 2017, in Tianjin University, the Ministry of Education held the "Innovation, Entrepreneurship" construction action line ("Tianda Action"), and clearly pointed out that cultivation system of new engineering talents "Innovation, Entrepreneurship" should be perfected^[5]. It can be seen that how to ensure the effective integration of innovation and entrepreneurship education with the cultivation of new engineering talents has risen to the nation level.

The credit system is a major reform of the traditional education and teaching model in order to meet the needs of the economic and social development for the diversification of talents and the development of student's personality. It is of great significance to carry out the research on the optimization of the professional cultivation program of application-oriented universities under the credit system^[6]. Colleges and universities introduce innovative entrepreneurship education into the major construction of "New Engineering" so as to improve the personnel cultivation system of "New Engineering"^[7]. To this end, we take biomedical and pharmaceutical interdisciplinary

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resources as the foundation, with an emphasis on curriculum reform and the reform of the personnel cultivation program, with the development of credit system in the professional cultivation mode, innovation and entrepreneurial personnel cultivation mechanism for guidance, in order to cultivate new drugs research and development, achievements transformation and start-up, operation and management of high-end talent as the goal, will integrate innovation entrepreneurship education idea into biological pharmaceutical undergraduate professional personnel cultivation program, merge in professional courses and professional practice teaching, strengthen the professional education and creative contents in the new system, efforts to improve biological pharmaceutical professional undergraduate course the practice innovation ability of students, the employment competition ability and sustainable development potential.

In 2016, the Ministry of Education approved Binzhou University to establish a biopharmaceutical undergraduate major and began to recruit students nationwide in 2017. As teachers of biopharmaceutical discipline of Binzhou University, Sun Chunlong and other teachers of this discipline actively explore the innovation and entrepreneurial personnel cultivation program under the credit system, and integrate innovative entrepreneurship education into the goal of personnel cultivation of biopharmaceutical discipline. A series of studies have been carried out on the specifications and curriculum system.

2 Principles of innovative entrepreneurship education under credit system and cultivation program for biopharmaceutical professionals

According to the *National Standard of Undergraduate Teaching Quality for Pharmacy Major*, the *List an Introductions of Higher Learning* (2012 edition), and the *Basic Requirements of Entrepreneurship Education in Ordinary Undergraduate Schools (for Trial Implementation)*, the *Practical Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in Colleges and Universities*, the *Construction Action Line of the "New Engineering"*, *Regulations on The Management of Credit System in Colleges and Universities in Shandong Province* and other document requirements, in the light of the *Drug Administration Law and its Implementation Methods*, and the *Major Project Practice Plan for The Conversion of New And Old Kinetic Energy in Shandong Province*, the *Development Plan of the High-efficiency Ecological Economic Zone of The Yellow River Delta* and other spirit of relevant laws, regulations and documents, to conform to the trend of innovation and entrepreneurship education into the reform of higher education, and to meet the needs of the regional school-running orientation and development of Binzhou University, take the market talent demand as the guidance, take the innovation start-up type talent as the goal, set up the professional construction standard, highlight the regional characteristic of running a school; optimize the credit system curriculum system, integrate the innovative and entrepreneurial educative and entrepreneurial education into the teaching content and practice teaching content, and construct the cultivation system for the biopharmaceutical professionals adapted

to the economic and social development of the Yellow River delta.

2.1 Meeting the social demands Guided by social needs, adapting to the biopharmaceutical industry, facing the high-efficiency ecological zone of the Yellow River delta, facing on strengthening exchanges and cooperation with the biopharmaceutical, biotechnology, pharmaceutical industry and other industries, enterprises and scientific research industries should strengthen the school-running model of synergetic education. The determination of the cultivation program of biopharmaceutical, the design of curriculum system and the implementation of out-of-class teaching reflect the requirement that innovation and entrepreneurship education be incorporated into personnel cultivation.

2.2 Adapting to the aptitude It highlights the cultivation of students taking strengthening teaching as main body, and promotes the infiltration of liberal arts and science, the combination of science and technology, and the interdisciplinary integration of students' knowledge structure through the credit system education of students' self-design and interdisciplinary course selection. To cultivate the comprehensive, coordinated and personalized development of students. Innovation and entrepreneurship education and professional knowledge imparting, ability cultivation, quality improvement organic integration in the whole process of personnel cultivation; strengthening individualized teaching and individualized discovery teaching, and optimizing personnel cultivation model in combination with the characteristics of biopharmaceutical discipline will create conditions for the improvement of students' innovation and entrepreneurship ability and promote the improvement of student's comprehensive quality.

2.3 Improving the innovation and entrepreneurship ability It pays attention to students' professional knowledge and skill, and their innovation and entrepreneurship ability. Besides, it is required to insist on the combination of in-class and after-class, practice innovation and entrepreneurship and professional practice education integration of practical education model, actively promote the school and enterprise, scientific research department and other departments of the joint cultivation, promote students practical ability and practical innovation and entrepreneurship ability and practical innovation and entrepreneurship ability to improve.

2.4 Highlighting the professional features Located in the ecological zone of the Yellow River delta, Binzhou University is positioned as a high-level application-oriented university. With the help of the major project of the conversion of old and new driving forces in Shandong province, Binzhou University aims to create a characteristic personnel cultivation model for the biopharmaceutical discipline in the region, so as to provide innovative and entrepreneurial professionals for the economic and social development of the Yellow River delta.

3 Cultivation objectives and specifications of biopharmaceutical professionals under credit system

3.1 Train objective According to the requirements of the ministry of education for the cultivation of innovative and entrepre-

neurial talents and the positioning of the cultivation of talents in our school, and in combination with the industrial and regional economic and social needs, the cultivation objectives of biopharmaceutical is determined; this professional orient to biological pharmaceutical industry and regional economic and social development, cultivation of the overall development, such as solid grasp of basic knowledge of biological pharmaceutical related, with the integrated use of Biotechnology, Pharmaceutical Technology and Engineering and other professional technology, have entrepreneur-

ial spirit and innovation ability, can in the field of biopharmaceutical and its related, engage in engineering design, production technology and quality management and service work, such as applied senior specialized talents of science and technology.

3.2 Cultivation specifications The cultivation standard of biopharmaceutical discipline in Binzhou University is based on the cultivation target of professional talents, and it is the requirement to be reached in the process of cultivation. This major graduates should meet the listed specifications and requirements in Table 1.

Table 1 Cultivation specifications and requirements for biopharmaceutical discipline

Classification	Specifications	Requirements
Knowledge	Knowledge of natural science	Master basic theories and knowledge of advanced mathematics, General biology, University physics, Chemistry and other aspects
	Humanities and social sciences knowledge	Have certain basic knowledge of humanities and social sciences and basic knowledge of Max's theory
	Professional knowledge	(i) Master the basic theoretical knowledge of biopharmaceutical; (ii) master the basic theory and knowledge of Organic chemistry, Microbiology, General biology and other basic courses; (iii) systematically master the basic principles and methods of biotechnology and pharmaceutical course; (iv) familiar with biological pharmaceutical production process, quality control and related policies and regulations; (v) understand the frontiers and trends of the biopharmaceutical discipline
	Instrument knowledge	(i) Be familiar with basic knowledge of English and related knowledge of biopharmaceutical major; (ii) familiar with the basic knowledge of computer application, have the relevant knowledge of statistics; (iii) master the basic knowledge of professional literature and data retrieval, information processing and scientific and technological writing
	Other relevant scientific knowledge	understand national policies, laws, regulations and regulations on biopharmaceutical production technology, safety management and so on
Capability	Basic capacity	(i) Have scientific and technological information acquisition and self-study ability; strong ability to acquire scientific and technological knowledge, good self-learning habits and abilities; (ii) speech expression and communication ability; good language communications skills
	Core capacity	(i) Have the ability of comprehensive use of professional and practical methods, the basic ability to solve the problems in biopharmaceutical production; professional knowledge and engineering technology in comprehensive application of pharmaceutical chemical principles, Biotechnology pharmaceuticals, Biopharmaceutical analysis, Pharmacology, Biopharmaceutical technology, Biopharmaceutical technology, Pharmaceutical equipment and engineering design. Basic ability to solve practical problems of biopharmaceutical; have the ability to produce, detect and popularize biopharmaceuticals by using the knowledge and skills of biotechnology pharmaceutical theory; (ii) basic ability of biopharmaceutical process design and management; have the ability and technology to consult the date, search the literature, analyze the biology statistics, deal with the biological information, have the ability to track the frontiers of the development of this subject and participate in the production process design; ability to establish appropriate management system, organization, management, coordination, implementation of tasks, improve product quality and production efficiency according to production practice
	Innovation entrepreneurship ability	(i) Have a strong ability to innovate and start a business, and have the ability to design a product using theory and method technology in a comprehensive way; (ii) have good entrepreneurial spirit and ability, be good at team division and cooperation, accomplish the goal together, have certain social activity and innovative entrepreneurial foundation
Quality	Political quality requirements	Have a firm political stand, love the motherland, support the leadership of the communist party of China, firmly establish and consciously practice the scientific outlook on development adapted to China's development
	Personality requirements	Have a correct word outlook, outlook on life and values, with a healthy physical quality, good psychological quality, sound personality and social responsibility.
	Innovation and entrepreneurship quality requirements	Get trained in innovation and entrepreneurship, have a strong sense of innovation and entrepreneurship, good quality of innovation and entrepreneurship, self-confidence, self-improvement, independent innovation and entrepreneurship and ability

4 Integrating the innovation and entrepreneurship education into the curriculum system of biopharmaceutical discipline

4.1 Course category According to the main task of the teach-

ing of biopharmaceutical, it is of great significance to research and correctly classify the courses of this major to ensure the integrity and systematicness of all the teaching work and improve the teaching quality. This discipline is specifically divided into general edu-

cation platform courses, accounting for 30.3% of the total credits. Platform courses for discipline basic educational education platform courses account for 25.5% of the total credits, innovation and entrepreneurship education and quality development platform courses account for 6.6% of the credits, practical teaching platform courses account for 14.8% of the total credits, and the five major platform courses can be compulsory and elective courses respectively.

Table 2 Curriculum category and structure scale

Curriculum category	Period		Credit				
	In-class time	Class hour	Theoretical credit	Practical credit	Practice credit	Total credit	Percentage of total credit//%
General education platform curriculum	Required	400	272	27	11	38	23.0
	Take as an elective course	192	0	12	0	12	7.3
Discipline basic education platform curriculum	Required	408	128	25.5	4	29.5	17.9
	Take as an elective course	112	32	7	1	8	4.8
Professional education curriculum	Required	336	128	21	4.5	25.5	15.5
	Restrict selection	128	16	8	0.5	8.5	5.2
	Optional	128	0	8	0	8	4.8
Innovation and entrepreneurship education and quality development platform curriculum	Required	24	24	1.5	1.5	3	1.8
	Take as an elective course	8	24	0.5	7.5	8	4.8
Concentration practice teaching link	Required	—	—	—	20.5	20.5	12.4
	Take as an elective course	—	—	—	4	4	2.4
Total		1 736	624	110.5	54.5	165	100.0
Credit percentage//%		—	—	67.0	33.0	—	100.0

4.2.1 General education platform courses. The platform consists of compulsory courses and elective course. General compulsory courses mainly include: ideological and moral cultivation and basic law courses, essentials of Chinese modern history, Basic principle of Marxism, an introduction to Mao Zedong thought and the theoretical system of socialism with Chinese characteristics, Comprehensive practice of ideological and political theory, Situation and policy, College English, College Chinese, College sports, Military theory, The university of IT and other general compulsory courses is 38 credits, accounting for 23.0% of the total credits. General elective courses include: Humanities and arts, Philosophy and history, Economic and legal, Social inquiry and critical thinking, Science and technology, Innovation and entrepreneurship six courses templates. Among them, there are at least two credits of aesthetic education in humanities and art, and at least two credits of innovation and entrepreneurship, which means that three are at least 12 credits in total, accounting for 7.3% of the total credits.

4.2.2 Platform courses for discipline basic education. This platform course is composed of compulsory courses and elective courses. The key course of the basic discipline platform are set to intersect Mathematics, Physics, Chemistry, Biology and other discipline, so as to provide solid basic knowledge for students to learn professional courses. Since the biopharmaceutical discipline is a special discipline in the *Undergraduate Major Catalogue of General Institutions of Higher Learning* published in 2012, there is no clear professional course setting in the catalogue, so the courses of this platform mainly refer to the curriculum setting of Biotechnology,

4.2 Curriculum structure system The curriculum structure is mainly composed of general education platform curriculum, discipline basic education platform curriculum, professional education curriculum, innovation and entrepreneurship education and quality development platform curriculum, practice teaching platform curriculum (Table 2).

Pharmaceutical engineering and pharmacy majors in the catalogue. This platform mainly includes compulsory courses: Freshman seminar, Higher mathematics, Inorganic and analytical chemistry, General biology, Organic chemistry, Engineering drawing, Microbiology, Biochemistry; elective courses includes: University physics, Physical and chemical. Among them, 29.5 credits are compulsory subject courses, accounting for 17.9% of the total credits, and 8 credits are minimum elective courses, accounting for 4.8% of the total credits.

4.2.3 Professional education curriculum. The platform consist of compulsory course and elective course. Since the biopharmaceutical discipline is a special discipline in the *Undergraduate Major Catalogue of General Institutions of Higher Learning* published in 2012, there is no clear professional course setting in the curriculum setting of biotechnology, pharmaceutical engineering and pharmacy majors in the catalogue. Compulsory courses mainly include: Principles of pharmaceutical and chemical and Chemical engineering (Experiment), Biotechnology pharmacy (Experiment), Biopharmaceutical analysis (Experiment), Pharmacology (Experiment), Pharmaceutical equipment and engineering design (Experiment). Elective courses are divided into two parts: Limited selective courses are divided into two parts: limited selection and optional selection. Restricted courses include: Biostatistics, English for biopharmaceutical discipline, Modern instrumental analysis, Drug production quality control, Drug administration and regulation, for students to choose according to interest and career planning. Optional courses reflect the interdisciplinary and professional

intersections mainly including: Physiology, Scientific literature retrieval and thesis writing, Immunology, Genetics, Molecular biology, Gene engineering, Enzyme engineering, Fermentation engineering, Natural pharmaceutical chemistry, Pharmaceutical enterprise management, Drug marketing, Safety production knowledge; the total number of required professional courses is 25.5 credits, accounting for 15.5% total credits. The minimum elective credits are 8.5 for the limited courses, 8 for the optional courses, and 16.5 for the optional courses, accounting for 10.0% of the total credits.

4.2.4 Innovation and entrepreneurship education and quality development platform courses. The platform consists of compulsory courses and elective courses. Among them, compulsory course include specialized innovation and entrepreneurship education courses, which are composed of three courses: Career planning for college students, Innovation and entrepreneurship guidance for college students, and Employment guidance for college students. Elective courses include professional innovation and entrepreneurship education and innovation and entrepreneurship cultivation and quality development series of courses, mainly composed of Biopharmaceutical development and utilization, Biological products development and utilization, Entrepreneurship practice, Participation in discipline competition, Teaching assistant research assistance management, Social practice and series of theoretical and practical cultivation courses. The above compulsory and elective courses are designed to cultivate student's innovation and entrepreneurship spirit, improve their innovation and entrepreneurship ability, and improve their innovation and entrepreneurship ability, and improve their comprehensive quality according to their individual characteristics.

4.2.5 Practice teaching platform curriculum. This platform course is composed of three parts: basic practice course, professional practice course and comprehensive practice course, it runs through the whole process of the cultivation of biopharmaceutical professionals. Basic practice consists of Military and political cultivation, Entrance education labor and Graduation education; professional practice consists of Cognition practice, Metal working practice, Production practice, Professional practice, Metalworking practice, Comprehensive practice consists of five parts: Biological pharmaceutical course design, Microbial fermentation pharmaceutical course design, Professional comprehensive course, and Graduation design. This platform focuses on cultivation students' professional practical ability, as well as promoting students' understanding of discipline basic courses and professional courses, and improving students' comprehensive quality level 20.5 credits are required for intensive practice, accounting for 12.4% of the total credits; 4 credits for elective courses, accounting for 2.4%.

5 Degree and graduation requirements of biopharmaceutical discipline under credit system

According to the *Credit System Management Regulations of Ordinary*

ry Institutions of Higher Learning in Shandong Province, the major of biopharmaceutical adopts the basic credit system. The basic length of school is four years and the length of schooling may vary depending on the students' circumstances. The minimum is three years and the maximum is not more than eight years. The degree of bachelor of engineering is awarded. Students of this major are required to pass the ideological and political examination upon graduation, and complete the minimum credits within the specified time. The structure of the credits obtained meets the requirements of the university, and pass the graduation project (thesis) defense, and does not violate the relevant regulations of school roll management. After completing the courses and teaching links stipulated in the cultivation program, students will obtain the minimum 165 credits required for graduation, 110.5 credits for mid-term theoretical teaching and 54.5 credits for practical teaching. Among the credits, 38 credits are required for general education and 12 credits are optional for general education; compulsory course of discipline foundation 29.5 credits, elective course of discipline foundation 8 credits; 25.5 credits of compulsory courses and 16.5 credits of elective courses; 11 credits of innovation and entrepreneurship education and quality development courses, and 24.5 credits of concentration practice teaching link.

6 Characteristics of innovation and entrepreneurship integrated into professional cultivation programs under the credits system

(i) The educational concept of cultivating application-oriented senior professionals with innovation and entrepreneurship awareness and ability should be established, and innovation and entrepreneurship education should be integrated into the personnel cultivation system. According to the *Undergraduate Major Catalogue and Major Introduction of Colleges and Universities (2012)*, *Opinions to Deepening the Reform of Innovations and Entrepreneurship Education in Institutions of Higher Learning*, *Administrative Regulations on Credit System of Ordinary Institutions of Higher Learning in Shandong Province* and Binzhou University personnel cultivation orientation, the structure of students' knowledge and ability as well as the innovation and entrepreneurship environment where the school is located, make every effort to popularize entrepreneurship knowledge, cultivate innovation spirit, entrepreneurship consciousness and practical ability as the main goals of our school's education and teaching, and establish the common and individual goals of innovation and entrepreneurship talent, and establish a personnel cultivation system that integrates professional cultivation and innovation and entrepreneurship education, knowledge imparting and ability cultivation, and teaching and scientific research and production.

(ii) It is required to strengthen the establishment of a curriculum system for innovation and entrepreneurship education. Innovation and entrepreneurship education will always run through the process of personnel cultivation, innovation and entrepreneurship

education into the general courses, science and technology course and innovation and entrepreneurship course in the general elective course; strengthen students' organic connection in the teaching of compulsory and elective course, for example, the design courses of biotechnology pharmacy and the design courses of microbial fermentation pharmacy are designed for the professional core courses; set up professional courses related to innovation and entrepreneurship, for example, career planning for college students, college students innovation and entrepreneurship and guidance, development and utilization of biological products and development and utilization of biological drugs and other professional courses.

(iii) It is required to set up the innovation and entrepreneurship education model of "Theoretical Education – interdisciplinary-skill cultivation – time cultivation". We should give priority to theories, actively explore practical approaches to innovation and entrepreneurship, improve the credit ratio of courses on the platform for innovation and entrepreneurship education and quality development, increase the credit ratio of cross integration course, reflect the interdisciplinary penetration of biology, pharmacy and engineering technology, and realize the integration of knowledge. Innovation entrepreneurship education and quality development platform courses is mainly composed of various selected teachers, teachers guide students' innovative entrepreneurial practice mainly by the school career guidance teachers and external enterprises experts, to learn, successful entrepreneurs and senior engineer and other teachers, for the students' practical skills cultivation and exercise the most direct guidance teachers and education model.

(iv) It is required to carry out innovation and entrepreneurship education practice and cultivation base construction. In order to improve students' innovative and entrepreneurial skills and cultivate healthy innovative and entrepreneurial minds, this discipline mainly establishes entrepreneurship education cultivation room, entrepreneurship education practice room and entrepreneurship education electronic simulation cultivation room is practical course education; signed cultivation base agreement with Binzhou biopharmaceutical enterprises, we will establish innovation and entrepreneurship education bases, cultivation and internship bases and production, teaching and research base; it helps students syntactically learn entrepreneurial spirit and quality, understand entrepreneurial process and model, master entrepreneurial methods and steps, and improve their awareness of self-employment and success rate of entrepreneurship.

7 Conclusions

(From page 95)

- [12] HE JY, REN YF, ZHU C, *et al.* Effects of cadmium stress on seed germination, seedling growth, and amylase activities in rice[J]. Chinese Journal of Rice Science, 2008, 22(4): 399–404. (in Chinese).
- [13] SEREGIN IV, IVANOV VB. Physiological aspects of cadmium and lead

With the demand of social and economic transformation and upgrading for personnel cultivation in China, as well as the need to adjust and improve the structure and system of higher education in China, the transformation and development of undergraduate colleges and universities has become an inevitable trend of higher education reform, the core of the transformation and economic and social needs and the diversification of students' individual needs require a diversified personnel cultivation model. Personnel cultivation is a systematic work, involving the target positioning, professional construction, course system, operation mechanism and so on many factors, according to the system theory point of view, in view of the present undergraduate course colleges and universities under the background of credit system, innovation entrepreneurship education into the professional can't keep pace with the times, personnel cultivation model reform is not complete, innovative entrepreneurial practice teaching of the course construction and reform the problem such as slow progress, combined with the needs of transformation and development, it is recommended to explore and integrate the cultivation model of innovation and entrepreneurship education into biopharmaceutical discipline, which has important theoretical and practical significance for promoting the development of personnel cultivation.

References

- [1] State Council. Made in China 2025 strategy[EB/OL]. <http://www.gov.cn/zhuanti/2016/MadeinChina2025-plan/mobile.htm>, 2015-05-19.
- [2] LUO Y. Problem analysis and countermeasure research of innovation and entrepreneurship education reform in local college and universities[J]. Journal of Yellow River University of Science and Technology, 2017, 19(3): 101–105
- [3] Ministry of Education. Basic requirements for entrepreneurship education and teaching in ordinary undergraduate schools[EB/OL]. <http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s5672/201208/140455.html>, 2012-08-01.
- [4] General Office of the State Council. Opinions on deepening the reform of innovation and entrepreneurship education in institutions of higher learning[EB/OL]. http://www.gov.cn/xinwen/2015-05/13/content_2861327.htm, 2015-05-13.
- [5] Higher Education Division. "New engineering" construction action line[EB/OL]. http://www.moe.gov.cn/s78/A08/moe_745/201704/t20170412_302427.html, 2017-04-08.
- [6] WU T, YAO ZG. Study on the optimization of college food quality and safety major training program under the credit system[J]. Food Industry, 2018, 39(8): 277–281.
- [7] XIAO RH. The construction of "three innovations" education system for college students under the background of new engineering construction[J]. Exploration of Higher Vocational Education, 2018(6): 44–47.

toxic effects on higher plants[J]. Russian Journal of Plant Physiology, 2001, 48(4): 523–544.

- [14] JIANG XY, ZHAO KF. Mechanism of heavy metal injury and resistance of plants[J]. Chinese Journal of Applied and Environmental Biology, 2001, 22(7): 92–99. (in Chinese).