

Research On The Cultivation Of Pharmaceutical Engineering Professionals

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ABSTRACT. *Pharmaceutical engineering is a new major, which can adapt to a wide range of social demand, broad prospects. as a result, many colleges and universities continue to offer this major. however, how to train pharmaceutical engineering professionals to meet the needs of social development and keep pace with the times is an urgent problem to be solved in colleges and universities. this article has carried on the statistics to the part university which has the pharmacy engineering specialty and has carried on the discussion to the pharmacy engineering undergraduate course talent training target orientation, the guidance multi-quality view, the teaching mode, the practice ability training and so on.*

KEYWORDS: *Pharmaceutical engineering major, Training mode, Undergraduate education, Professionals*

1. Introduction

China's pharmaceutical industry started late and developed rapidly. How to narrow the gap with the world's advanced enterprises as soon as possible, adapt to intensive production to improve the product in the global market competition, China's pharmaceutical industry is facing an urgent problem. Therefore, the Ministry of Education adjusted the catalogue of higher education majors in 1998, among which the pharmacy engineering major was added. Pharmaceutical engineering is a major that integrates chemistry, life science, pharmacy, engineering and related management regulations. In higher education, it is a wide - caliber major with strong adaptability and wide coverage. How to do a good job in this major, to cultivate the talents with excellent comprehensive quality and solid professional foundation, wide knowledge fields, and with a pioneering spirit and innovation ability, this to our country science and technology, economic and social development, and effectively is vital to participate in international competition, but also of pharmaceutical engineering specialty in our country the general teachers and students to put forward a new challenge. Therefore, colleges and universities should stick to the local basis, rely on the local and serve the local according to their own different school-running policies, which is not only the basic of the school-running positioning of local colleges and universities, but also the objective requirement of local economic development. Therefore, studying the training mode of pharmaceutical engineering talents and discussing the optimization of the training mode of pharmaceutical engineering talents can develop the pharmaceutical engineering specialty and thus promote the development of China's pharmaceutical industry.

2. Research on Training Objectives of Pharmaceutical Engineering Professionals

Pharmaceutical Engineering is an integrated major after the adjustment of undergraduate major in the Ministry of Education in 1998. It is an engineering and technical discipline that applies chemistry, biotechnology, pharmacy, engineering, management and related scientific theories and technical means to solve drug r&d and manufacturing, with strong engineering and technical characteristics [2]. Engineering problems are the final problems faced by students of this major, which mainly involve engineering problems such as drug manufacturing, separation, preparation, process control and quality management regulations. Therefore, the talent training scheme and training mode should be formulated from the perspective of engineering technology. The teaching system should pay more attention to the cultivation of students' engineering technical ability, strengthen students' practical training of engineering practice, and emphasize the cultivation of innovation ability and entrepreneurial ability.

Therefore, the training objectives of pharmaceutical engineering professionals should be: to master the basic theory, basic knowledge and basic skills necessary for chemistry, pharmacy and pharmaceutical engineering systematically; Have the ability to study the chemical drug production process, production process and quality

control; Basic ability of new drug research and development; Solid knowledge of pharmaceutical engineering design; Ability to research and solve practical problems in pharmaceutical engineering. To train senior engineering and technical personnel in drug production, new drug development, pharmaceutical engineering design and management for chemical pharmaceutical factories, pharmaceutical preparation plants, pharmaceutical research units, pharmaceutical commercial enterprises and administrative departments of medicine and health at all levels.

3. Research on the Training Orientation of Pharmaceutical Engineering Professionals in China

Different types of talents are cultivated by different types of schools: for academic research talents, they are mainly cultivated by first-class universities and graduate schools; For engineering research - oriented and technical practice - oriented talents, mainly trained by undergraduate colleges. China belongs to medical colleges and universities, and the focus of training talents should be the engineering applied talents who master medical knowledge, namely the two types of technical practice and technical practice, or in between. China's positioning is based on the regional economy, facing the province and the whole country, the service area is relatively clear. In personnel training and professional direction, therefore, should give full consideration to the regional economy more demand for talent training, timely understanding of regional economic development trend, timely according to the regional economic development to set up the professional, professional direction, adjusting the training objectives, curriculum system and teaching content, in order to better serve the regional economy, but also can at the same time of constantly to meet the market demand, get faster development and improve itself. Starting from this orientation, the orientation of pharmaceutical engineering cultivation in China should be closely centered on the theme of "engineering application".

4. Research on the Training Mode of Pharmaceutical Engineering Professionals

At present, the domestic school that opens pharmaceutical engineering major is more. However, in general, the pharmaceutical engineering major offered by medical colleges and universities is partial to science, and traditional Chinese medicine and Western medicine are separated. Pharmaceutical engineering majors offered by comprehensive universities tend to be engineering majors, which are difficult to integrate with pharmacy [3]. At present, the rapid development of school scale of pharmaceutical engineering is inseparable from the rapid development of the pharmaceutical industry. However, as drugs are special commodities, the establishment and expansion of pharmaceutical enterprises are subject to certain restrictions, and it is impossible to expand indefinitely. At the same time, the pharmaceutical industry is a high-tech industry, not labor-intensive enterprises, so the demand for technical personnel and operation workers is not great, but the quality requirements for talents are relatively high. This suggests that there are various modes in the cultivation of pharmaceutical engineering talents, namely, application-oriented undergraduate education, research-based postgraduate continuous study and engineering master training. The undergraduate education mainly cultivates senior applied talents to meet the needs of modern pharmaceutical industry in the 21st century. The master of Engineering is a professional degree, which focuses on engineering application and mainly trains application-oriented and compound high-level engineering technology and engineering management talents. The main training goal of the master's degree is the same as that of the master's degree in engineering, but the training mode is different.

In order to cultivate compound talents who know both pharmacy and engineering and are good at management, and embody the characteristics of universities, it is necessary to explore the training mode of pharmaceutical engineering in China. Rationalize pharmaceutical engineering specialized courses and the organic integration of relevant major, subject, course and the similar curriculum integration, set up curriculum system adapted to professional training target, training to satisfy the needs of the pharmaceutical industry in the 21st century solid professional foundation, engineering practice and innovation ability of professional talents, the training of talents to better suit the needs of the development of the market and industry, to better serve the pharmaceutical industry in our province, can begin from the following points:

4.1 Innovate the Talent Training Mode, Reform the Teaching Plan Setting System, and Cultivate Students' Innovative Ability

Establish a new curriculum system and content, adopt modern teaching methods, make classroom teaching and practical teaching links closely combined, achieve a new system, thick foundation; New means, emphasis on practice, promote self-study. Change the traditional teacher-centered teaching mode, and gradually establish the student-centered "active" teaching mode to cultivate students' innovative consciousness and practical ability.

Through selecting, optimizing and integrating teaching content, the latest research results, development trends and academic trends in the field of medicine are introduced into the curriculum, and an innovative curriculum system is established.

4.2 Set Up Courses That Are in Line with the Training Objectives and Strengthen the Organic Integration of Professional Courses Reform

the current talent training system for pharmaceutical engineering majors and set up a curriculum system that is in line with the training objectives. The teaching plan and training plan should reflect the characteristics of traditional Chinese medicine colleges, so as to organically combine the courses of related disciplines of pharmaceutical engineering, integrate the same courses, research and explore a more reasonable and perfect professional personnel training mode, and improve the quality of professional personnel training.

4.3 Actively Explore Professional Positioning, Adapt to Market Demand, and Define Training Objectives

According to the catalogue and Introduction of Undergraduate Majors of Ordinary Institutions of Higher Learning issued by the Ministry of Education in 1998, combined with the development status of the pharmaceutical industry in Zhejiang Province, the business training requirements and goals for pharmaceutical engineering majors with obvious characteristics, clear goals, market demands and social development were formulated.

4.4 Pay Attention to the Cultivation of Professional Quality

Professional quality requirements include ideological quality, humanistic quality and professional quality. Among them, the professional quality should be embodied in systematically mastering the basic theory and knowledge of the major, receiving good basic training of engineering practice, and having the basic ability of systematic analysis, design, development and research. Pharmaceutical engineering graduates should acquire the following knowledge and abilities:

(1) Have a solid foundation in natural science, good foundation in humanities and social sciences and comprehensive foreign language skills.

(2) Master the necessary technical basic theoretical knowledge in this field, including drug synthesis, drug preparation, drug analysis, pharmaceutical technology, pharmaceutical engineering, etc.

(3) Have a good command of the knowledge of biochemistry, separation engineering and other aspects, have the professional knowledge and skills of one or more professional directions in the professional field, and understand the disciplinary frontiers and development trends of the professional field.

(4) Good engineering practice training in course design, pharmaceutical plant design, etc.

(5) Have certain scientific research, science and technology development, organization and management ability in the professional field, and have strong adaptability to work.

5. Research on Curriculum System and Teaching Content of Pharmaceutical Engineering Major

Pharmaceutical Engineering is based on pharmacy, chemistry, engineering and other disciplines [7]. The curriculum setting should not only avoid favoring one discipline, but also prevent the formation of simple superposition of various courses. At present, the curriculum of pharmaceutical engineering specialty in China is various and chaotic, with many names and no prominent key points, which is easy to be confused. On the basis of referring to the curriculum setting of "Pharmaceutical Engineering major" in different schools at home and abroad and considering the school-running characteristics of China, it is necessary to focus on the reform and setting of the curriculum system. According to the orientation of pharmaceutical engineering in China, the "knowledge structure and capacity structure framework" of pharmaceutical engineering should include three major curriculum systems: chemistry, medicine and engineering.

There are division of labor and connection among the three curriculum systems. In the teaching of medical curriculum system, through the introduction of basic medical knowledge, combined with the domestic and foreign new drug research examples, to enable students to study New drug Problems that should be paid attention to in the training of pharmaceutical engineering professionals

Universities are both professional education and higher education. It is well known that the basic function of higher education should be the transmission and innovation of knowledge of science and technology, humanities and social sciences. The undergraduate education in colleges and universities should demand the quality and character of talents in the new century, and educate students: "they can be great men and create great things ." Therefore, attention should be paid to the following issues in the culture process:

5.1 Pay Attention to the Cultivation of Students' Basic Skills and Creativity

Basic course should be the most basic and main course in undergraduate education. Therefore, from the perspective of curriculum setting, the most fundamental thing is to strengthen the teaching of basic courses. No matter any major without exception only to lay a good foundation to learn the major well. Only solid foundation, to be able to draw inferences by analogy, it is possible to have the ability to create. Otherwise, it can only be whimsical and unscientific.

5.2 Pay Attention to the Cultivation of Students' Experimental Ability

The essence of theory and experiment is the dialectical unity of the relationship between two relatively independent, interdependent and mutually promoting teaching system. Experiment is the basis of theory, the source of theory and experiment. There is no relationship between principal and subordinate between the two. Only by mastering the basic experiment can we better understand the theoretical knowledge. Similarly, only master the basic knowledge, can cultivate students' basic experimental skills. Therefore, the cultivation of students' practical ability should be strengthened at the same time of theory.

5.3 Pay Attention to Students' Factory Practice

Factory practice is another practical teaching link for students after completing professional courses such as pharmaceutical technology, equipment and workshop design. Students in person to industrial production, for them to provide practical training opportunities, so as to better achieve the combination of theory and practice. Compared with the experimental teaching in the school, the time and space of the factory internship change greatly, so in order to ensure the quality of the internship, it is necessary to have a strict assessment method. The performance assessment of the internship should adopt a comprehensive assessment to ensure the basic quality of the internship.

6. Conclusion

To sum up, this paper discusses the training mode of pharmaceutical engineering professionals. Combined with the basic functions of higher education, the course setting and training objectives of pharmaceutical engineering are discussed, and some Suggestions are put forward in combination with the characteristics of running a school in China, hoping to promote the development of pharmaceutical engineering in China!

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