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Application of Molecular Chemistry in Biochemistry and Chemistry and Biology Application of Traditional in Medicine

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ABSTRACT
The concept, origin, development and application of supramolecular chemistry are briefly introduced. This paper introduces in detail: the preparation and application of rare ginsenoside, a biological supramolecular ligand.Synthesis, properties and applications of supramolecular complexes of macrotricyclic crown ether ligands with N-Extended dipyridyl salts.The selective adsorption and separation of gas molecules by supramolecular ligand organic porous materials. The development of supramolecular chemistry is prospected.

Keywords: *supramolecular chemistry, ligands, applications*

1. INTRODUCTION

Supramolecular chemistry is a new hot frontier discipline, which is formed by the mutual penetration and integration of chemistry and biology, physics, coordination chemistry, life science, biochemistry, biophysics, materials science, information science, environmental science and energy science. The emergence and development of supramolecular chemistry promote the formation and development of the above-mentioned related disciplines. In recognition of the pioneering work of C. J. Pedersen, J. M. Lehn and D. J. cram in proposing, forming and developing the concept of supramolecular chemistry, the three chemists shared the Nobel Prize in chemistry in 1987. Supramolecular chemistry originated from Paterson's first synthesis and discovery of crown ethers in 1967 [1].The concept of supramolecular chemistry originated from Ryan, known as "the father of supramolecular chemistry", who proposed it in his speech of Nobel Prize in chemistry in 1987. "Supramolecular chemistry is the study of supramolecular systems with specific structures and special functions, which are formed by the association of two or more chemical substances through the intermolecular forces of non-covalent bonds," Ryan said. Therefore, supramolecular chemistry is a sublimation of covalent bond molecular chemistry, which is called "chemistry beyond molecular concept"[2]. Later, Cramer called it "subject object chemistry". The formation of supramolecular chemistry weakens the boundaries among the four basic chemistry, biochemistry and material chemistry, emphasizes the supramolecular system with specific structure and function, and organically integrates the four basic chemistry, thus becoming the hot subjects in the 21st century, such as molecular devices, molecular self-assembly, emerging materials science, life science, information science, environmental science, and so on The formation and development of energy science, biochemistry, medicine, nanoscience and macrochemistry have opened up a new channel. It is known as one of the important sources of new ideas, new concepts and new technologies in the

21st century. It is a sunrise science, and provides an important and new research direction for the development of Chemistry in the 21st century[3]. In addition, supramolecular chemistry also shows broad application prospects in the fields of industry, agriculture, national defense, medicine and the four modernizations[4].

1.1. Related Work

Preparation and application of rare ginsenosides as 1 biological supramolecular ligand transformation of main ginsenosides into rare ginsenosides F2 and F2 by endophytic bacteria of Platycodon grandiflorum.C-k and applied plant endophytes are a kind of microorganisms that live in healthy plant tissues and do not cause obvious infection symptoms of host plants. Medicinal plant endophytes have the function of synthesizing the same or similar active ingredients as host plants, and have broad prospects in the fields of biological control, medicine and health. Rare ginsenosides F2, c-k and Rh1 have strong pharmacological effects, such as anti-tumor, anti-cancer and anti apoptosis[5]. However, their use and clinical application are limited due to their little or no content in nature. Therefore, it is very important to transform ginsenosides into rare ginsenosides. Therefore, Cui Lei and others of Yanbian University used endophytic bacteria of Platycodon grandiflorum to screen high efficient strains for ginsenoside biotransformation, and discussed the transformation pathway of ginsenoside. They disinfected the surface of the newly collected Platycodon grandiflorum, separated it by tissue separation method and purified it by lineation method. A total of 33 endophytic bacteria were obtained[6]. Among them, strains J9, J10 and J23 had strong transformation ability to ginsenoside Rb1, Rb2, RC, RD and ginsenoside Rg1, and transformed ginsenoside F2 and C - Ginsenoside of Panaxatriol type was transformed into rare ginsenoside Rh1. The transformation pathway of monosaccharide was also discussed. During the transformation of strain J23 to Rb1, the maximum yield of F2 reached 98.71%; During the transformation of RB1 by strain J9, the maximum yield of C - < reached 57.59%. This research will have broad application prospects in biological control, biological research, biochemical research, medical and health research and life science research.

Research and application of microbial transformation of ginseng in tissue culture ginseng, known as "king of herbs", is one of the three treasures in Northeast China. It is also a precious medicinal material and health care product. It has the functions of anti-tumor, anti-cancer, anti-aging, improving memory, anti-inflammatory and liver protection, and improving immune function. Ginseng has long cultivation period, high management cost, serious disease and great damage to the environment, while tissue culture ginseng has short cultivation period and quick effect, so it is widely used. However, the content and types of ginsenosides in tissue culture are few, so how to improve the content of ginsenosides has become a research hotspot. In order to improve the content of Ginsenoside in tissue culture, song Xiaolin and others from Yanbian University carried out microbial transformation of ginseng. In other words, they isolated 243 strains from Ginseng Soil, and screened out 12 kinds of ginsenoside biotransformation strains. Their experimental results showed that the content of Ginsenoside in tissue culture was low, mainly containing ginsenoside Rd. The results showed that the content of ginsenoside increased significantly. After 13 days of fermentation, all RD in tissue culture ginseng was transformed into rare ginsenoside F2 and c-k [7]. This research will be applied in the research of life science, medicine, biological science, biological control and biochemistry.

Transformation of ginsenoside Rb1 into rare ginsenoside C by endophytic bacteria-Research and application of virtual reality. Endophytes are important microbial resources that exist in plant

tissues and do not cause infection symptoms. Studies have shown that the secretion of endophytic bacteria, like the host plant of endophytic bacteria, can enhance immunity, improve anti fatigue ability, has significant probiotic effect, and has high medical value [8]. Ginseng is a perennial herb of Araliaceae, which is a traditional and precious Chinese medicinal plant in China.

Studies have shown that ginsenoside compound K (referred to as c-k) is the metabolite of Panaxadiol type saponins in human intestine, and has good anti-tumor effect both in and out of human body. It is a new anticancer drug with good development prospects [8]. Therefore, Cui Yonghu and others from Yanbian University transformed ginsenoside Rb1 into rare anti-tumor saponin c-k by endophytic bacteria of ginseng, and discussed its transformation mechanism. In their research, 192 strains were isolated from 5-year-old, 6-year-old and 8-year-old ginseng and 17-year-old ginseng, and 25 strains producing 0-glucosidase were screened. The strain gs17-18 isolated from 17-year-old ginseng could transform ginsenoside Rb1 into rare anti-tumor saponin c-k. The transformation process is ginsenoside Rb1 trdtf2-c -. This is the first report on the transformation of ginsenoside Rb1 into rare ginsenoside c-k by endophytic fungi of ginseng, which lays a solid foundation for the preparation of rare ginsenoside against tumor [8].

Research and application of transforming total ginsenoside into rare Ginsenoside Rg3.Ginsenoside is the main effective component of ginseng. At present, more than 40 ginsenosides have been isolated from ginseng. Ginsenoside has good anti-aging, anti-oxidation, anti-tumor and other pharmacological effects [9]. Among them, rare Ginsenoside Rg3 has anti-cancer, anti-cancer metastasis, neuroprotection, vasodilation and other curative effects .However, the content of Rg3 in ginseng is very low, and the extraction and preparation process is extremely complex[10].Therefore, it is of great significance to obtain rare Ginsenoside Rg3 with better curative effect through the selective hydrolysis of ginsenoside side chain sugar groups. Therefore, Cui Lei and others of Yanbian University isolated 256 strains from Ginseng Soil, including 102 strains of 0-glucosidase, and then selected 14 ginsenoside biotransformation strains, numbered ys1 ~ ys14. The results showed that ginsenosides Rb1, Rb2, RC and RD were mainly contained in the total saponins of stems and leaves of Panax ginseng, while ginsenosides Rb1, Rb2 and RD were mainly contained in the extracts of Panax ginseng. Neither of them contained rare ginsenosides Rg3 and Rh2 with pharmacological and physiological activities. They used 14 kinds of ginsenoside transformation strains to carry out ginsenoside transformation experiments. The results showed that the strains YS2, YS12, ys13 and ys14 could transform the total ginsenosides of ginseng stems and leaves into rare Ginsenoside Rg3, and the transformation rate of YS2 was the highest. Strain YS2 and YS7 could transform ginsenoside from ginseng extract into rare Ginsenoside Rg3. The fermented ginseng extract had a strong inhibitory effect on co-lon26-m3.1 cancer cells. This research will be applied in life science, biology, biochemistry and medicine.

1.2. Our Contribution

Synthesis, properties and applications of supramolecular complexes of 2-macrotricyclic crown ether ligands with N-Extended dipyridyl salts.In host guest chemistry, the development of new macrocyclic hosts has become an eternal and challenging topic. For this reason, Han Ying and others from Institute of chemistry, Chinese Academy of Sciences synthesized the cylindrical macrotricyclic crown ether supramolecular ligand compound , and studied the formation of supramolecular complexes and complexation between a and bipyridyl salt, and constructed a variety of assemblies with unique structure and function. Compared with bipyridine, the

N-Extended dipyridine salt of a has more abundant chemical properties and functions. Through the study of the complexing properties of a on the guest molecules of N-Extended dipyridine salt, we have laid a good foundation for the construction of new assemblies. The results show that these N-Extended pyridine salts can form 1:1, 1:2 complexes and supramolecular polymers with host a in solution and solid state[11]. It is also found that in these N-Extended dipyridyl salts, small changes in the type and length of linker will lead to very large changes in the complex mode, this lays a good foundation for the design and construction of new assemblies with special structures and functions in the future. This research will be applied in materials science, information science, environmental science and other fields. Small changes will lead to great changes in the complex mode, which lays a good foundation for the design and construction of new assemblies with special structure and function in the future. This research will be applied in materials science, information science, environmental science and other fields.

2. BACKGROUND

Selective adsorption and separation of gas molecules by supramolecular ligand organic porous materials.With the rapid development of science and technology, organic porous materials have shown more and more broad application prospects in the fields of analytical separation science, environmental science, material science, medical science and information science. For this reason, Han Baohang and others from the National Center for nanoscience have prepared a series of organic microporous supramolecular polymers containing heteroatoms such as oxygen, nitrogen and sulfur by different polymerization reactions, using organic compounds with specific configuration and heteroatoms as monomers. The BET specific surface areas of these polymers range from 700m2-g-1 to 2500m2 · g-1. [12]The hydrogen adsorption capacity of some nitrogen-containing polymer porous materials reaches 2.80% (mass fraction) at 1 bar and 77 K, which is the highest hydrogen storage value under the same conditions. At the same time, its carbon dioxide adsorption performance ranks first among other adsorption materials[12]. In addition, the adsorption capacity of these microporous polymers for methane and nitrogen is very small, so they can be used for selective adsorption or separation of gases. Through the adjustment of micropores and the optimization of materials, the adsorption and storage of specific gases can be achieved, which makes it gradually develop into a new type of gas storage and separation material with great potential.

Supramolecular chemistry, as a new and popular frontier discipline, has been full of vitality since its birth and growth. We firmly believe that with the further study of supramolecular chemistry theories and methods by scientists in the world, it will continue to promote the rapid development of various natural sciences. With the deepening of its application research, the flourishing supramolecular chemistry will make greater contribution to the sustainable development of human society and material civilization.

3. CONCLUSION

The adsorption of Cr (m) on molybdenum tailings was studied. The results show that: under the conditions of 120 mesh molybdenum tailings, 12g tailings, 40mg / L Cr (m) initial concentration and 27h adsorption time, the adsorption performance of molybdenum tailings for Cr (m) is higher. The thermodynamic and kinetic experiments of molybdenum tailings adsorption were studied. The results show that the adsorption is more inclined to theoretical adsorption, and the adsorption mode is mainly chemical adsorption, which indicates the feasibility and reliability of the study; Because molybdenum tailings belong to resource reuse, it has fixed source and low price, which makes molybdenum tailings have more practical

application advantages than traditional adsorption materials in removing Cr (m) in wastewater.

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