



## Research Status of Medicinal Resources in *Abelmoschus Manihot* (L.) Medic.

<sup>1</sup>DUAN Qiong-hui, <sup>2</sup>ZHENG Yi, <sup>3</sup>LI Yong, <sup>4</sup>ZHANG Ting

<sup>1,2,3</sup>Jiangsu Agri-animal Husbandry Vocational College, China

**Corresponding Authors: LI Yong**

Associate professor, Jiangsu Agri-animal Husbandry Vocational College, China

### Abstract:

To ascertain the status quo of *Abelmoschus manihot* (L.) medicinal resources research and development. This paper reviews the resources of *Abelmoschus manihot* (L.) by consulting related literatures. The results showed that as the traditional Chinese medicine, the root, stem, leaf, flower and seed can be used medicinally, has more accurate curative effect, and the chemical composition and pharmacological action have been proved and studied clinically. *Abelmoschus manihot* (L.) the whole body is treasure, should increase research dynamics, reasonable development and utilization medicinal resources.

**Keywords:** *Abelmoschus manihot*; medicinal resources; research status; Development and utilization

### 1. Introduction

Pharmacopoeia Records "The flowers of *Abelmoschus manihot* L. picking in the two seasons of summer and Autumn, timely drying. clearing dampness, swelling and detoxification <sup>[1]</sup>. The medicinal history of *Abelmoschus manihot* L. is very long, in folk often used to treat boil sores, mumps, lung hot cough, rich in resources, was originally contained in the "Jia-You materia medica", "Compendium of Materia Medica" also recorded. Its roots, stems, leaves, flowers and seeds can be used medicinally.

At present, "Okra Capsule" produced by Su Zhong pharmaceutical industry in Jiangsu, using the flowers of *Abelmoschus manihot* L as the main raw materials, has been listed, clinically widely used in the treatment of nephritis, rheumatoid arthritis and other diseases. Because the effect is exact, the market demand is broad, also driven the Jiangsu province Taizhou and its periphery *Abelmoschus manihot* L planting industry's vigorous development. Because the "Okra capsules" mainly use *Abelmoschus manihot* L's flowers, other medicinal parts such as leaves, roots, stems, seeds and so many are discarded, not only waste resources, but also pollute the environment. According to the literature records, *Abelmoschus manihot* L whole body is the treasure, all have certain medicinal value, in order to make full and reasonable use of *Abelmoschus manihot* L drug resources, this article through to consult the published related literature, has summarized the *Abelmoschus manihot* L medicinal Resources Research present situation, in order to provide the reference for *Abelmoschus manihot* L deep processing and the accurate development and utilization, Fully improve *Abelmoschus manihot* L economic and social benefits, and promote the rapid development of *Abelmoschus manihot* L industry.

### 2. Flowers of *Abelmoschus manihot* L

The research and application of *Abelmoschus manihot* L are more comprehensive. Liu Shuang summarized chemical constituents and pharmacological activities. *Abelmoschus manihot* L mainly contains flavonoids,

organic acids, tannic acid and long chain hydrocarbons and other compounds, the activity has protective effects on renal tubular injury, glomerular, osteoporosis, cardio-cerebral ischemic injury and myocardial ischemia-reperfusion injury, in addition to analgesia and improving depressive behavior of post-stroke depression rats<sup>[2]</sup>. Zhou Qing summarized that the constituents are mainly flavonoid compounds with myricetin and quercetin as their parent nuclei. Clinically commonly used in chronic kidney disease, infected wounds, and so on, with inhibition of immunity, anti-inflammatory, protection of the liver, anti-infection and other functions, its metabolism in the body of the carboxyl reaction, acetylation reaction, hydrolysis reaction mainly<sup>[3]</sup>. Other studies on the total flavonoids in the *Abelmoschus manihot* L are more mature, from the extraction process to pharmacological action, there are many literatures published, and more in-depth research. such as Ludong's doctoral thesis carried out the study of the protective mechanism of total flavonoids from *Abelmoschus manihot* L to the ischemic injury<sup>[4]</sup>, Zhou Xiaolong's research about the function and mechanism of the total flavonoids in flower of the *Abelmoschus manihot* L on experimental hyperglycemic rats<sup>[5]</sup>.

### 3. Stems and leaves of *Abelmoschus manihot* L

Shigangrong<sup>[6]</sup> anatomy the stems and leaves of *Abelmoschus manihot* L, the results showed that the stems of *Abelmoschus manihot* L belonged to herbaceous stem, only formed the vascular formation layer in the secondary growth, did not form the cork formation layer, and the secondary vascular tissue has developed phloem fiber and wood fiber, which could be used as the important raw material of the fibers. *Abelmoschus manihot* L leaves are dorsiventral leaves, the stomata of leaf are paracytic type, palisade tissue developed, hollow petiole. The ecological significance of the stem-leaf structure indicates that *Abelmoschus manihot* L is a typical arid plant with strong adaptability. Pan xinxin<sup>[7]</sup> with *Abelmoschus manihot* L stem and leaf as the study object, extraction and preparation of its polysaccharide components, three kinds of acetyl modified products were prepared by acetic anhydride method, and the immunological regulation activity in vitro was studied. The results showed that the SLAMP-A of polysaccharide from *Abelmoschus manihot* L stems and leaves could significantly improve the immune regulation activity in vitro, and SLAMP-A1 could be developed as an immune regulator. Lin jin<sup>[8]</sup> determined the fingerprints of *Abelmoschus manihot* L stems and leaves from different habitats in Guizhou were determined and the content determination method of three flavonoids in stem and leaf of *Abelmoschus manihot* L (rutin, hyperoside and isoquercitrin) was explored, which provided important reference for the establishment of quality standard of *Abelmoschus manihot* L stem and leaf and the comprehensive utilization of resources.

### 4. *Abelmoschus manihot* L rhizome

Gaosulian<sup>[9]</sup> using hot water leaching-ethanol precipitation, the polysaccharides from *Abelmoschus manihot* L rhizome were prepared by separating the tannic acid, hydrogen peroxide and activated carbon by decoloration and microcrystalline Cellulose column chromatography, and the content of polysaccharide was determined by phenol-sulfuric colorimetry, and the contents were 93.8%. *Abelmoschus manihot* L roots and stems are processed as a natural food thickener. The toxicological experiments carried out by Li wei<sup>[10]</sup> showed that the *Abelmoschus manihot* L rhizome powder is a kind of actual non-toxic type, has weak accumulation, has no mutagenic effect on salmonella typhimurium, and has no effect on chromosome aberration in somatic male cells of mice. *Abelmoschus manihot* L rhizome contains many sticky polysaccharides, can be used as lubrication drugs for mucosal inflammation, can protect, reduce the role of stimulation, with the right amount of marshmallow root decoction, can treat enteritis, dysentery, urinary tract infection and urine red pain, can also be applied to treat burns. Yao jiaxi<sup>[11]</sup> studied the preventive and quality effects of hollyhock root extract on calcium oxalate calculi in rat kidney, the results showed that the extracts of marshmallow root could reduce the formation of crystallization, and could prevent and treat the kidney calcium oxalate stones in rats, reduce the damage of kidney and protect the kidney function.

### 5. *Abelmoschus manihot* L seeds

*Abelmoschus manihot* L seeds Medicine, diuretic pass, used to treat the adverse effects of defecation, edema, urinary calculi, etc., the current research shows that it is rich in fat oil, traditionally used to extract petroleum. Lin wenqun <sup>[12]</sup> observed the morphological characteristics of *Abelmoschus manihot* L seeds under optical microscope, the general nutritional composition of the *Abelmoschus manihot* L seeds contains 18 kinds of amino acids and 24 mineral elements, such as Fe, Mn, Cu, Zn and Mo, which are essential pharmacological activities. Rich in amino acids, the essential amino acid content is higher, the content reaches 30.59%, the fat oil contains the rich unsaturated fatty acid, among them linoleic acid content reaches 82.179%, is one kind of vegetable oil which is worth developing and utilizing.

Liu Jie <sup>[13]</sup> used modern analytical methods to analyze and determine the main components in the seeds of *Abelmoschus manihot* L., and the total fatty acid was 55.47~102.17mg/g, and the unsaturated fatty acid accounted for 78.01%~79.40%, and the content of soluble polysaccharide was 6.53%~6.68%. The total fiber content was 12.77%~14.26%, and the soluble protein content was 10.36%~14.51%. The results showed that *Abelmoschus manihot* L seeds are rich in fatty acid, total soluble polysaccharide, total fiber, soluble protein, free amino acid, nucleoside and alkali base was detected and the fatty acid, and could be developed as vegetable oil.

### 6. Conclusion

*Abelmoschus manihot* L can be eaten as medicine or food, is the traditional Chinese flowers, widely distributed throughout the country. It can be used as vegetable, feed, oil, beverage and so on, its characteristic is extensive management, economic benefit is extremely high, and because of its nutrition and health care function has been highly praised in recent years. The marshmallow red pigment extracted from the flowers of Marshmallow not only contains no poisonous substances, but also has the effect of inhibiting bacillary dysentery, which has a broad development prospect and is an important natural pigment source.

*Abelmoschus manihot* L is full of treasure, because of high medicinal value and economic value, China planted more than 1300 hectares of land, for the local agricultural development, agricultural upgrading and farmers to make a significant contribution to the enrichment. But in the practical application in addition to the study of *Abelmoschus manihot* L flower more in-depth, the remaining parts, such as roots, stems, leaves and seeds, the study is relatively lagging. Failure to carry out a more systematic and perfect study on its chemical composition has limited the deep exploitation and comprehensive utilization of its resources. The literature and numerous studies have shown that the roots, stems, leaves, flowers and seeds are available for medicinal purposes. Therefore, it is necessary to develop the comprehensive utilization and deep processing of *Abelmoschus manihot* L resources, which will bring more economic benefits for farmers and growers, and thus help to improve the value-added of their products and promote the scientific, rational and sustainable development of *Abelmoschus manihot* L industries.

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