

## Research Article

### Cluster Analysis on Edible and Health Foods of Traditional Chinese Medicine Paste

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**Abstract:** Objective Researched on use and distribution of edible and medicinal foods in paste and provided a new idea for prevention and health care of traditional Chinese Medicine and food. Method with the Excel tab and SPSS19.0 statistical software, counted utilization of edible and medicinal foods in every paste and clustering analyzed edible and medicinal foods in all paste. Result After the statistics found that all paste contained 21 medicinal and edible food, which divided into 4 classes by the system clustering analysis, first classes to reinforce the main drugs, second kinds to reconcile the herbs, third class help digestion and promote the circulation of qi, the fourth to eliminate dampness and reduce phlegm. Discussion System clustering analysis method can make edible and medicinal foods in paste quantization and classification, help to analyze the correlation between paste and edible and medicinal foods and the law of utilization of edible and medicinal foods in paste and Provide research method for the organic combination of Chinese medicine and food in the field of health care.

**Keywords:** Cluster analysis, food, paste, traditional Chinese medicine

## INTRODUCTION

Paste, a dosage form of traditional Chinese medicine to medical treatment and health care, is also called soft, cream. It is the semi fluid preparation, made from the Chinese medicine pieces, through repeated decoction, removing slag and taking juice, after evaporation and made with honey and other accessories (Long *et al.*, 2014). It is under the guidance of Chinese medicine theory, with the effect of health care and treatment, physical fitness and disease prevention, as well as has some advantages, such as small dose, easy to long service, convenient taking, higher bioavailability, good effect on the chronic diseases and sub-health state. Traditional Chinese medicine is the methods of treatment and prevention in the TCM, which belongs to natural medicines, including the plant, animal and mineral. Likely (Li *et al.*, 2011), food is also derived from the nature of animals and plants fun minerals, so the source of traditional Chinese medicine and food is the same, called "the homology of medicine and food". Furthermore, Some of food can be used as both food and medicine, known as medicinal and edible food. The Ministry of Health of China announced medicinal and edible food, a total of 88, including lilac, Chinese anise, sword bean, fennel, thistle, yam, hawthorn, dark plum, papaya, semen oil orange, bergamot, almond, buckthorn, donkey-hide gelatin, endothelium malt, kelp, jujube,

peach kernel, mulberry leave, mulberry, etc (Chen *et al.*, 2011). Now, researches of paste mainly focus on the experience of famous doctor introduction, few reports on the drug law. This study aims to sum up the utilization and drug law of edible and medicinal foods by clustering analysis, so as to guide the daily health care (Yang *et al.*, 2010).

## MATERIALS AND METHODS

### Materials:

**Statistical methods:** With the search condition of "paste", retrieved published between the year of 2004-2014 about the document of paste, found a total of 248 pastes meeting the search condition. To prevention and treatment of diseases of different classification, divided into the paste of the respiratory system, the digestive system, the urinary system, the cardiovascular system, diabetes, thyroid dysfunction disease, rheumatism, gynecological, pediatric and surgical, a total of ten categories.

## RESULTS AND DISCUSSION

**Classification results of paste:** 248 pastes are divided into 10 classes according to different effects and found that the maximum number of paste in the treatment of internal diseases, a total of 195 and ratio reaching

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78.6%. The paste for the treatment of diseases of the digestive system is in the first place, a total of 66.53 pastes are to treat the respiratory system disease. 40 pastes are to treat diseases of the cardiovascular system. Paste treating gynaecology diseases are 34. Paste of urinary system disease are 16. Pastes of pediatric disease are 14. Paste of rheumatism disease are 9. Paste of diabetes are 7. Paste of thyroid disease are 5 and surgical diseases are 4. The results are below (Fig. 1).

**Result statistics of edible and medicinal foods in all kinds of paste:**

- Comparison variety and quantity of edible and medicinal foods each type of paste containing. According to retrieve statistics, counted type and quantity of edible and medicinal foods in paste of the digestive system, respiratory system, cardiovascular system, gynecology and pediatrics and calculated utilization rate of edible and medicinal foods. Results showed that edible and medicinal foods in paste of the digestive system were used 49 types and the utilization rate of poria cocos, licorice and gelatin were higher more than 60%. Paste of respiratory system used 43 kinds of edible and medicinal foods, of which the highest utilization rate were poria cocos, 66%. Paste of the cardiovascular system used 40 kinds of edible and medicinal foods, with the utilization rate of gelatin, poria cocos and medlar higher. Paste of department of gynaecology used 40 kinds of edible and medicinal foods. Paste of pediatric diseases used 34 kinds of edible and medicinal food, including licorice usage by 92.9% in the first.
- Edible and medicinal foods of five types of paste using all statistical results of edible and medicinal foods of five types of paste using all: by the statistical results, found that 21 kinds of Edible and medicinal foods were used in all paste,

including yam, hawthorn, polygonatum, liquorice, semen dolichoris, lily, bergamot, oyster, gordon, dhg, jineijin, euryale, malt, jujube, wolfberry fruit, poria cocos, peach kernel, lotus seed, rhizome, polygonatum, honey, Spine date Seed, semen coicis.

Clustering analysis of edible and medicinal foods in five kinds of paste using all. By clustering analysis, edible and medicinal foods as observation variables, the drug properties, taste of drug, channel tropism and effect as reflect the characteristics of the variables. Drug properties of Chinese medicine is divided into cold, hot, warm, cool, smooth, taste of drug is divided into sour, bitter, sweet, bitter, salty, acerbity. Then converted the text into digital, quantitatively, there is recorded 1 points with only one properties or taste. According to this study, the degree of the drug properties and taste of drug has a slight difference, adding and subtracting 0.2 on the basis of 1 points, such as temperature for 1 minute, while lukewarm, 0.8 points, cold for 1 minute, small cold for 0.8 points and so on. Channel tropism of drugs is the selective action to the part refers to the body (He, 2013), which has a total of 12, adding 1 points When has a channel tropism. Drug efficacy is also normalized, merging the same and similar efficacy and eliminating a single drug efficacy.

**Cluster analysis results:** with SPSS19 system clustering analysis, clustering number 4, results showed that the yam, hawthorn, jade, bamboo, white hyacinth bean, lily, oysters, donkey-hide gelatin, malt, wolfberry fruit, peach seed, rhizoma polygonati, semen coicis poly got together as class 1. Licorice alone got together to second classes. Bergamot, chicken's gizzard-membrane classed into third. Gordon fruit, poria cocos, jujube, lotus seeds, semen zizyphi spinosae, honey into forth classes. The results are shown in Fig. 2.

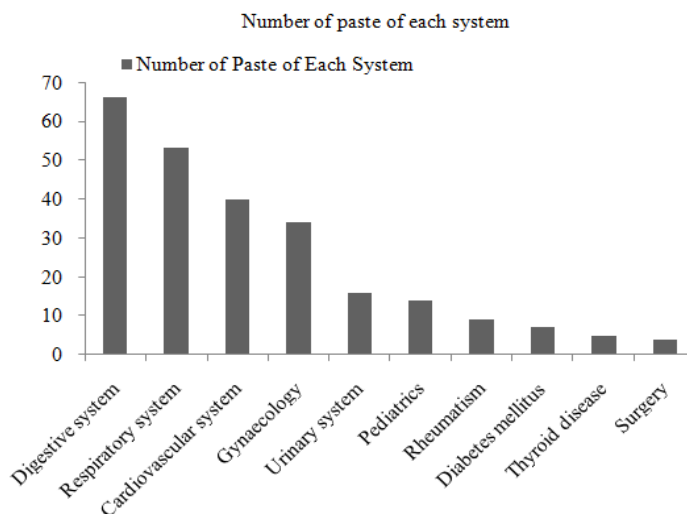


Fig. 1: Number of paste of each system

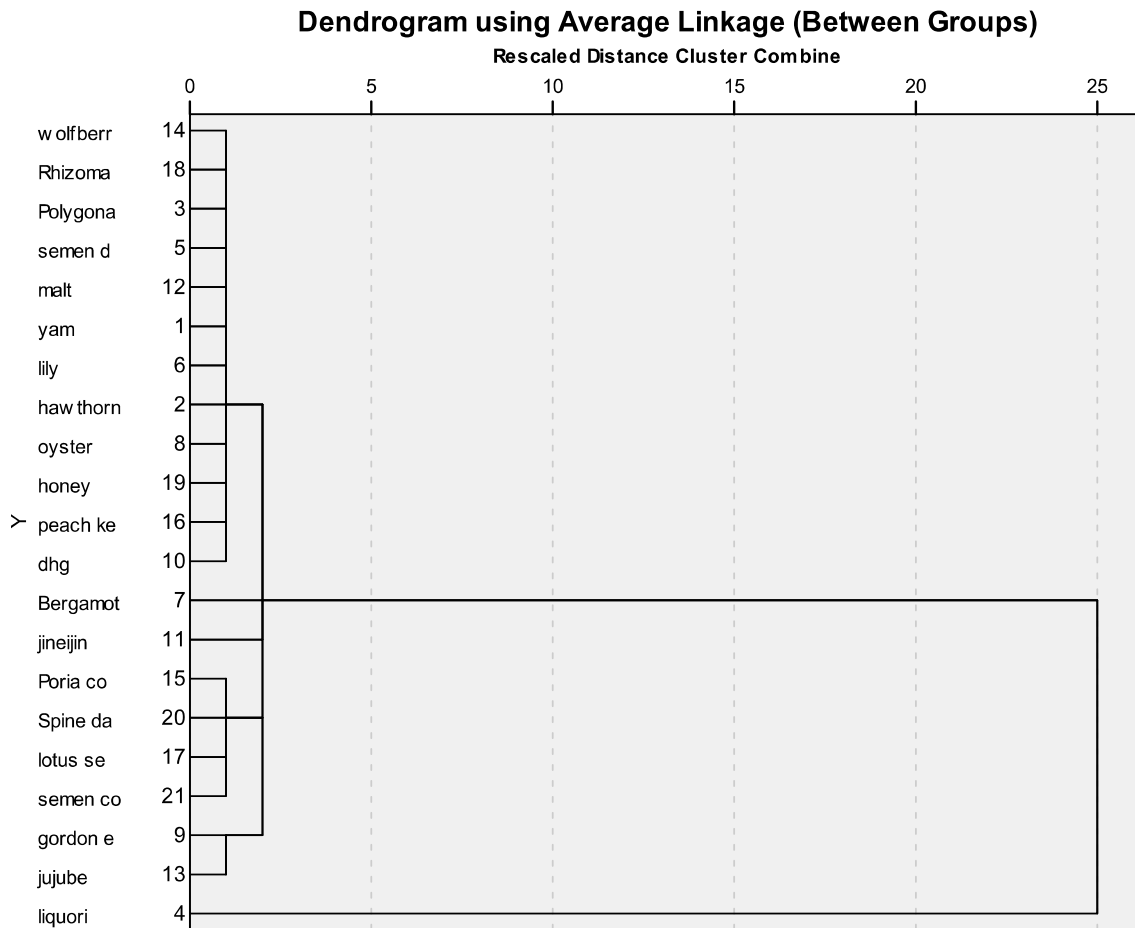


Fig. 2: Cluster analysis results

System clustering analysis is a method of data packet, which put the similar data in a class. Clustering is not dependent on the predefined classes and do not need training set. It is a common classification and distinction. In biological medicine and Chinese herbal medicine has widely used in pattern recognition and classification problem (Liu, 2004). From Fig. 2, clustering analysis results can be concluded, gathering for class 1 more than food for tonic medicine with sweet and smooth in properties and taste, more into the meridian of lung, spleen, kidney and with efficacy of moistening lung, strengthening spleen, benefiting kidney, giving priority to benefit spleen and kidney, because in Chinese medicine theory, the postnatal spleen and kidney is the foundation of the birth. Benefiting spleen and kidney can reach the effect of dispelling illnesses, health care and prolonging life. Licorice alone gathered into the second class, as licorice special position in Chinese traditional medicine, which belongs to the twelve meridian and reconciles the other drug. Bergamot and chicken's gizzard-membrane gathered into the third class, approved by both the spleen and stomach, with effect of helping digestion and promoting the circulation of qi, which can prevent a large number

of nutritious drug to hinder the function of stomach, benefit spleen, make fill without delay, make for drug absorption. Edible and medicinal foods of class 4 are sweet and smooth in properties and taste, with efficacy of eliminating dampness, reducing phlegm, nourishing the heart and calming the nerves, which embodies the paste in the prevention and treatment of diseases not only benefit, at the same time also exorcism, tapping and supplement, make the centralizer and not evil, exorcism and does not hurt. Clustering analysis provides the basis for us to be more objective analysis of drug law of paste, also make the quantification of traditional Chinese medicine and provides a reference in the research of correlation between drug and food for further.

### CONCLUSION

Paste is a kind of dosage form that traditional Chinese medicine treat disease, Chinese medicine is the carrier of prevention and cure of TCM. It has homology with food which is the key to human to sustain life and stay healthy. This study found that some edible and medicinal foods used often in paste through the various

system research, summary and analysis. It is beneficial to further research the health benefits of paste and traditional Chinese medicine health food. Many modern researches has also confirmed that the paste can be modulation of sub-health state (He *et al.*, 2004), embodies the Chinese medicine “preventive treatment of disease “theory. With the rapid development of the society and more and more pressure in modern society, the human body is prone to fatigue and unwell, so to modern human pay attention to health care. Chinese medicine has become a hot issue at a health food. But, how to develop Chinese medicine health food, many researchers also carried out extensive research, such as Long wei conceived safety evaluation of Chinese medicine health food. Other scholars study the formulation principles of traditional Chinese medicine health food, enriched the Chinese medicine health food research, established a link between Chinese medicine and food and made the organic combination between traditional Chinese medicine and food, opened up a new research idea traditional Chinese medicine in health care. In the future, research should further develop the application scope of edible and medicinal foods, such as some scholars studied the production of poria cocos, Chinese wolfberry noodles and traditional Chinese medicine health care tea, etc and strive to make edible and medicinal foods for human health services in maximum.

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