Analysis of the Rule of Allium Tuberosum Rottler Medication Based on Association Rule

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Abstract. Objective: The compatibility law of Allium tuberosum Rottler was discussed based on association rule analysis. Methods: With "Allium tuberosum Rottler" as the subject, from January 1998 to October 2018, the search was conducted in the advanced search interface of the database of CNKI and Wanfang Medical Net, and 48 literatures meeting the standards were included. Using Excel 2013, SPSS Modeler 14.1 and SPSS Statistics 19.0 statistical software as tools, frequency analysis and association rule analysis were conducted for the Chinese medicine included in the standard. Results: Frequency analysis found that among the 48 groups included in the standard, Allium tuberosum Rottler (48 times, 100%), Astragalus membranaceus (Fisch.) Bunge (11 times, 22.9%), appeared most frequently. In the statistics of sexual flavor of single drug with frequency of 5 or more, sweet(15 times, 55.6%), Pungent(4 times, 14.8%) was the most common; Kidney meridian(14 times, 31.1%), Liver meridian(9 times, 20.0%) was the most common; There were 7 kinds of common TCM diseases, most of which were prepubertal diseases. Nine drug pairs with the highest intensity of association were obtained in association rule analysis. Conclusion: By applying modern information technology and combining TCM clinical data with big data for in-depth analysis and integration, it will be more convenient to explore the potential compatibility law of TCM, and finally feedback to clinical practice, providing basis for guiding the research and development of clinical medication and new prescription.

1. Introduction

Allium tuberosum Rottler is the dry mature seed of Allium tuberosum Rottler. ex Spreng. a lily plant. Nowadays, Allium tuberosum Rottler ex Spreng are also called "viagra" in vegetables. People eat the tender leaves, Hualien, flowers and seeds of Allium tuberosum Rottler. ex Spreng. Allium tuberosum Rottler ex Spreng have a very long history of cultivation in China. Its nutritional value and medicinal value are extremely high, containing sulfide, alkaloid, volatile oil, flavonoids and other active ingredients. Studies have shown that total flavonoids of leek seed have strong antioxidant effect in vitro, Leek seed is a good natural antioxidant and has a good antioxidant effect.

2. Materials and Methods

2.1 Data Sources With "Allium tuberosum Rottler" as the subject, the time range was from January 1998 to October 2018, and the search was conducted in the database advanced retrieval interface of CNKI and Wanfang Medical Net, and 117 and 606 literatures were retrieved respectively.

2.2 Inclusion Criteria 48 literatures meeting the standards were selected from 723 literatures, and all the 48 first prescriptions in the literatures were recorded into Excel 2013 for processing, so as to establish the database of Chinese traditional medicine prescription containing Allium tuberosum Rottler.

2.3 Data Processing With reference to the Chinese pharmacopoeia (2015) and traditional Chinese medicine, and with reference to the national standard of the People's Republic of China, Chinese medicine clinical terms of diagnosis and treatment, the diseases recorded in prescription treatment were classified.
2.4 **Statistical Methods** All Chinese medicines that meet the standards were sorted and statistically processed using Excel2013, SPSS Clementine 12.0 and SPSS Statistics 19.0.

3. **Results**

3.1 **Application of Single Chinese Medicine**

A total of 16 flavors with frequency of 5 or more were recorded in all the 48 TCM compounds. See table 1.

| Drug Name                          | Frequency | Percentage (%) | Drug Name                          | Frequency | Percentage (%) |
|------------------------------------|-----------|----------------|------------------------------------|-----------|----------------|
| Allium tuberosum Rottler           | 48        | 100.0          | Rehmannia glutinosa Libosch.       | 6         | 12.5           |
| Astragalus membranaceus (Fisch.) Bunge | 11        | 22.9           | Poria cocos (Schw.) Wolf           | 6         | 12.5           |
| Cuscuta chinensis Lam.             | 10        | 20.8           | Rosa laevigata Michx.              | 5         | 10.4           |
| Lycium barbarum L.                 | 10        | 20.8           | velvet antler                      | 5         | 10.4           |
| Dioscotea opposita Thunb.          | 8         | 16.7           | Cinnamomum cassia Presl            | 5         | 10.4           |
| Epimedium brevicaulis Maxim.       | 8         | 16.7           | Glycyrrhiza uralensis Fisch         | 5         | 10.4           |
| Plantago asiatica L.               | 7         | 14.6           | Chinese gall                       | 5         | 10.4           |
| Rubus chingii Hu                   | 6         | 12.5           |                                   |           |                |
| Schisandra chinensis (Turcz.) Baill.| 6         | 12.5           |                                   |           |                |

3.2 **The Use of Sexual Taste of Drugs**

According to the classification standards of the Chinese pharmacopoeia (2015 edition), statistical analysis of medicinal ingredients of 17 traditional Chinese medicines with frequency of 5 or more were conducted. See figure 1 below.

![Figure 1](image-url)  
**Figure 1.** Statistics Flavour and Properties of a Drug (Frequency≥5).
3.3 The Use of Medication in Channel Tropism

The results are shown in figure 2.

![Figure 2. Channel Tropism and Statistics of Drugs (Frequency≥5).](image)

3.4 Main Disease

It can be seen from the figure that there are 8 kinds of common TCM diseases, and male prepubertal diseases are more. As shown in figure 3.

![Figure 3. Distribution of the Major Functions of a Drug (Frequency≥5).](image)

3.5 Analysis of High-Frequency Drug Association rules [8-11]

The statistical results of the 9 core drug combinations were shown in table 2, and the "networked display" of high-frequency drugs (frequency of use > 5) was shown in figure 4.

![Figure 4. Association Network Display Between Drugs (Frequency≥5).](image)
Table 2. Analysis of Association Rules Between Drugs.

| Drug combination                                      | Support (%) | Confidence (%) | Ascension degree |
|-------------------------------------------------------|-------------|----------------|------------------|
| Allium tuberosum Rottler= = >Astragalus membranaceus (Fisch.) Bunge | 22.4        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Lycium barbarum L        | 20.4        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Cuscuta chinensis Lam.   | 20.4        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Epimedium brevicomu Maxim. | 16.3        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Plantago asiatica L     | 14.2        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Dioscotea opposita Thunb. | 14.2        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Rehmannia glutinosa Libosch. | 12.2        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Schisandra chinensis (Turcz.) Baill. | 12.2        | 100.0          | 1.021            |
| Allium tuberosum Rottler= = >Rubus chingii Hu         | 12.2        | 100.0          | 1.021            |

4. Discussion

Modern pharmacological studies have shown that leek alcohol extract can improve the excitability of external stimulation of castrated rat penis and enhance the cold and fatigue resistance of model animals. Some studies have shown that the contents of Fe, Mn and Zn are higher in traditional Chinese medicine for tonifying the kidney, so leek seed can play a role in tonifying the kidney. Allium tuberosum Rottler an also improve the immunity of mice with low immunity, restore the cellular immune function, and regulate the cellular and humoral immune functions of animals.

Traditional Chinese medicine has a huge data. It is one of the new modes of modern Chinese medicine to use modern information technology to process existing data, discover potential commonalities and explore the rule of grouping. Based on the new computer technology, it is more likely to find out the occurrence, development and trend of the disease by summarizing and sorting out the clinical medication experience of famous traditional Chinese medicine, analyzing the rule of common prescription, refining its academic thought, discovering the common features and proposing innovations, and finally feeding back to the clinic, guiding the clinical medication and serving the patients.

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