Fine-Humor Producing Materia Medica in Persian Medicine

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Abstract

According to Persian Medicine (PM), humors that can replace the consumed body compounds, while contributing to health maintenance, is called 'fine humor' (khelt-e saleh). However, a limited number of foods and beverages have been mentioned as the producers of fine humor. These substances are particularly important in maintaining health in vulnerable populations including pregnant women, lactating mothers, the elderly, infants and children. They also play an important role in certain treatment plans during illness and injury and after recovery. The present study was designed to investigate properties of fine-humor producing materia medica, as described by PM resources. Based on the search performed in PM textbooks, 63 substances were found to have this property. The most frequent Mizaj types were hot-wet (33.34%), hot-dry (19.05%), and cold-wet (17.47%). The highest organ tropism belonged to kidneys and bladder, brain, liver, sex organs, stomach and lungs respectively. Examining drug indications indicated obeseogenous (53.97%), enhancing sperm production and sexual potency (42.86%), laxative (39.69%), and tonic (33.34%) actions to be the most prevalent effects of these substances in the body. By integrating these substances into diets, health promotion for children, the elderly, and mothers during nursing and pregnancy may be achieved. Additionally, patients can benefit from a fine-humor producing nutrition both for 1) prevention of chronic diseases and 2) during disease recovery, acute phases of illness, anemia, and metabolic illnesses. Further studies are recommended to analyze the components and nutritional value, and the use of PM capability in culinary medicine.

Keywords: Fine humor; Nutrition; Health; Persian medicine; Iranian traditional medicine

Introduction

Persian Medicine (PM) pays special attention to maintaining human health and preventing diseases. Persian scholars considered six principles in maintaining good health and promoting well-being: air, food and drink, movement and stillness, emotional and mental states, sleep and wakefulness, evacuation and retention [1]. PM takes a holistic and comprehensive approach to the concept of health. This indicates that an individual’s inherent qualities and lifestyle including diet have a strong influence on preserving health, or preventing diseases [2]. The emphasis of PM on proper nutrition goes to the extent that Rhazes, a well-known Persian philosopher and physician in the third century, had dedicated special care to the priority of food therapy in the treatment of patients, and had advised it to all

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physicians in his illustrious quote, “Do not use medicine until you can treat patients with food” [3].

Based on the perspective of PM, all body organs are made up of four kinds of substances known as humors: phlegm (balgham), blood (dam), yellow bile (safa), and black bile (sauda). The quantity and quality of these humors must be balanced in order for the human body to be healthy. In his book, Human Nature, Hippocrates states, “The human body is made of blood, phlegm, yellow bile, and black bile, and these are the four natures of the human body.” These four humors are causes of health and disease. As a result, the ideal condition in a human being is a result of having balanced humors. The ratio of humors in the body are not constant, and vary depending on consumed food [4].

Disease develops when an imbalance develops in one or more of these humors [5]. However, a notable point mentioned in PM resources, is that illnesses can be a result of a disturbance in either the quality (abnormal humors) or quantity (excess or insufficiency) of humors [1,5].

According to Avicenna’s Canon of Medicine, humors that can replace the consumed body compounds, while contributing in health maintenance, are called fine humors. These are called under various names including Khelt-e Saleh, Khelt-e Mahmoud, Khelt-e Jayyed [6]. “Saleh al-Kimous” substances (as the material cause of fine humors), produce blood with humors in appropriate proportions. For a fine humor to be produced, the type of food substance used by humans constitutes the most important factor [7]. The main functions of fine humors include disease prevention and general health maintenance, especially for vulnerable groups (pregnant and lactating women, children, etc.). Another important clinical application is treatment and rehabilitation plants for various acute and chronic diseases [8,9].

The names and functions of substances that are sources of fine humors are scattered in PM resources [10,11,12,13,14,15,16]. This article intends to systematically identify single and compound medicinal substances and foodstuff that create fine humors according to reference textbooks of PM, and also introduce them for use in the diet of children, pregnant and lactating women, and the elderly.

Methods
A systematic review approach was used in the following study, with keywords including “Khelt-e Saleh”, “Khelt-e Mahmoud”, “Khelt-e Jayyed”, “Saleh al-kimous”, searched in relevant textbooks, such as The Canon of Medicine (Avicenna), Hedayat al-Motelemin fi-Tebb (Akhwawayni), Kholasat al-Hekmat (Aghili khorasani), Zakhireh Kharaazmshahi (Jorjani), Mofarrah al-Gholub (Shahrazani), Al-Shamil fi al-Sa

na’a al-Tibbiya and Kamel al-Sanaat (Ahwazi). Our search also included Makhzan al-Advieh, an encyclopedia of materia medica comprising 1741 monographs. To define terminology, Bahr al-Jawahir and other dictionaries were also used.

Furthermore, the terms “nutrition”, along with “Persian Medicine”, and “Iranian Traditional Medicine” were queried in PubMed and Scopus databases to examine the perspective of modern literature on the subject. There were no articles that particularly addressed the above topics.

The frequency of Mizaj (temperament) and organ tropism, as well as the effect of each of these materia medica on body organs, were investigated subsequently. Additionally, Iranian traditional medicine General Ontology (IrGO) [17] was used to annotate drugs in UnaProd database with IrGO entities and create a document-term matrix (DTM). DTMs are matrices that present the frequency or absence/presence of terms that occur in a collection of documents. In our case, drugs made up the rows and extracted terms constituted the columns of the matrix. The matrix was binary, where zero indicated the absence of the term for a given drug while 1 indicated its presence.

An analysis that can be performed on a DTM is the co-occurrence analysis between terms. The co-occurrence of two terms with each other is an indicator of semantic similarity and can be positive, negative or random. A co-occurrence analysis makes it possible to discover the relations between terms directly from the thematic content [18].

However, it should be pointed out that co-occurrence alone is not always indicative of relations between terms, making assessment of its statistical significance necessary. Dice index and Log-likelihood are good methods for determining the relations between terms in text and binary data [19,20]. The latter was used to examine the results of this study.

Results
Our search in PM literature yielded 63 materia medica as producers of fine humor. Mizaj, actions and organ tropism of each were retrieved. In the quality analysis of these substances, 61.91% had a hot quality, 53.97% percent had wetness, 30.16% percent were dry, and 28.58% percent had coldness. In terms of Mizaj, 33.34% of the retrieved materia medica had a hot-wet Mizaj, 19.05% were hot-dry, 17.47% were cold-wet, 14.29% had a balanced Mizaj, 11.12% were cold-dry, and finally 3.18% were multipotency (having more than one Mizaj). These data have been illustrated in figure 1 and table 2.

In the analysis of the relationship between the substances that produce fine humor and organs, the highest tropism belongs to kidney and bladder, brain, liver, sex organs, stomach and lungs respectively (Table 3 and Figure 2).
| No. | Common Name                      | Scientific Name               | Folkloric Name | Mizaj                        |
|-----|----------------------------------|-------------------------------|----------------|------------------------------|
| 1   | Alfalfa                          | *Medicago sativa* L.          | Yonjeh         | Hot and wet                  |
| 2   | Almonds                          | *Prunus dulcis* (Mill.) D.A.Webb | Badam          | Hot and wet                  |
| 3   | Apple                            | *Malus domestica* Borkh.      | Sib            | Balanced with slight hot-ness and wetness |
| 4   | Barley                           | *Hordeum vulgare* L.          | Jo             | Cold and dry                 |
| 5   | Bogra (a type of soup made from wheat flour) | *Cyperus esculentus* L.    | Bogra          | Hot and Balanced             |
| 6   | Brown nutsedge                   | *Cyperus esculentus* L.       | Hab ol-aziz    | Hot and wet                  |
| 7   | Candy                            | *Crystallized sugar*          | Nabaat         | Balanced                     |
| 8   | Carob                            | *Ceratonia siliqua* L.        | Kharnoub       | Cold and dry                 |
| 9   | Carrot                           | *Daucus carota* L.            | Havij          | Hot and wet                  |
| 10  | Chicken/rooster                  | *Gallus domesticus*           | Morgh/Khorous  | Hot and wet                  |
| 11  | Chickpea                         | *Cicer arietinum* L.          | Nokhod         | Hot and dry                  |
| 12  | Chicory                          | *Cichorium intybus* L.        | Kasni          | Cold and Wet                |
| 13  | Christ’s thorn                   | *Ziziphus spin-christ* (L.) Desf. | Sedr          | Cold and dry                 |
| 14  | Coconut                          | *Cocos nucifera* L.           | Nargil         | Hot and dry                  |
| 15  | Date                             | *Phoenix dactylifera* L.      | Khorma         | Hot and wet                  |
| 16  | Duck                             | *Anatidae*                    | Ordk            | Hot and dry                  |
| 17  | Egg                              | -                             | Tokhm-e-morgh  | Multipotency                 |
| 18  | Edible animal skin               | -                             | Poost-e heivan | Hot                         |
| 19  | Eryngos                          | *Eryngium sp.*                | Boughnagh      | Hot and dry                  |
| 20  | Esfidbaj (a kind of soup made from chicken, goat meat, or lamb, vegetables and beans, without taste) | -                             | Soup           | Hot and wet                  |
| 21  | Fish                             | -                             | Mahi           | Cold and wet                 |
| 22  | Four nuts mixture-Walnut         | *Juglans regia* L.           | Chahar maghz    | Hot and dry                  |
| 23  | Fresh cheese                     | -                             | Panir          | Cold and wet                 |
| 24  | Gizzard                          | *Ventriculus gastric* mill.   | Chineh dan     | Hot                         |
| 25  | Goat                             | *Capra hircus*                | Boz            | Hot and wet                  |
| 26  | Grape                            | *Vitis vinifera* L.           | Angour         | Hot and wet                  |
| 27  | Grape sap                        | -                             | Shire Angour   | Hot and wet                  |
| 28  | Jujube                           | *Ziziphus jujuba* Mill.       | Annab          | Balanced                     |
| 29  | Kebab                            | -                             | Kebab          | Hot and dry                  |
| 30  | Lamb                             | *Ovis aries*                  | Barreh         | Hot and wet                  |
| 31  | Lettuce                          | *Lactuca sativa* L.           | Kahoo          | Cold and wet                 |
| 32  | Meat stock                       | -                             | Abe-e gousht   | Hot and wet                  |
| No. | Description | Scientific Name | Part | Temperature and Moisture |
|-----|-------------|-----------------|------|--------------------------|
| 33  | Mohallahia (a dessert made from rice flour, milk and sugar) | - | Ferni | Hot and wet |
| 34  | Mung bean | Vigna mungo (L.) Hepper | Mash | Cold and dry |
| 35  | Muscle | - | chelo gousht | Hot and wet |
| 36  | Non-alcoholic beer (Barley water) | - | ma-al-shaer | Cold and wet |
| 37  | Orchard poppy | Papaver rhoeas L. | Khashkhash | Cold and dry |
| 38  | Partridge | Tetraogallus caspius | Kabk | Hot and dry |
| 39  | Pheasant | Phasianus colchicus | Gharghavol | Hot and dry |
| 40  | Pigeon | Columba domestica | Kaboutar | Hot and dry |
| 41  | Pistachio | Pistacia vera L. | Pesteh | Hot and dry |
| 42  | Pomegranate | Punica granatum L. | Annar | Cold and wet |
| 43  | Purple amaranth | - | Taj-e khoiros | Cold and wet |
| 44  | Qatayef | - | Quttab | Hot and wet |
| 45  | Quince | Cydonia oblonga Mill. | Beh | Balanced with slight wetness |
| 46  | Rice | Oryza sativa L. | Berenj | Multipotency |
| 47  | Samanoo (a sweet paste made entirely from germinated wheat) | - | Samanu | Balanced with slight hotness |
| 48  | Sesame | Sesamum indicum L. | Konjed | Hot and wet |
| 49  | Shrimps | Caridea | Meigoo | Cold and wet |
| 50  | Sheep’s foot | - | Pacheh | Balanced |
| 51  | Sour pear | Pyrus sp. | Golabi-e torsd | Cold and dry |
| 52  | Spinach | Spinacia oleracea L. | Esfenaj | Balanced with slight coldness and wetness |
| 53  | Sudanese olives | - | Ziyt al-suwdan | Hot and wet |
| 54  | Sugar | Saccharum officinarum L. | Shekar | Hot and dry |
| 55  | Wheat | Triticum aestivum L. | Henteh | Hot and dry |
| 56  | Turnip | Brassica rapa L. | Shalqam | Hot and wet |
| 57  | Veal | Bos taurus | Goosaleh | Hot and wet |
| 58  | Well-baked wheat bread | - | Nan-e pokhteh | Balanced with slight hotness |
| 59  | White mulberry | Morus alba L. | Toot | Hot and wet |
| 60  | Wood-sorrel | Oxalis acetosella L. | Torshak | Cold and dry |
| 61  | Zolabieh (a traditional sweet) | - | Zoulbia | Hot |
| 62  | Zucchini/ pumpkin | Cucurbita maxima Duchesne | Kadou | Cold and wet |
Table 2. Fine-humor producers in terms of organ tropism

| No. | Organ                | Name                                                                 | Frequency | Percent |
|-----|----------------------|---------------------------------------------------------------------|-----------|---------|
| 1   | Brain                | Sour pears, rice, apples, eggs, wood-sorrel lettuce, mung bean, poppy, partridge, *Esfidbaj*, pheasant, chicken and rooster, *Triticum aestivum*, Sudan olive oil, White mulberry, Sugar, *Samanoo*, Coconut, Pumpkin, Pistachio, Grape syrup, Fish, Spinach, Walnut, Alfalfa, Almond, Quince, *Mohallabiah* | 29        | 46.04%  |
| 2   | Mouth, throat and nose | Eggs, wood-sorrel pomegranate, mung bean, partridge, duck, mulberry, sugar, pistachio, chickpeas, spinach, almond, quince jujube | 14        | 22.23%  |
| 3   | Lung                 | Purple amaranth Leafy goosefoot egg, carob, *Zolabieh*, garden poppy, *Esfidbaj* grape, sugar, *Samanoo* pumpkin, lamb trotters, chickpea, grape syrup, fish, sesame, spinach, alfalfa, almond, quince jujube | 21        | 33.34%  |
| 4   | Stomach              | Sour pear, apple, eggwood-sorrel, carob lettuce, pomegranate, poppy, partridge, *Bogra*, kebab, *samanoo*, pistachio, cheese, Persian carrot, chickpeas, sesame, Eryngos, almond, quince, gizzard, *Mohallabiah* | 22        | 34.93%  |
| 5   | Intestine            | Rice wood-sorrel, mung bean poppy grapes lamb trotters, cheese sesame turnip walnut almond chicory gizzard | 13        | 20.64%  |
| 6   | Liver                | Roman spinach, sour pear, apple, wood-sorrel, pomegranate, partridge, mulberry, sugar, malt, barley water, Brown nut sedge, coconut, pumpkin, pistachio, Persian carrot, chickpea, grape syrup, fish, walnut, lamb, chicory, quince gizzard, jujube | 23        | 36.51%  |
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| Organ Tropism | Materia Medica | Frequency |
|---------------|---------------|-----------|
| Spleen        | Roman spinach wood-sorrel, pomegranate, *Zolabieh* white mulberry Persian carrot chickpeas, grape syrup | 8 12.70 % |
| Kidney and bladder | Roman spinach, sour pear, purple amaranth leafy goosefoot, rice, egg, sour, pomegranate, mung bean, shrimps, duck, *Bogra*, *triticum aestivum*, grape, pigeon, date, mulberry, brown nut sedge, kebab, coconut, pumpkin, pistachio, cheese, Persian carrot, chickpea, grape syrup, fish, sesame, turnip, walnut, eryngos, lamb meat, almond, chicory, quince jujube | 36 57.15 % |
| Reproductive Organs | rice, apples, eggs, lettuce, shrimp, duck, chicken and rooster, pigeon, (date) sugar brown nut sedge, kebab coconut Persian carrot chickpea sesame turnip broth walnut wheat *Eryngos almond Mohallabiah* | 23 36.51 % |
| Skin and hair | Leafy goosefoot, rice, carob pomegranate chicken and rooster date, coconut cheese chickpeas grape syrup Christ’s thorn, jujube meat stock Purple amaranth | 12 19.05 % |
| General tonic | Leafy goosefoot, eggs grape kebab coconut muscle Christ’s thorn, jujube goat and veal lamb meat Pears purple amaranth | 11 17.47 % |
| Blood | *Qatayef*, lettuce, grapes, barley water, calf and lamb meat | 6 9.53 % |
| Nerve | Mung bean, partridge, pigeon, Sudan olive oil, sugar, fish, sesame | 7 11.12 % |
| Uterus | Shrimp | 1 1.59 % |
| Heart | Sour pear, apple, egg, sugar, pistachio, grape syrup, walnut lamb chicory gizzard | 11 17.47 % |

**Figure 2.** Frequency of fine-humor producing materia medica in terms of organ tropism
Table 3. Fine-humor producers in terms of actions

| No. | Action       | Name                                                                 | Frequency | Percent  |
|-----|--------------|----------------------------------------------------------------------|-----------|----------|
| 1   | Obesogenous  | *Qatayef*, rice, eggs, carob, pomegranate, *Zolabieh*, partridge, duck, chicken, *Triticum spelta*, grapes, pigeon, date, mulberry, sugar, brown nut sedge, kebab, *sumunoo*, coconut, pistachio, muscle, cheese, peas, fish, sesame, walnut, Alfalfa, *Mohallahbiah*, grape syrup, wheat bread, veal and lamb meat, almond, poppy | 34        | 53.97%   |
| 11  | Aphrodisiac  | Persian rice, apple, egg, pomegranate, shrimp, duck, chicken and rooster, pigeon, date, mulberry, sugar, *Brown nut sedge*, kebab, coconut, pistachio, Persian carrot, chickpeas, fish, sesame, walnut, Eryngos, Alfalfa, *Mohallahbiah*, Candy syrup, turnip, wheat bread, almonds | 27        | 42.86%   |
| 6   | Laxative     | Roman spinach, Purple amaranth, wood-sorrel, lettuce, pomegranate, mung bean, duck, chicken and rooster, date, sugar, pumpkin, lamb trotters, cheese, Persian carrot, fish, sesame, spinach, walnut, Alfalfa, gizzard, candy syrup, turnip, almond Sweet, quince fruit, jujube | 25        | 39.69%   |
| 13  | Tonic        | Sour pear, egg, carob, mung bean, shrimp, *Bogra*, langur, pigeon, date, mulberry, sugar, kebab, pistachio, Persian carrot, chickpeas, Walnut, turnip, beef and lamb meat, almond, quince | 21        | 33.34%   |
| 3   | Fluid expelling | Roman spinach, carob, lettuce, pomegranate, Sudan olive oil, mulberry, sugar, barley, coconut, Persian carrot, chickpeas, sesame, Alfalfa, Eryngos, grape syrup, turnip, quince, non-alcoholic beer (barley water) | 18        | 28.58%   |
| 2   | Deopplinant  | Roman spinach lettuce, pomegranate, pheasant, *bogra*, Sudan olive oil, mulberry, pumpkin, pistachio, Persian carrot, chickpeas, Christ’s thorn, sesame, grape syrup, almond, chicory | 16        | 25.40%   |
| 5   | Dissolver    | Roman spinach, lettuce, mung bean, shrimps, chicken and rooster, *Triticum aestivum*, grapes, Persian carrots, sesame, walnuts, Eryngos, grape syrup, Christ’s thorn | 13        | 20.64%   |
| 9   | Extinguishing | Roman spinach, sour pear, Purple amaranth, apples, barley, squash, pistachios, walnuts, goat meat, chicory, barley water, jujube | 12        | 19.05%   |
| 10  | Aperient     | Sour pear, apple, Wood-sorrel, carob, lettuce, *Bogra*, kebab, chickpeas, turnip, quince | 10        | 15.88%   |
| 8   | Abstergent   | Pomegranate, mung bean, grape, sugar, barley, peas, spinach, candy syrup, almonds | 9         | 14.29%   |
| 12  | Elating      | Sour pear, apple, sugar, coconut, meat stock, grape syrup, candy syrup, chicory | 8         | 12.70%   |
| 4   | Lithontriptic | Roman spinach, wood-sorrel, pigeon, Persian carrot, chickpea, grape syrup, turnip | 7         | 11.12%   |
| 14  | Rarefactive  | Sudan olive Sudan, mulberry, pumpkin, Persian carrots, sesame, meat stock, goat meat | 7         | 11.12%   |
| 7   | Heating      | Shrimp, duck, kebab, coconut | 4         | 6.35%    |

http://jtim.tums.ac.ir
The following conclusions were reached after examining the drug actions and determining the mechanism of their activities according to PM: obesogenous (53.97%), enhancing sperm production and sexual potency (42.86%), laxative (39.69%), and tonic (33.34%) actions were the most prevalent effects of these substances in the body (Figure 3 and Table 4). Results of the co-occurrence analysis between fine-humor producing materia medica and organ tropism/action is illustrated in figure 4. Regarding organ tropism, the most significant co-occurrence was seen with kidneys, the liver and peri-renal fat respectively. In terms of actions, fine-humor producing materia medica are most positively related to softening, obesogenous, and organ generating properties.

![Figure 3. Frequency of fine-humor producing materia medica in terms of actions](image1)

![Figure 4. Co-occurrence graph using Log-likelihood method showing statistically significant relations between fine-humor producing materia medica and A. organ tropism; and B. actions.](image2)
Discussion

Based on PM references, 63 cases of materia medica were classified as producers of fine humor. The most common quality in these substances was hotness. This finding is based on the most common Mizaj in the overall frequency of hot quality studied in monographs of the Makhzan al-Advieh [21]. Among the Mizaj of the retrieved producers of fine humor, hot and wet Mizaj had the highest frequency and hot-dry ranked second.

According to PM principles, qualities of hotness and wetness are necessities and main factors of growth [1]. This accordance is observed in the producers of fine humor. The tendency of fine humor producers to head organs such as the liver (source of natural spirit), brain (source of psychic spirit), and the liver-kidney pathway as a route of humor production waste excretion (the kidney serves the liver according to PM) demonstrates the role of chief organs and the interaction of the health of the major organs in the process of producing body humors and healthy nutrition.

The foods listed in Table 4 are aphrodisiacs due to tropism to the kidneys and sexual organs. They can be considered in dietary plans of patients seeking pregnancy.

Mosammen (obesogenous) is a PM terminology for substances with the action of facilitating optimal completion of the four phases of digestion to produce fine humor, that in turn helps the body to grow and gain weight. However, it was discovered in our research that not all substances with Mosammen (obesogenous) action necessarily produce a large quantity of humors (like pomegranate). It appears that these kinds of food stimulate the formation of fine humor, resulting in weight gain and growth, by empowering the natural spirit of the liver [11].

In PM resources, the aphrodisiac action is mainly observed in fine-humor producing foods rather than medicine; nonetheless, meals that enhance sexual power are mainly hot in quality.

According to PM, ‘tonics’ are substances that improve the body’s general movement or powers at the cellular level, such as digestive faculty (Ghove-e-hazemeh), absorptive faculty (Ghove-e-jazebeh) and Mental faculty (Ghove-e-mofakereh), or protect tissues from porosity and acceptance of waste products. The body is strengthened by all three systems by the normal humor producers. Fine-humor producers are valuable substances that can be advised individually or as part of recipes and formulations in health, in proportion to temperament growth and development, regulation and strengthening of the performance of chief organs (Aza-e-raeiseh) and humor-producing organs, and general/physical strengthening.

By integrating these substances into diets, health promotion for children, the elderly, and mothers during nursing and pregnancy may be achieved. Additionally, patients can benefit from a fine-humor producing nutrition both for 1) prevention of chronic diseases and 2) during disease recovery, acute phases of illness, anemia, and metabolic illnesses. The proposal to study and analyze the components and nutritional value and the use of PM capability in culinary medicine will open new exploratory horizons for future studies.

Conflict of Interests

None.

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None.

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