



## 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 actions indicated obesogenous (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 (*safra*), 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-Motealemin fi-Tebb* (Akhawayni), *Kholasat al-Hekmat* (Aghili khorasani), *Zakhireh Kharazmshahi* (Jorjani), *Mofarrah al-Gholub* (Shaharzani), *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

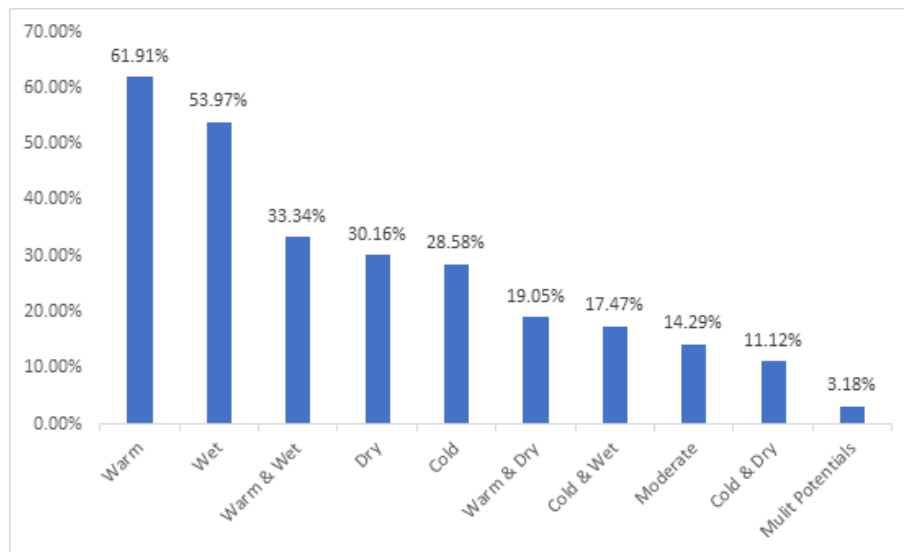
Our search in PM literature yielded 63 materia medica as producers of fine humor. Mizaj, actions and organ tropism of each were retrieved. In the quality analysis of these substances, 61.91% had a hot quality, 53.97% percent had wetness, 30.16% percent were dry, and 28.58% percent cold. In terms of Mizaj, 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).

**Table 1.** Fine-humor producers in terms of Mizaj

No.	Common Name	Scientific Name	Folkloric Name	Mizaj
1	Alfalfa	<i>Medicago sativa</i> L.	Yonjeh	Hot and wet
2	Almonds	<i>Prunus dulcis</i> (Mill.) D.A. Webb	Badam	Hot and wet
3	Apple	<i>Malus domestica</i> Borkh.	Sib	Balanced with slight hotness and wetness
4	Barley	<i>Hordeum vulgare</i> L.	Jo	Cold and dry
5	<i>Bogra</i> (a type of soup made from wheat flour)	-	Bogra	Hot and Balanced
6	Brown nutsedge	<i>Cyperus esculentus</i> L.	Hab ol-aziz	Hot and wet
7	Candy	Crystallized sugar	Nabaat	Balanced
8	Carob	<i>Ceratonia siliqua</i> L.	Kharnoub	Cold and dry
9	Carrot	<i>Daucus carota</i> L.	Havij	Hot and wet
10	Chicken/rooster	<i>Gallus domesticus</i>	Morgh/Khorous	Hot and wet
11	Chickpea	<i>Cicer arietinum</i> L.	Nokhod	Hot and dry
12	Chicory	<i>Cichorium intybus</i> L.	Kasni	Cold and Wet
13	Christ's thorn	<i>Ziziphus spina-christi</i> (L.) Desf.	Sedr	Cold and dry
14	Coconut	<i>Cocos nucifera</i> L.	Nargil	Hot and dry
15	Date	<i>Phoenix dactylifera</i> L.	Khorma	Hot and wet
16	Duck	Anatidae	Ordak	Hot and dry
17	Egg	-	Tokhm-e-morgh	Multipotency
18	Edible animal skin	-	Poost-e heivan	Hot
19	Eryngos	<i>Eryngium</i> sp.	Boughnagh	Hot and dry
20	<i>Esfidbaj</i> (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	<i>Juglans regia</i> L.	Chahar maghz	Hot and dry
23	Fresh cheese	-	Panir	Cold and wet
24	Gizzard	<i>Ventriculus gastric</i> mill.	Chineh dan	Hot
25	Goat	<i>Capra hircus</i>	Boz	Hot and wet
26	Grape	<i>Vitis vinifera</i> L.	Angour	Hot and wet
27	Grape sap	-	Shireh Angour	Hot and wet
28	Jujube	<i>Ziziphus jujuba</i> Mill.	Annab	Balanced
29	Kebab	-	Kebab	Hot and dry
30	Lamb	<i>Ovis aries</i>	Barreh	Hot and wet
31	Lettuce	<i>Lactuca sativa</i> L.	Kahoo	Cold and wet
32	Meat stock	-	Abe-e gousht	Hot and wet

33	<i>Mohallabiah</i> (a dessert made from rice flour, milk and sugar )	-	Ferni	Hot and wet
34	Mung bean	<i>Vigna mungo</i> (L.) Hepper	Mash	Cold and dry
35	Muscle	-	chelo gousht	Hot and wet
36	Non-alcoholic beer (Barley water)	-	ma-al-shaeer	Cold and wet
37	Orchard poppy	<i>Papaver rhoeas</i> L.	Khashkhash	Cold and dry
38	Partridge	<i>Tetraogallus caspius</i>	Kabk	Hot and dry
39	Pheasant	<i>Phasianus colchicus</i>	Gharghavol	Hot and dry
40	Pigeon	<i>Columba domestica</i>	Kaboutar	Hot and dry
41	Pistachio	<i>Pistacia vera</i> L.	Pesteh	Hot and dry
42	Pomegranate	<i>Punica granatum</i> L.	Annar	Cold and wet
43	Purple amaranth	-	Taj-e khouros	Cold and wet
44	<i>Qatayef</i>	-	Quttab	Hot and wet
45	Quince	<i>Cydonia oblonga</i> Mill.	Beh	Balanced with slight wetness
46	Rice	<i>Oryza sativa</i> L.	Berenj	Multipotency
47	<i>Samanoo</i> (a sweet paste made entirely from germinated wheat)	-	Samanu	Balanced with slight hotness
48	Sesame	<i>Sesamum indicum</i> L.	Konjed	Hot and wet
49	Shrimps	Caridea	Meigoo	Cold and wet
50	Sheep's foot	-	Pacheh	Balanced
51	Sour pear	<i>Pyrus</i> sp.	Golabi-e torsh	Cold and dry
52	Spinach	<i>Spinacia oleracea</i> L.	Esfenaj	Balanced with slight coldness and wetness
53	Sudanese olives	-	Ziyt al-suwdan	Hot and wet
54	Sugar	<i>Saccharum officinarum</i> L.	Shekar	Hot and dry
55	Wheat	<i>Triticum aestivum</i> L.	Henteh	Hot and dry
56	Turnip	<i>Brassica rapa</i> L.	Shalqam	Hot and wet
57	Veal	<i>Bos taurus</i>	Goosaleh	Hot and wet
58	Well-baked wheat bread	-	Nan-e pokhteh	Balanced with slight hotness
59	White mulberry	<i>Morus alba</i> L.	Toot	Hot and wet
60	Wood-sorrel	<i>Oxalis acetosella</i> L.	Torshak	Cold and dry
61	<i>Zolabieh</i> (a traditional sweet)	-	Zoulbia	Hot
62	Zucchini/ pumpkin	<i>Cucurbita maxima</i> Duchesne	Kadou	Cold and wet



**Figure 1.** Frequency of fine-humor producing materia medica in terms of Mizaj

**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, <i>Esfidbaj</i> , pheasant, chicken and rooster, <i>Triticum aestivum</i> , Sudan olive oil, White mulberry, Sugar, <i>Samanoo</i> , Coconut, Pumpkin, Pistachio, Grape syrup, Fish, Spinach, Walnut, Alfalfa, Almond, Quince, <i>Mohallabiah</i>	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, <i>Zolabieh</i> , garden poppy, <i>Esfidbaj</i> grape, sugar, a, <i>Samanoo</i> 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, <i>Bogra</i> , kebab, <i>samanoo</i> , pistachio, cheese, Persian carrot, chickpeas, sesame, Eryngos, almond, quince, gizzard, <i>Mohallabiah</i>	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 %

7	Spleen	Roman spinach wood-sorrel, pomegranate, <i>Zolabieh</i> white mulberry Persian carrot chickpeas, grape syrup	8	12.70 %
8	Kidney and bladder	Roman spinach, sour pear, purple amaranth leafy goosefoot, rice, egg, sour, pomegranate, mung bean, shrimps, duck, <i>Bogra</i> , <i>triticum aestivum</i> , 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 %
9	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 <i>Mohallabiah</i>	23	36.51 %
10	Skin and hair	Purple amaranth Leafy goosefoot, rice, carob pomegranate chicken and rooster date, coconut cheese chickpeas grape syrup Christ's thorn, jujube meat stock	12	19.05 %
11	General tonic	Pears purple amaranth Leafy goosefoot, eggs grape kebab coconut muscle Christ's thorn, jujube goat and vealand lamb meat	11	17.47 %
12	Blood	<i>Qatayef</i> , lettuce, grapes, barley water, calf and lamb meat	6	9.53 %
13	Nerve	Mung bean, partridge, pigeon, Sudan olive oil, sugar, fish, sesame	7	11.12 %
14	Uterus	Shrimp	1	1.59 %
15	Heart	Sour pear, apple, egg, sugar, pistachio, grape syrup, walnut lamb chicory gizzard	11	17.47 %

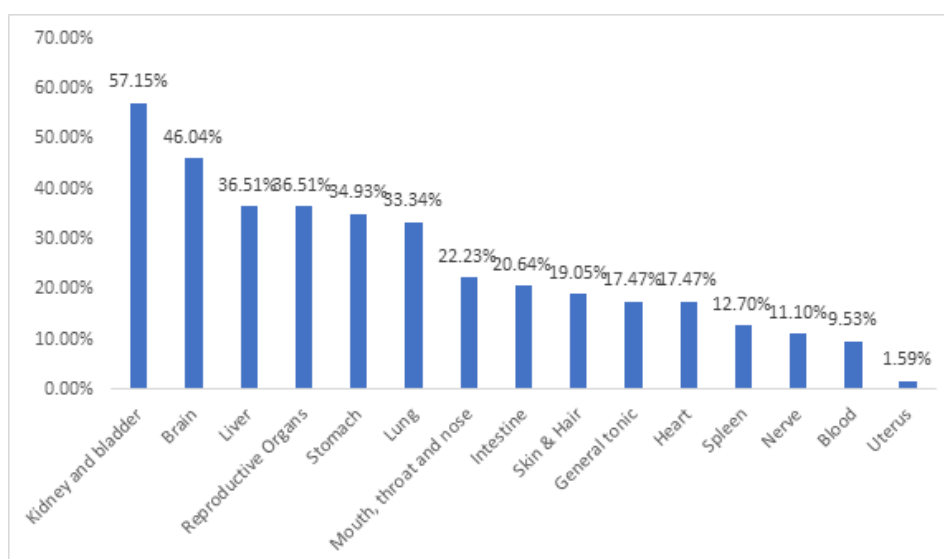


Figure 2. Frequency of fine-humor producing materia medica in terms of organ tropism

**Table 3.** Fine-humor producers in terms of actions

No.	Action	Name	Frequency	Percent
1	Obesogenous	<i>Qatayef</i> , rice, eggs, carob, pomegranate, <i>Zolabieh</i> , partridge, duck, chicken, <i>Triticum spelta</i> , grapes, pigeon, date, mulberry, sugar, brown nut sedge, kebab, <i>sama-noo</i> , coconut, pistachio, muscle, cheese, peas, fish, sesame, walnut, Alfalfa, <i>Mohallabiah</i> , 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, <i>Mohallabiah</i> , 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, <i>Bogra</i> , 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	Deopillant	Roman spinach lettuce, pomegranate, pheasant, <i>bogra</i> , 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, <i>Triticum aestivum</i> , 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, <i>Bograh</i> , kebab, chickpeas, turnip, quince	10	15.88%
8	Abstergent	Pomegranate, mung bean, grape, sugar, barley, peas, spinach, candy syrup, almonds	9	14.29%
12	Eiating	Sour pear, apple, sugar, coconut, meat stock, grape syrup, candy syrup, chicory	8	12.70%
4	Lithonriptic	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%

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.

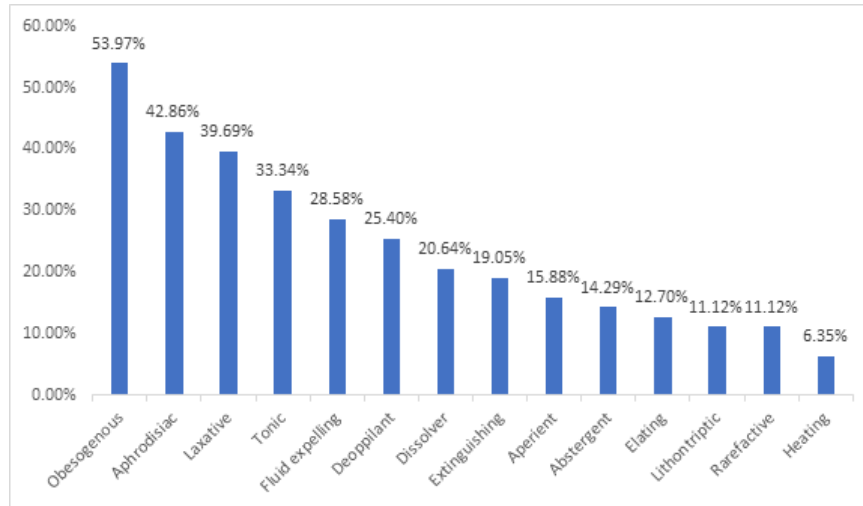


Figure 3. Frequency of fine-humor producing materia medica in terms of actions

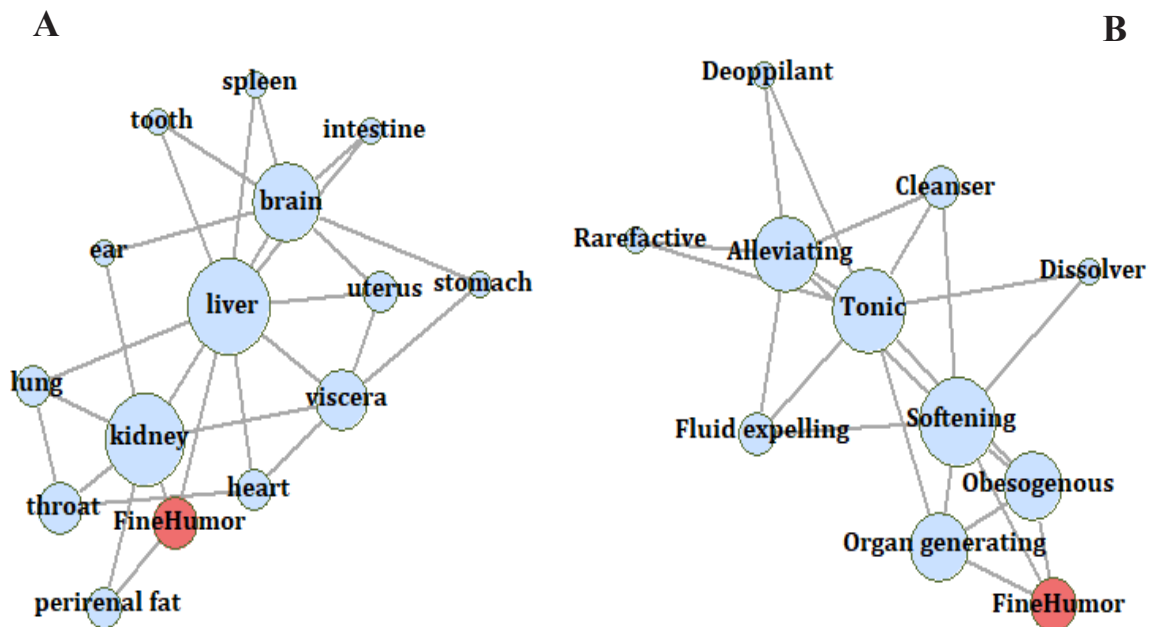


Figure 4. Co-occurrence graph using Log-likelihood method showing statistically significant relations between fine-humor producing materia medica and A. organ tropism; and B. actions.



## 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.

## Acknowledgements

None.

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