



The Compote-Like Nutraceutical of *Naqoa*: A Traditional Cholagogue Agent

Parmis Badr^{1,2*}, Forough Afsari Sardari³

¹Pharmaceutical Sciences Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

²Phytopharmaceutical Technology and Traditional Medicine Incubator, Shiraz University of Medical Sciences, Shiraz, Iran

³Department of Phytopharmaceuticals (Traditional Pharmacy), Shiraz University of Medical Sciences, Shiraz, Iran

Received: 17 Oct 2019

Accepted: 1 Nov 2019

Abstract

The system of medieval medicine was based on the four humors (blood, yellow bile, black bile, and phlegm) theory that connected disorders to disturbance of humor balance. Herbal infusions containing fruits in a sugary solvent were one of the preferences when bile exceeded. Current study aimed to introduce the traditional nutraceutical of *naqoa* and analyze the formulations suited for bilious disorders. Formulations of *naqoa* were extracted from three main multi-component encyclopedias of Traditional Iranian pharmacy, *Qarabadin Salehi*, *Qarabadin Kabir*, and *Qarabadin Azam*. Fifteen compote-like formulations were selected and analyzed. The scientific names of ingredients were authenticated, and the constituents and pharmacology of highly-used ingredients were discussed. Frequent indications among 53 formulations of *naqoa* were fever, and bilious disorders such as hot-temperament headache, warmth in liver or stomach, and thirst. Highly-repeated ingredients in *naqoa* were fruits of *Prunus domestica*, *Ziziphus jujube*, *Tamarindus indica*, *Prunus armeniaca*, the flower of *Viola odorata*, and the manna of *Alhagi maurorum*. All things considered, the compote-like formulation of *naqoa* is a multi-fruit nutraceutical in a sugary solvent, that has been traditionally prescribed for bilious disorders as an efficient cholagogue.

Keywords: Nutraceutical; *Naqoa*; Cholagogue; Traditional Iranian pharmacy

Citation: Badr P, Afsari Sardari F. The Compote-Like Nutraceutical of *Naqoa*: A Traditional Cholagogue Agent. Trad Integr Med 2019; 4(4): 170-175.

*Corresponding Author: Parmis Badr
Pharmaceutical Sciences Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
Tel: +98-7132348930-4 ext.303
Fax: +98-7132333771
Email: badrp@sums.ac.ir

Introduction

The system of medieval medicine was based on the four humors (blood, yellow bile, black bile, and phlegm) theory that connected disorders to the disturbance of humor balance [1]. Yellow bile, associated with the element of fire, with warm and dry quality was thought to be secreted from liver, and the excess of yellow bile was defined as one of the characteristics for choleric temperament [2,3]. Moreover, heat-related medical condition of fever was traditionally explained through increase of bile [4]. To relief bilious disorders, selecting the ingredients of multi-component formulations was of great importance [5]. Herbal infusions containing fruits in a sugary solvent were one of the preferences. The traditional nutraceutical of *naqoa* was prepared through an eight-hour steeping process, often without cooking or boiling step [6]. One example of this dosage form is *mishmish naqoa* (dried-apricot compote) that has been cited in a traditional Egyptian cookbook. Used after meal, this formulation improved digestion and relieved thirst [7]. Current study aimed to introduce the traditional nutraceutical of *naqoa* and analyze the formulations suited for bilious disorders.

Methods

Formulations of *naqoa* were extracted from three main multi-component encyclopedias of Traditional Iranian Pharmacy, *Qarabadin Salehi* (1766), *Qarabadin Kabir* (1781), and *Qarabadin Azam* (1853) [6,8,9]. Out of fifty-three formulations, 26 ones had bile-related indications, and cured various hot-temperament illnesses. In the next step, 15 compote-like formulations were selected and analyzed. The scientific names of ingredients were authenticated by indices of *Makhzan-al-advieh*, *Al-Saidaneh*, and *The Useful Plants of Iran and Iraq*, afterward being checked in The Plant List [10-13]. The constituents and pharmacology of high-

ly-used ingredients were discussed.

Results

Concerning 53 formulations of *naqoa* that were mentioned in three qarabadins, frequent indications were fever, and bilious disorders (fig. 1). The analysis of fifteen bile-related formulations has been reported in table 1. Main constituents and proved effects of highly-repeated ingredients have been summarized in table 2. Figure 2 illustrates the percentage of used parts of the whole ingredients.

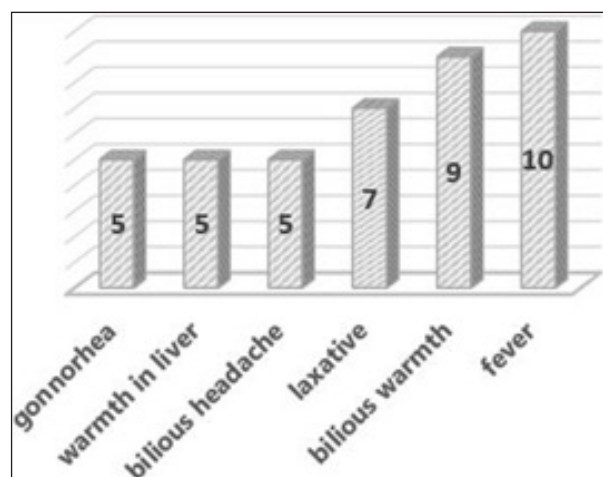


Figure 1: more frequent indications for *naqoa* (out of total 53 formulations) [6,8,9]

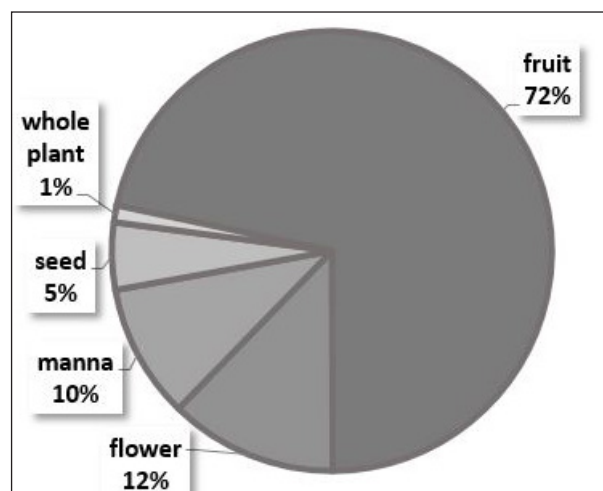


Figure 2: Proportion of used parts of ingredients in 15 bile-related formulations of *naqoa* mentioned in table 1

Table 1: Bile-related formulations of *naqoa*, the ingredients, used parts, plant families, and indications thereof [6,8,9]. Abbreviations are as follows. fr: fruit, fl: flower, m: manna, s: seed, wp: whole plant

	Ingredients	Family	Suitable as/for	Ref.
1	<i>Prunus domestica</i> L. (fr) <i>Ziziphus jujuba</i> Mill. (fr)	Rosaceae Rhamnaceae	bilious headache	[9]
2	<i>Alhagi maurorum</i> Medik. (m) <i>Cassia fistula</i> L. (fr) <i>Cotoneaster nummularioides</i> Pojark. (m)	Fabaceae Caesalpinaceae Rosaceae	hot-temperament headache	[9]
3	<i>Berberis vulgaris</i> L. (fr) <i>Echium amoenum</i> Fisch.&C.A.Mey (fl) <i>Prunus domestica</i> L. (fr) <i>Rosa</i> × <i>damascena</i> Herrm. (fl) <i>Vitis vinifera</i> L. (fr)	Berberidaceae Boraginaceae Rosaceae Rosaceae Vitaceae	cholagogue	[9]
4	<i>Berberis vulgaris</i> L. (fr) <i>Punica granatum</i> L. (fr) <i>Tamarindus indica</i> L. (fr)	Berberidaceae Lythraceae Fabaceae	warmth in liver	[9]
5	<i>Cichorium intybus</i> L. (s) <i>Nymphaea alba</i> L. (fr) <i>Ribes uva-crispa</i> L. (fr) <i>Rosa</i> × <i>damascena</i> Herrm. (fl) <i>Viola odorata</i> L. (fl)	Asteraceae Nymphaeaceae Grossulariaceae Rosaceae Violaceae	bilious fever	[9]
6	<i>Cichorium intybus</i> L. (s) <i>Coriandrum sativum</i> L. (fr) <i>Lens culinaris</i> Medik. (fr) <i>Nymphaea alba</i> L. (fr) <i>Prunus armeniaca</i> L. (fr) <i>Prunus domestica</i> L. (fr) <i>Viola odorata</i> L. (fl) <i>Ziziphus jujuba</i> Mill. (fr)	Asteraceae Apiaceae Fabaceae Nymphaeaceae Rosaceae Rosaceae Violaceae Rhamnaceae	fever	[6,8]
7	<i>Nymphaea alba</i> L. (fr) <i>Prunus armeniaca</i> L. (fr) <i>Tamarindus indica</i> L. (fr) <i>Viola odorata</i> L. (fl) <i>Ziziphus jujuba</i> Mill. (fr)	Nymphaeaceae Rosaceae Fabaceae Violaceae Rhamnaceae	bile expellant, warmth in stomach and liver	[8]
8	<i>Berberis vulgaris</i> L. (fr) <i>Nymphaea alba</i> L. (fr) <i>Prunus armeniaca</i> L. (fr) <i>Prunus domestica</i> L. (fr) <i>Tamarindus indica</i> L. (fr) <i>Viola odorata</i> L. (fl) <i>Ziziphus jujuba</i> Mill. (fr)	Berberidaceae Nymphaeaceae Rosaceae Rosaceae Fabaceae Violaceae Rhamnaceae	bile expellant	[6,8]
9	<i>Alhagi maurorum</i> Medik. (m) <i>Cordia myxa</i> L. (fr.) <i>Prunus armeniaca</i> L. (fr) <i>Prunus domestica</i> L. (fr) Sugar <i>Tamarindus indica</i> L. (fr) <i>Ziziphus jujuba</i> Mill. (fr)	Fabaceae Boraginaceae Rosaceae Rosaceae - Fabaceae Rhamnaceae	bile expellant, thirst	[6,8]

10	<i>Alhagi maurorum</i> Medik. (m) <i>Cassia fistula</i> L. (fr) <i>Chenopodium</i> spp. (s) <i>Cordia myxa</i> L. (fr.) <i>Prunus domestica</i> L. (fr) <i>Prunus cerasus</i> L. (fr.) Sugar <i>Tamarindus indica</i> L. (fr) <i>Viola odorata</i> L. (fl) <i>Ziziphus jujuba</i> Mill. (fr)	Fabaceae Caesalpinaceae Amaranthaceae Boraginaceae Rosaceae Rosaceae - Fabaceae Violaceae Rhamnaceae	bilious fever, cholagogue	[8]
11	<i>Berberis vulgaris</i> L. (fr) <i>Nymphaea alba</i> L. (fr) <i>Prunus armeniaca</i> L. (fr) <i>Prunus domestica</i> L. (fr) <i>Tamarindus indica</i> L. (fr) <i>Viola odorata</i> L. (fl) <i>Ziziphus jujuba</i> Mill. (fr)	Berberidaceae Nymphaeaceae Rosaceae Rosaceae Fabaceae Violaceae Rhamnaceae	bilious headache, cholagogue	[8]
12	<i>Alhagi maurorum</i> Medik. (m) <i>Cichorium intybus</i> L. (s) <i>Cordia myxa</i> L. (fr.) <i>Coriandrum sativum</i> L. (fr) <i>Cuscuta monogyna</i> Vahl. (wp) <i>Prunus domestica</i> L. (fr) <i>Tamarindus indica</i> L. (fr) <i>Vitis vinifera</i> L. (fr) <i>Ziziphus jujuba</i> Mill. (fr)	Fabaceae Asteraceae Boraginaceae Apiaceae Convolvulaceae Rosaceae Fabaceae Vitaceae Rhamnaceae	severe fever, warmth in liver	[8]
13	<i>Ficus carica</i> L. (fr.) <i>Phoenix dactylifera</i> L. (fr.) <i>Prunus armeniaca</i> L. (fr) <i>Prunus domestica</i> L. (fr) <i>Prunus dulcis</i> (Mill.) D.A.Webb (fr) <i>Prunus persica</i> (L.) Batsch (fr) <i>Vitis vinifera</i> L. (fr)	Moraceae Arecaceae Rosaceae Rosaceae Rosaceae Rosaceae Vitaceae	fever, warmth in liver	[8]
14	<i>Alhagi maurorum</i> Medik. (m) <i>Cotoneaster nummularioides</i> Pojark. (m) <i>Prunus domestica</i> L. (fr) <i>Tamarindus indica</i> L. (fr)	Fabaceae Rosaceae Rosaceae Fabaceae	cholagogue	[6]
15	<i>Alhagi maurorum</i> Medik. (m) <i>Cassia fistula</i> L. (fr) <i>Cordia myxa</i> L. (fr.) <i>Prunus domestica</i> L. (fr) <i>Prunus dulcis</i> (Mill.) D.A.Webb (fr) <i>Spinacia oleracea</i> L. (s.) Sugar <i>Tamarindus indica</i> L. (fr) <i>Viola odorata</i> L. (fl) <i>Ziziphus jujuba</i> Mill. (fr)	Fabaceae Caesalpinaceae Boraginaceae Rosaceae Rosaceae Amaranthaceae - Fabaceae Violaceae Rhamnaceae	bilious fever, cholagogue	[6]

Table 2. highly-repeated ingredients in 15 selected formulations of *naqoa*, their proved effects in modern phytotherapy and related compounds to mentioned effects

main ingredient/(nr. in total 15)	effect	constituents	Ref.
1. <i>Prunus domestica</i> L. / (11)	laxative	polyphenols (chlorogenic acid, neochlorogenic acid) sorbitol, fiber	[14]
2. <i>Ziziphus jujuba</i> Mill. / (10)	antipyretic	phenolic compound	[15,16]
3. <i>Tamarindus indica</i> L. / (9)	antipyretic	fiber, carbohydrates	[17,18]
4. <i>Viola odorata</i> L. / (7)	laxative	mucilage	[19]
5. <i>Prunus armeniaca</i> L. / (6)		sucrose, glucose fructose, inositol, pectin, glucose, polysaccharides	[20,21]
6. <i>Alhagi maurorum</i> Medik. / (6)	laxative, antipyretic	mannitol, melezitose, sucrose	[22,23]

Discussion

The formulation of *naqoa* is a traditional nutraceutical that contains various fruits in a sugary syrup. Based on figure 1, the most frequent applications are bile-related, so this multi-fruit infusion can be introduced as a cholagogue agent. These formulations can be effective on fever, bilious headache, warmth in liver or stomach, and thirst. Moreover, half of them expels excessive amounts of bile from body (table 1). The formulation of *naqoa* is either simple having two ingredients like number 1 or more complicated such as number 10 and 15.

Highly-repeated ingredients in *naqoa* are fruits of *Prunus domestica*, *Ziziphus jujuba*, *Tamarindus indica*, *Prunus armeniaca*, the flower of *Viola odorata*, and the manna of *Alhagi maurorum* (table 2). It is proved that some of them are antipyretic and laxative. Main constituents responsible for these two effects are polyphenols, fiber, mucilage, and different types of sugar such as sucrose, glucose, and fructose [14-22]. The fruit of *Tamarindus indica*, and the manna of *Alhagi maurorum* lower the level of bilirubin by reducing its intestinal-liver cycle, therefore, they are prescribed in jaundice [17, 23]. Proportions of used parts of plants in bile-related formulations are as follows: fruit 72%, flower 12%, manna 10%, seed 5%, and the whole plant 1%. According to natural philosophy, fruits

like *Prunus domestica*, *Tamarindus indica*, and *Prunus armeniaca* are dominant in element of water meaning they have a light-density quality that leads to reacting against fire element or bilious disorders [24]. The role of manna in formulations of *naqoa* is purgation. Two laxatives, *Alhagi maurorum* and *Cotoneaster nummularioides*, remove bile from body, so they have been suggested in cases of hot temperament and fever [10]. All things considered, the compote-like formulation of *naqoa* is a multi-fruit nutraceutical in a sugary solvent, that has been traditionally prescribed for bilious disorders as an efficient cholagogue.

Conflict of Interest

None.

Acknowledgement

Research reported in this publication was supported by Vice Chancellor for Research of Shiraz University of Medical Sciences with grant no. 98-01-36-20933.

References

- [1] Stelmack RM, Stalikas A. Galen and the humour theory of temperament. *Pers Individ Differ* 1991;12:255-263.
- [2] Nathan AF. Temperament and early experience form social behavior. *Ann NY Acad Sci* 2004;1038:171-178.
- [3] Vogel HG. Similarities between various systems of traditional medicine, considerations for the future of ethnophar-

- macology. *J Ethnopharmacol* 1991;35:179-190.
- [4] Thompson HJ. Fever: a concept analysis. *J Adv Nurs* 2005;5:484-492.
- [5] Afsharypuor S, Shams Ardakani MR, Mosaddegh M, Ghannadi A, Mohagheghzadeh A, Badr P. Introduction to Iranian Traditional Pharmacy and Pharmaceutical Dosage Forms. 1st ed. Choogan Press. Tehran 2013; pp 228-230.
- [6] Ghaeni Heravi SM. Qarabadin-e-Salehi. 1st ed. Choogan Press. Tehran 2013.
- [7] Nasrallah N. Treasure Trove of Benefits and Variety at the Table: a Fourteenth-Century Egyptian Cookbook. Brill Press. 2017; p 435.
- [8] Aghili Shirazi MH. Qarabadin-e Kabir. Edition Litograph. 1855.
- [9] Hakim Mohammad Azam Khan. Qarabadin-e Azam. Almai Press. 2014.
- [10] Aghili Khorasani SMH. Makhzan-al-Adwieh, 1st ed. Rah-e-Kamal Press. 2009.
- [11] Biruni A. Kitab-al Saydana fi-Tibb, Academy of Persian Language and Literature. 2004.
- [12] Hooper D. Useful Plants of Iran and Iraq. Research Institute for Islamic and Complementary Medicine, Iran University of Medical Sciences. Tehran 2003.
- [13] <http://www.theplantlist.org/>
- [14] Igwe EO, Charlton KE, A systematic review on the health effects of plums (*Prunus domestica* and *Prunus salicina*), *Phytother Res* 2016;30:701-731.
- [15] Preeti, Tripathi S. *Ziziphus jujuba*: A phytopharmacological review, *Int J Res Dev Pharm Life Sci* 2014;3:959-966.
- [16] Chen J, Liu X, Li Z, Qi A, Yao P, Zhou Z, Dong TXD, Tsim KWK. A review of dietary *Ziziphus jujuba* fruit (Jujube): developing health food supplements for brain protection. *Evid Based Complement Alternat Med* 2017;2017:1-10.
- [17] Sulieman AE, Alawad SM, Osman MA, Abdelmageed EA. Physicochemical characteristics of local varieties of tamarind (*Tamarindus indica* L.) medicinal plant in sindh. *Int J Plant Res* 2015;5:13-18.
- [18] Khanzada SK, Shaikh W, Sofia S, Kazi TG, Usmanghani K, Kabir A, Sheerazi Th. Chemical constituents of *Tamarindus Indica* L. *Pak J Bot* 2008;40:2553-2559.
- [19] Mittal P, Gupta V, Goswami M, Thakur N, Bansal P. Phytochemical and pharmacological potential of *Viola odorata*. *Int j pharmacogn* 2015;2:215-220.
- [20] Erdogan-Orhan I, Kartal M. Insights into research on phytochemistry and biological activities of *Prunus armeniaca* L. (apricot). *Food Res Int* 2011;44:1238-1243.
- [21] Ali S, Masud T, Abbasi KS. Physico-chemical characteristics of apricot (*Prunus armeniaca* L.) grown in Northern Areas of Pakistan. *Sci hortic* 2011;130:386-392.
- [22] Fakhri M, Farhadi R, Mousavinasab SN, Yosefi SS, Hosseinimehr SJ, Azadbakht M. Effect of natural products on jaundice in Iranian neonates. *Jundishapur J Nat Pharm Prod*, online ahead of print;14:e83042.
- [23] Ramezany F, Kiyani N, Khademizadeh M. Persian manna in the past and the present: an overview. *Am J Pharmacol Sci* 2013;1:35-37.
- [24] Ibn al-Nafis. Al-Shamil fi al-Tibb (The Comprehensive Book on Medicine), Research Institute for Islamic and Complementary Medicine, Iran University of Medical Sciences, Tehran 2009.