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Short Communication

Herbal Remedies for Cancer based on Persian Medicine

Marjan Mahjour[1], Arash Khoushabi[2], Mohammad Reza Noras[3*]

[1]Department of Persian Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
[2]Health Department, Mashhad University of Medical Sciences, Mashhad, Iran
[3]Department of Persian Medicine, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

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Abstract

Cancer is the second cause of mortality in the world which causes poor quality of life. In Persian Medicine (PM), some issues about cancer have been mentioned in details. Many herbs are claimed to be useful in cancer. This paper aimed to search the most common herbal drugs affecting the cancer based on PM literature. This is a review study based on PM literature and data retrieved from the electronic databases such as PubMed and Scopus through key terms such as herbal drug and cancer. The study found 15 herbs affecting the cancer in this regard. Most of these herbs have been investigated in the recent studies. It is recommended further evaluation on the plants mentioned in PM books, particularly those with no clinical trials or laboratory tests.

Keywords: Cancer; Herbal drugs; Persian medicine

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*Corresponding Author: Mohammad Reza Noras
Faculty of Persian and Complementary Medicine, next to the Faculty of Medicine, Azadi Square, Pardis Campus, Mashhad, Iran
Tel: +98-5138829279, +989151650410
Email: Norasmr@mums.ac.ir

Introduction

Cancer is the second cause of mortality in the world. It causes poor quality of life [1]. It causes various morbidities based on its type. The prevalence of cancer is increasing in the world. In Western societies, 14.1 million individuals involved in cancer in 2014 [2]. There are most of the cancer cases (about 57%) in developed countries which accounts for 65% of mortality rate [3]. In Iran, 106.7:1000 ones are suffering from cancer. However, this number is increasing from six years ago. The last reports for the cancer rate indicate the prevalence of cancer 58% in men and 42% in women. Meanwhile, breast cancer in women and stomach cancer in men are the most types of cancers. Many cancer patients (53.3%) end with mortality [4]. Cancer remedies have been developed greatly in the last two decades. However, dissatisfaction with the remedies is still a problem [5]. Cancer mechanism is unknown [6]. In recent years, physicians and researchers require supportive and palliative care facilities for cancer patients in order to inducing high quality of life [7]. There are advances in some fields such as genomics, proteomics, and nanotechnology to detect cancer earlier [8]. Today, we can detect cancers earlier and cure them more than before [9]. There are various strategies in cancer treatment such as biological therapy, hormone therapy, and radiotherapy [10]. Food strategies and correction of lifestyle, such as greater intake of fruits and vegetables, restricted caloric foodstuffs, consuming whole grains, exercise and regular checkups are needed for cancer prevention [11]. Meanwhile, usage of herbal drugs (drugs used to treat in traditional medicine) from complementary and alternative medicine (CAM) is increasing and it is used by 25% to 50% of the population of industrialized nations [12]. Half of the cancer patients use CAM, even with chemotherapy [13]. These botanicals have many usages in complementary medicine, including Chinese, Persian, and Indian medicine. This paper aimed to introduce the most common herbal drugs in cancer treatment based on Persian Medicine (PM) recourses, and also searching these herbs in electronic databases for comparison purposes.

Methods

For identification of herbal drugs affecting cancer we searched through PM literature such as the Canon of Medicine (written by Avicenna), Al-Hawi fi tebb (Written by Zakaria) [14] and the other resources mentioned in table1 using keywords such as “herbal drug”, “cancer”, and “treatment”. The researchers also reviewed some anti-cancer herbal drugs retrieved from Persian electronic databases (SID, Silivica, Irandoc) along with international electronic databases (PubMed, Google scholar, Scopus) using keywords “anticancer” and “treatment”. In the second step, we noted safety and function of each herb in cancer by in-vivo, in-vitro, animal and human studies. Collected data covered 1990 to 2018. Articles’ lists of references were also checked to find any related articles. The title and abstract of each article were reviewed and all repetitious and unreliable articles were excluded. The articles were studied by the two reviewers independently; if there was a disagreement, a third reviewer interfered after eval-

uating ideas of the two previous reviewers.
Inclusion criteria: valid PM books (the original books), valid electronic journals.
Exclusion criteria: invalid PM books (the books were extracted from the others), invalid electronic databases.

Table1. Profile of Persian scientists and their literatures

Persian name	English name	Author	Birthday	Death	Topic
Al-Qanoon fi al-Tibb	The Canon of Medicine	Avicenna	980	1037	Principles of Medicine- Herbal drugs- Diseases- Pharmaceutical Industry
Makhzan-al-advie	Storehouse of Medicaments	Aqili Khorasani	Unknown	12th	Herbal drugs
Al-Hawi fi tebb	The Liber Continens (The comprehensive book on medicine)	Rhazes	854	925	Diseases
Tohfat Al-momenin	Rarity of the Faithful	Hakim Mohammad Momen Tonekaboni	Unknown	11th	Principles of Medicine- Herbal drugs- Pharmaceutical Industry- Idioms
Zakhireh Khârazmshâhi	Treasures of the Khwarazm Shah	Sayed Isamail Jorjani	1042	1137	Principles of Medicine- Herbal drugs- Diseases- Pharmaceutical Industry
Exire Azam	The Greatest Elixir	Nazem Jahan Chishti	Unknown	1902	Diseases

Results

We evaluated 15 effective herbal drugs for various types of cancers. (Table 2)

1- Cabbage - Broccoli

Cabbage is effective in all types of cancers such as uterus and skin cancers based on PM resources. This drug was prescribed in the form of unguent, decoction (externally), vaginal bath, and cooked (orally and externally) [15-19].

Recently, it is reported that Broccoli is widely used in the treatment of several forms of cancer. Some ingredients of broccoli such as brassinin, isothiocyanates, indole-3-carbinol and especially selenium have an important role in cancer prevention [20].

Brassica oleracea L (BO). Var. sabauda (Cab-

bage) showed pro-oxidant activity that correlates with the inhibition of cell proliferation [21]. BO. var. italic (Broccoli) has an antioxidant activity and it is associated with a lower risk of lung and colorectal cancers [22]. In a study, some male mice received a diet including high lard and sucrose with or without freeze-dried broccoli. The result showed an inhibition of the progression of hepatic neoplasm [23]. The other studies showed that Brassica vegetables in the daily diet caused lower risk of several cancers [24].

2- Black nightshade

PM scholars recommended *Solanum nigrum* (SN) for all types of cancers, especially uterus and skin cancers. This drug is prescribed in the form of cataplasm and extract [15-19, 25].

Nowadays, it is used in anticancer drugs. In a study with forty patients, SN in a Chinese drug compound named Fuzheng Kang'ai decoction (including *Pseudostellaria heterophylla, Atractylodes macrocephala* Koidz*, Astragalus membranaceus, Oldenlandia diffusa,* SN*, Salvia chinensis Benth, Cremastra appendiculata, Coix lachrymal-jobi L., Rubus parviflolius* L.*, Curcuma kwangsiensis,* and *Glycyrrhiza uralensis*) was effective in gastric antrum cancer [26, 27]. In the other study on 70 patients, it could be effective in lung cancer (Fuzheng Kang›ai decoction). And also, it was reported to be effective in 60 patients with middle-advanced stage liver cancer by tumor shrinking activity and improving clinical symptoms [28].

3- Dodder

Based on PM resources, dodder is effective in all types of cancers and ulcerating tumors. It has been administrated in the form of powder and decoction (orally) [15,16,18,19,25,29].

The recent articles showed that *Cuscuta epithymum* L (CE) is effective in cancer. In an article, *in vitro* chloroform and hydroalcoholic extracts of the aerial parts of CE significantly decreased the breast carcinoma cell line, human colorectal adenocarcinoma cell line and human uterine cervical carcinoma due to cytotoxic properties [30,31].

4- Roman nettle

PM scholar recommended *Urtica pilulifera* L (UP) for treatment of all types of cancers, especially skin cancer and ulcerating tumor in the forms of cataplasm, ash dusting and powder (externally) [16,18,19,29].

In the recent studies, *in vitro* cytotoxic effect of UP extract was evaluated in which the results showed that UP induces apoptosis in human breast cancer cells [32].

5- Flixweed

Based on PM resources, *Descurainia sophia* L (DS) was recommended for all types of cancers in the form of cataplasm [18,19].

In a study, DS increased the *in vitro* apoptotic cell death that can be introduced as a good herbal source for anticancer activity [33].

6- Frankincense

It is expressed in PM books that frankincense is effective in eye cancer. Also, it is recommended to be applied in the form of condensed smoke as collyrium [16,18,19,29].

In an in vitro study, *Boswellia sacra* Flueck (BSF) resin was extracted. Inhibitory activity against CaCo2 and HeLa cancer cell lines was evaluated. The result showed that frankincense

could block the proliferation of the colorectal cancer and cervical cancer cell growth [34].

7- Lesser galangal

PM scholar recommended *Alpinia officinarum* Hance (AOH) for the treatment of all types of cancers in the forms of electuary (Orally) [18,19].

According to an *in vitro* study, aqueous and organic solvent extracts of AOH were tested for its anti-proliferative activities against THP-1 AMoL cells. The findings showed an anti-proliferative effect of AOH on acute monocytic leukemia cells [35].

8- Chicory

It is mentioned in PM resources that chicory is effective in all types of cancers especially uterus and ulcerating tumor. It was administrated for cancer treatment orally or in the form of a cataplasm for external use [15, 17, 18].

Cichorium intybus L. (CI) in an *in vitro* study had a total antioxidant activity by counteracting the oxidative stress and cellular damage since it had a beneficial effect on colorectal cellular damages [36].

9- Chrysanthemum

This plant was described in PM resources as an effective herb in ulcerating tumors in the form of decoction from its yellow flower [19].

Chrysanthemum indicum (CHI) is a famous plant in China that traditionally used for the treatment of neoplastic disorders. It was examined in an *in vitro* study that attenuated the mitogenic effect of isoproterenol on human hepatocellar carcinoma cells [37]. Also, in a study, thirty Swiss albino male mice were divided into six groups, including control group and case group which each of them treated with Adriamycinin, CHI (low and high dose). The results showed consumption of CHI with Adriamycinin reduces the adverse effect of ADR in cancer chemotherapy [38].

10- Coriander

According to PM resources, coriander is effective in all types of cancers, especially in eye, uterus and skin cancers. It was administrated orally or in the form of cataplasm and vaginal douche for the external usage [15-19, 29]

In an *in vitro* study, *Coriandrum sativum* L (CS) was extracted. The antioxidant and anticancer properties of CS root were assessed. This herb showed the highest anti-proliferative activity in the human breast cancer cells due to antioxidant activity and inducing apoptosis. It had also a role in cancer prevention and inhibition of metastasis [39].

11- Assyrion plum

PM scholars mentioned about the beneficial effects of this plant on uterine cancer in the form of decoction (orally) [29].

The present study did not find about the anti-cancerous specifies of *Cordia myxa*. However, the other species of cordia such as *Cordia dichotoma* were effective in the treatment of cancer. In a study, the anticancer activity of methanolic extract of *Cordia dichotoma* was tested. The result showed inhibition of proliferation of human cervical cancer cells by apoptotic activity [40].

12- *Sesbania aculeata*

In PM resources, *Sesbania aculeata* is effective in all types of cancers. It has been administrated in the form of cataplasm [19]

The present paper did not find about the an-

ti-cancerous specifies of *Sesbania bispinosa* in new articles. However, we found about the effect of the other species of sesbania such as *Sesbania grandiflora* on the lung cancer [41].

13- Chickpea

Chickpea in PM books is recommended for all types of cancers, especially uterus and ulcerating tumors. For treatment of this disorder, it has been ordered orally or in the form of cataplasm for external usage [15, 17, 18].

Recent studies confirmed the anti-cancer properties of *Cicer arietinum* L (CA). In a study, eight selected legume species were assessed about the inhibitory potential of legumes on cancer. The result showed that legumes such as CA have a potential use in anti-cancer diets [42]. In the other article, the effects of isoflavones extracted from chickpea sprouts was investigated on the human breast cancer cell lines in which the result showed CA could be suggested as a chemo-preventive or therapeutic agent against breast cancer [43].

14- China root

In PM resources, China root was considered as an effective herbal drug in the healing of skin cancer in the form of decoction for oral usage [18]

The anticancer activity of eight crude extracts of *Smilax china* L. (SC), in a study was assessed in which a flavonoid glycoside derived from SC, showed an anticancer activity by inducing apoptosis and anti-proliferative effect [44].

15- Alison

In PM resources, the anti-cancer activity of Alison on internal organ cancers has been described. It has been administrated in the form of cataplasm [29].

We found no study about its anticancer activity of Alison from the electronic databases.

Table2. Persian medicinal plants with anticancer activity

Common Name	Local Name	Scientific Name	Family	Parts Used	Cancer type	Ref in PM	Action based on the electronic articles	References in the Articles		
								Rev	RCT	In vivo/ in vitro
Cabbage	karnab	*Brassica oleracea* L.	Brassicaceae	Le Fl	Uterus, All types, Skin	[25]	Ai- Ao- Ia- Ct		[45]	
Black night-shade	enab al-tha`al-ab	*Solanum nigrum* L	Solanaceae	Le	Uterus, All types, Skin	[25]	Ao- Antitu-morogenic-blocking tne antia-poptosis pathway		[46]	
Dodder	aftimun	*Cuscuta epithymum*	Cuscutaceae	Ap	All types, Ulcerating tumor	[25]	Ao- Ai- Ct- Ap		[47]	

Roman nettle	anjorah	*Urtica pilulifera* L.	Urticaceae	Se Le	All types, Skin, Ulcerating tumor	[16, 18, 19]	Ao- Ai- Ct			[32]
Flixweed	khobbah	*Descurainia sophai* L. syn. *Sisymbrium sophia* L.	Cruciferae	Se	All types	[18, 19]	Ao- Ai- Antitumor activity- Ia	[48]		[33]
Frankincense	kondor	*Boswellia sacra* Flueck syn. *Boswellia carteri* Birdw	Burseraceae	Ogr	Eye	[16, 19, 25]	Ao- Ai- Ct -Ia		[47]	
lesser galangal	kholanjan	*Alpinia officinarum* Hance	Zingiberaceae	Rh	Liver, Skin	[18, 19]	Ao- Ct- Ai- Ia		[49]	
Chicory	hindeba	*Cichorium intybus* L.	Asteraceae	Le	Uterus, All types, Ulcerating tumor	[18, 25]	Ao- Ai- Stimulation Apoptosis		[50]	
Chrysanthemum	Gol davoudi	*Chrysanthemum indicum* L.	Asteraceae	Fl	Ulcerating tumor	[19, 51]	Ao-Ai- ct- Ia			[37]
Coriander	kozborah	*Coriandrum sativum* L.	Apiaceae	Le Se	Eye, Uterus, Skin, All types	[18, 19]	Ao- Ai- Ct-		[52]	
Large sebesten	sepestan	*Cordia myxa* L.	Boraginaceae	Fr	uterine cancer	[18]	Ao- Ai- Ia	--	--	--
Sesbania	sisban	*Sesbania aculeata* Poir.	Fabaceae	Le		[19]	Ao- Ai- Ct- Ia	--	--	--
Chickpea	hemmas	*Cicer arietinum* L.	Fabaceae	Se	Skin, All types, Ulcerating tumor	[18, 19]	Ao- Ai- Ia		[53]	
China root	Choob chini	*Smilax china* L.	Smilacaceae	R	All types	[18]	Ao- Ai- Ia		[54]	

Part used:
Ap = aerial parts, Ba = balsam, Be = berries, Br = bark, Ff = fresh fruit, Fl = Flowers, Fp = fruit pericarp, Fr = fruit, G = gum, Gre = gum resin, Le = leaves, Mu= mucilage, N = nuts, O = oil, Ogr = oleogum Resin, Ore = oleoresin, R = root, Rb = root bark, Re = resin, Rdj = Root dry juice, Rf = Ripe fruit, Rh = rhizome, Se = Seeds, Sh =shoots, So = seed oil, St = stigma, S= stem, Tap root = Tro, Sa = sap, Urf = Unripe fruit, W = wood, Wp = whole plant.
Action based on the electronic databases:
Ao: antioxidant- Ai: Antiinflammatory- Ap: Antiproliferative- Ia: Induces apoptosis- Ct: Cytotoxic

Discussion

Based on the results, 15 herbs such as BO, SN and CE affecting the cancer were extracted. One of the limitations of the present study was the lack of access to plant species introduced in PM. In a study, Javadi et al. introduced 107 herbs affecting the cancer based on 15 PM books. The reason for resource depletion in the present study compared with Javadi study was removing the duplicate resources. Most of the present study herbs were recommended for all types of cancer in PM. Some herbs, including BSF, AOH, CHI, CM, and *Alyssum campestre* (AC) specifically mentioned for one or more cancer types. BSF in PM is recommended for eye cancer treatment, but Zhang et al. investigated it in colorectal and cervical cancers. The PM has introduced AOH in the liver and skin cancer treatment, while Omoregie et al. introduced this herb for acute monocytic leukemia. Also, in Chinese Medicine, CHI had been used in malignancy and in the PM. It is introduced in ulcerous cancers; the results are almost in one direction. We found no new article about this herb. However, Yuan et al. have introduced CHI in reducing the progression of hepatocarcinoma. In PM, these herbs had been prescribed orally or topically or in both forms, but in new studies, we found no mentions about how to use these plants on cancer. BO, SN, CE, CHI, CA, which were recommended for cancer in PM, had been investigated on cancer more than the other herbs.

The study did not find an anti-cancer effect of some herbs such as CM, SA and AC based on the new articles. PM recommendations about anti-cancer properties are often consistent with the new articles. The difference between the two medicines is only in the pathogenesis views. Paying attention to this point is important that in ancient times, there have been no laboratory diagnostic facilities and advices had been taken as a whole, but in modern medicine, anti-cancer effects are accurately described by separating the active ingredients in plants. Some scientists such as Chaudhary et al. introduced the active ingredients present in BO in laboratory conditions (in vitro) for prevention of cancer [55]. Also, some studies have proven the active ingredients in BO by in vitro and animal tests on cancer cells [20, 56]. Among plants affecting the cancer, clinical trials have been conducted in BO, SN, CE, BSF, AOH, CI, CS, CA and SC .The rest of the study plants have been investigated in laboratory conditions (on plants or on animals). No practical work was found on some plants such as CM, SA and AC.

Conclusion

In the end, it is recommended that further evaluation be carried out on plants mentioned in PM books, particularly those with no clinical trials or laboratory tests.

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Conflict of interest

The authors have no conflicts of interest.

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