Egypt. J. Vet. Sci. **Vol. 53,** No. 2, pp. 209-217 (2022)

Egyptian Journal of Veterinary Sciences
https://ejvs.journals.ekb.eg/

Kidney: Management and Treatment with Medicinal Plants According to Ethno-botanical and Ethno-veterinary Evidence

Reza Asadzadeh[1], Khojasteh Hoseinynejad[2], Fatemeh Amin[3], Shabnam Shamaei[4] and Nasrin Bazgir[5*]

[1]Assistant Professor of Nephrology, School of Medicine, Ilam University of Medical Sciences, Ilam, Iran

[2]Department of Physiology, Faculty of Medicine, Persian Gulf Physiology Research Center, Medical Basic Sciences Research Institute, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

[3]Department of Persian Medicine, School of Medicine, Shiraz University of Medical Science, Shiraz, Iran

[4]Department of Chemistry, Khorramabad Branch, Islamic Azad University, Khorramabad, Iran

[5]Assistant Professor of Rheumatology, School of Medicine, Non-Communicable Diseases Research Center, Shahid Mostafa Khomaeini Hospital, Ilam University of Medical Sciences, Ilam, Iran

KIDNEY failure (CKD) is a debilitating disease that results in severe renal failure. The kidneys are destroyed very slowly and fail. Weakness, lethargy, chronic fatigue, paleness, swelling of the hands and feet, or puffiness around the eyes and high blood pressure are some of the symptoms of kidney failure. The aim of this study was to herbs used in Iranian ethnopharmacological knowledge in order to identify medicinal plants affecting renal failure. In this review study, keywords such as renal failure, renal impairment, hypertension, diabetes, herbs, ethnobotany, ethno-veterinary, ethnopharmacology, and Iran were used. Databases such as ISI, WOS, Scopus, IslamicWorld Science Citation Center, Scientific Index database and Google Scholar were used to review articles and resources. Finally, 23 articles containing ethno-pharmacological information for the treatment of renal failure were used to review the literature. Medicinal plants such as *L. album* L., *O. vulgare*, *A. sativum* L., *B. vulgaris* L., *E. elaterium*, *C. monogyna*, *P. spina-christi* Miller., *R. ribes* L., *O. europea*, *S. marianum* L., *T. polium* L., *N. sativa* L., *Z. jujuba* (L) H.Karst, *C. bruguieriana* Hand. Mzt., *J. regia* L., *B. Napus* L. and some other herbs. are the most important medicinal plants used to treat kidney failure and disorders. Traditional Iranian medicine has long used natural resources to prevent and treat kidney problems. There are various methods available to use herbs to treat diseases. Findings this study can be a comprehensive guide to the ideas and medicinal plants of different regions of Iran that are effective in treating kidney disorders.

Keywords: Kidney, Kidney failure, Ethno-botany, Ethno-veterinary, Medicinal plants, Iran

Introduction

Kidney failure means the inability of the kidneys to excrete waste products. The kidneys are normally responsible for clearing the body of waste products, and if they fail, the waste products will accumulate and cause symptoms that vary in severity; Kidney failure can occur in two forms, acute or chronic [1-3]. Kidney failure (CKD) eventually leads to end-stage renal disease and requires one of the alternative treatments,

Corresponding authors: Nasrin Bazgir, E-mail: bazgir-n@medilam.ac.ir
(*Received* 15/12/2021; *accepted* 17/01/2022)
DOI. 10.21608/ejvs.2022.111360.1322

including transplantation or dialysis [1, 2]. These patients are unable to survive without kidney replacement therapy and are at serious risk of death [3]. One of the most important causes of kidney failure is diabetes and high blood pressure. The number of people with diabetes and high blood pressure is increasing worldwide. As a result, the number of people with kidney disease due to diabetes and high blood pressure, which is associated with high mortality, is also increasing [4,5]. Persistent high blood sugar in prolonged diabetes damages the small blood vessels inside the kidney. Initially, this damage manifests itself in the excretion of protein in the urine. Following high blood pressure, edema and other symptoms of kidney damage appear. Eventually the damage progresses and kidney failure develops [6, 7]. Severe kidney damage leads to sudden deterioration and reduction of kidney function and inability to excrete excess nitrogen products, regulate homeostasis, water and electrolytes, and acidosis [8]. The end result of CKD, regardless of the type of kidney disease, includes progression to kidney failure, its complications and the development of cardiopulmonary disease, and bone problems that cause pain and suffering [9-13]. Its prevalence is 10 to 15% in the United States, 11.2% in Australia, 18.7% in Japan, 10.1% in Singapore and 18.9% in Iran [14-18]. Treatment of renal failure through permanent hemodialysis, in addition to high cost, has many physical and mental problems for the patient [19, 20]. Kidney disorders, including kidney failure, are common problems that cause general damage to the body. People's interest and approach in the new era includes the use of traditional medicine and herbal medicine, especially herbal medicine. Because herbs have active immune substances that have important medicinal effects on the body and can cure a person's disease. Today, herbs are used to treat many diseases, including cardiovascular disease (diabetes and/or hypertension) [21-23].

Considering the side effects of chemical drugs on the body and the popularity of people in different cultures in relation to medicinal plants and herbal medicines, therefore, the purpose of this study is to report medicinal plants that can be effective in renal failure disorder.

Methodology

Keywords such as renal failure, renal disorders, hypertension, diabetes, herbs and Iran were used to review the articles. Databases such

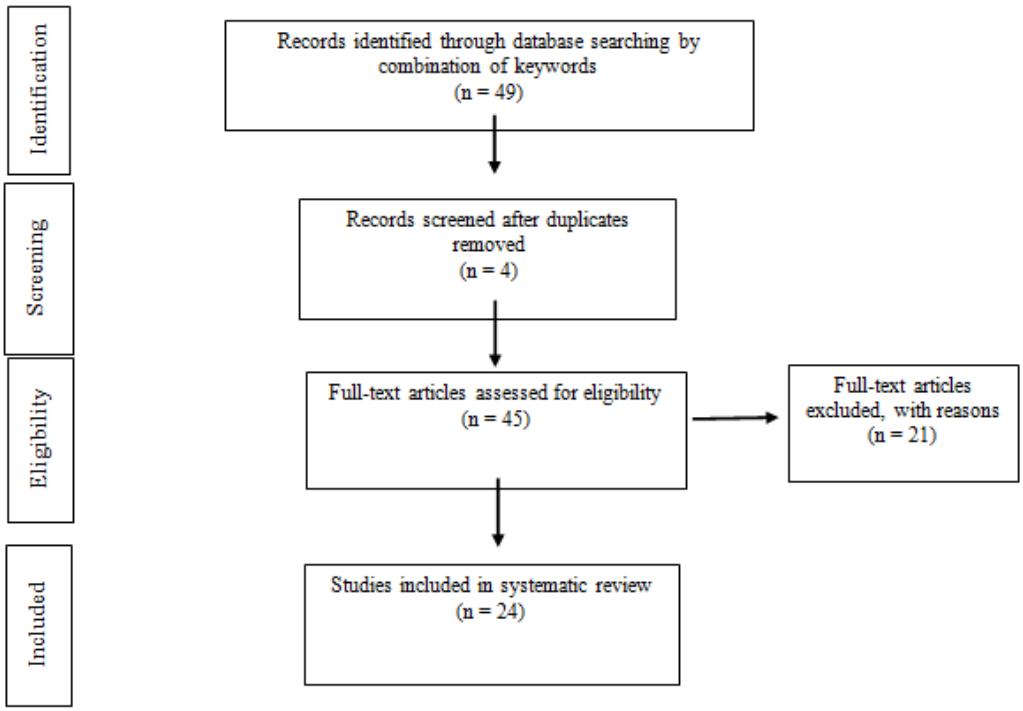

Fig. 1. The criteria and the number of entry and exit articles

as WOS, Scopus, Islamic World Science Citation Center, Scientific Index database and Google Scholar were used to search for articles. In this study, 49 articles were searched and found. 4 articles also lacked full text. There were two duplicate articles that were removed. Finally, 45 articles were reviewed for literature review. Of the 45 articles, only 23 articles contained ethnomedicine information (Flowchart).

Results

Based on the results of reviewing Iranian ethnobotany resource, it was determined that medicinal plants such as as *L. album L., O. vulgare, A. sativum L., B. vulgaris L., E. elaterium, C. monogyna, P. spina-christi Miller., R. ribes L., O. europea, S. marianum L., T. polium L., N. sativa L., Z. jujuba (L) H.Karst, C. bruguieriana Hand. Mzt., J. regia L., B. Napus L.* and some other herbs. Are the important medicinal plants used to treat kidney failure and disorders. The list of plants, families, organs used and the province in question is given in Table 1.

Discussion

Kidney failure occurs due to factors and diseases such as hypertension, diabetes, kidney stones, kidney infection, glomerulonephritis, etc. Medications used to treat kidney failure are usually associated with serious side effects. Therefore, a new approach and strategy for the treatment of renal failure is the use of medicinal plants. Today, natural products obtained from living organisms such as herbs and secondary metabolites are used as one of the most widely used complementary therapies and prevention in the treatment of renal failure [55]. In areas of country (Iran), in the knowledge of traditional medicine, types of herbs are used to remedies pain on the kidney. In Abadeh (Shiraz-southern Iran) *A. oreintalis and A. mellifolium* herbs are used for cases of kidney pain. In Arasbaran of *B. vulgaris* L. and *E. arvense* [57], in Ilam (western of Iran) of *A. persarum* and *L. depressum* [58], in Khuzestan (southwestern of Iran) of *A. haemanthoides* and *H. orthocarpus* [59], In Sistan of *M. neglecta* [60], in Mobarakeh from *P. crispum* [61], in Hormozgan of *T. terresteris* [62] and In Hamedan of *C. falcata* [63] and in Sistan from *M. neglecta*, and *A. persarum* [64] are used in cases of kidney pain. Some herbs in some parts of Iran have an pain killer effect. The results of present study and its comparison with the results of our study, and experienced suggestions of herbal medicine on the renal analgesic effects of herbs, these herbs can have a prophylactic properties on the treatment of renal disorders and insufficiency because some medicinal plants with renal analgesic effect, they have therapeutic effects on renal failure and disorder. Medicinal plants such as *Marrubium anisodo, Rosa hemispherica*, *Hippophae rhamnoides*, *Viola odorata*, *Haussknechtia elymaitica*, *Achillea wilhelmsii*, *Allium hirtifolium* Boiss., *Melilotus officinalis*(L.), *Silybum marianum*, *Rhus coriaria*,*Echium amoenum*, *Equisetum arvense*, *khorasanicum*, *Rheum turkestanicum*, *Rosa beggeriana*, *Camellia sinensis*, *Olea europaea*, *Allium sativum*, *Crataegus azarolus*, *Urtica dioica*, *Crataegus pontica*, *Rheum ribes*, *Mentha longifolia* and *Stachys lavandulifolia* are the most widely used herbs effective on blood pressure in Iranian ethnobotanical documents [65]. Problems with the urogenital tract and endocrine glands are common [66-68]. Medicinal plants today are the subject of extensive medical research [69,70] and they can cure diseases because of their therapeutic effects [71-74].

In Iranian ethnobotany, medicinal plants such as *Urtica dioica* L., *Teucrium polium* L., *T. foenum-graecum* L. and *Juglans regia* L. are 111 used to remedy diabetes. Comparison of the results of our study with another study by Asadi 112 Samani et al. (2017) shows that the anti-diabetic plants mentioned in Iranian ethnobotanical 113 studies can have a preventive effect on the treatment of kidney disorders and insufficiency 114 because some medicinal plants have anti-diabetic effects. Therapies are in renal failure and 115 disorder.

Conclusion

This review article found that different Iranian ethnic groups around the world use about forty medicinal plants from 25 herbal medicine families to treat kidney failure. The present study could provide a beacon and new ideas for kidney disorders that lead to the production of effective natural products.

TABLE 1. Medicinal plants affecting renal failure and additional information about the organ used, Persian name, region used

Scientific names	family	Organ used	Region used	Bioactive compounds	Chemical formula
Allium sativum L.	Aliaceae	Root	West Azerbaijan [33]	Allicin	$C_6H_{10}OS_2$
Berberis vulgaris L.	Berberidaceae	Leaf	Arasbaran [34]	Berberine	$C_{20}H_{19}NO_5$
Ecbalium elaterium	Cucurbitaceae	Root and fruit	Arasbaran [34]	kaempferol	$C_{15}H_{10}O_6$
Crataegus monogyna	Rosaceae	Leaves and fruit	Arasbaran [34]	Luteolin	$C_{15}H_{10}O_6$
Paliurus spina-christi Miller.	Rhamnaceae	Fruit	Ilam [35]	Quercetin	$C_{15}H_{10}O_7$
Rheum ribes L.	Polygonaceae	Stem	Ilam [35]	Sitosterol	$C_{29}H_{50}O$
Olea europea	Oleaceae	Fruit	North East Persian Gulf [36]	Oleoropein	$C_{25}H_{32}O_{13}$
Silybum marianum L. Gaertn.	Asteraceae	Root	Khuzestan [37]	Silydianin	$C_{25}H_{22}O_{10}$
Teucrium polium L.	Lamiaceae	Aerial parts	Khuzestan [37]	Carvacrol	$C_{10}H_{14}O$
Tragopogon aureus Boiss.	Asteraceae	Leaf and Fruit	Khuzestan [37]	n-hexadecanoic acid	$C_{16}H_{32}O_2$
Rumex pulcher L.	Polygonaceae	Root	Khuzestan [37]	Inoleic acid	$C_{18}H_{32}O_2$
Arctium lappa L.	Asteraceae	Root, leaves	Khuzestan [37]	1, 3cyclo-octadiene	C_8H_{12}
Nigella sativa L.	Ranunculaceae	Seed	Sistan [38]	9-eicosyne	$C_{20}H_{38}$
Suaeda altissima Pall.	Chenopodiaceae	Leaves and stem	Northern region [39]	Alpha-Pinene	$C_{10}H_{16}$
Silybum marianum (L.) Gaerth.	Asteraceae	Flower	Kazeroon [40]	Silydianin	$C_{25}H_{22}O_{10}$
Ziziphus jujuba(L) H.Karst	Rhamnaceae	Fruit	Mobarake [41]	Jujuboside B	$C_{52}H_{84}O_{21}$
Echium amoenum L	Boraginaceae	Flower	Mobarake [41]	Rosmarinic acid	$C_{18}H_{16}O_8$
Fumaria asepala Boiss	Fumariaceaea	Shoot	Marivan [42]	Protopine	$C_{20}H_{19}NO_5$
Rumex conglomerates Murr	Polygonaceae	Leaf and stem	Natanz [43]	beta-sitosterol	$C_{29}H_{50}O$
Falcaria vulgaris	Apiaceae	Flower and stem	Lorestan [44]	β-caryophyllene	$C_{15}H_{24}$
Allium ursinum	Asteraceae	Shoot	Lorestan [44]	Thymidine	$C_{10}H_{14}N_2O_5$
Anethum graveolens	Apiaceae	Shoot	Lorestan [44]	α-phellandrene	$C_{10}H_{16}$

Continue TABLE 1.

Scientific names	family	Organ used	Region used	Bioactive compounds	Chemical formula
Centaurea bruguieriana Hand.Mzt.	Asteraceae	Leaf, flower	Fars [45]	9-octadecanoic acid	$C_{18}H_{36}O_2$
Urtica dioica L.	Utricaceae	Root, aerial parts	Maraveh Tappeh [46]	Hexahydrofarne sylacetone	$C_{18}H_{36}O$
Cichorium intybus L.	Asteraceae	Whole plant	Kohghiloeh [47]	Sochoside A	$C_{32}H_{22}O_{11}$
Hausknechtia elymaitica Boiss.	Apiaceae	Aerial part	Kohghiloeh [47]	trans-asarone	$C_{12}H_{16}O_3$
Astragalus fasciculifolius Boiss.	Fabaceae	Flower, root,gum	Kohghiloeh [47]	Isochoifolin	$C_{..}H_{..}O_{..}$
Juglans regia L.	Juglandaceae	Leaf, bulb, fruit, root	Sirjan, Kerman province [48]	linoleic acid	$C_{18}H_{32}O_2$
Matricaria aurea	Asteraceae	Leaf and flower	Sirjan, Kerman province [48]	n-Nonadecane	C19H40
Centaurium tenuifolium	Gentianaceae	Flower, Leaf	Hormozgan [49]	Alpha-Pinene	C10H16
Salvia mirzayanii Rech.	Lamiaceae	Leaves	Hormozgan [49]	1,8-cineole	C10H18O
Dysphania botrys (L.)	Amaranthaceae	Aerial parts	Mashhad [50]	Camphor	C10H16O
Vaccinium arctostaphylos L.	Ericaceae	Fruit	Mashhad [50]	Alpha-Pinene	C10H16
Securigera securidaca (L.) Degen & Dorfl.	Fabaceae	Seed	Mashhad [50]	Cis-9-Octadecanioc acid	C18H34O2
Althaea officinalis L.	Malvaceae	Flowers, roots, leaves	Sardasht,Western Azerbaijan province [51]	Isoquercitrin	C21H20O12
Brassica napus L.	Brassicaceae	Root, seed, Leaf	Sardasht, Western Azerbaijan province [51]	Isothiocyanate	C3H5NS
Tanacetum parthenium L..	Asteraceae	Flower	Toiserkan [52]	Camphor	C10H16O
Alhagi pseudalhagi	Papilionaceae	Aerial part	Khabr and Rouchon [53]	Oxygenated sesquiterpenes	C15H24
Medicago sativa L.	Fabaceae	Stem, Flower juice	Dehe-lolo, Kerman [54]	Alpha-pinene	C10H16
Equisetum arvense L.	Equisetaceae	Whole plant	Zanjan [55]	kaempferol-3-O-sophoroside	C27H30O16
Juniperus excelsa	Cupressaceae	Aerial part	Kerman [56]	α-pinene	$C_{10}H_{16}$

Acknowledgement
To all stuff in the department

Conflicts of interest
The authors declared no competing interests.

Funding/Support
None.

References

1. Nasabeh, Z. and Hazrati, M. Medical Surgical Nursing .Tehran; Salemi-JameNegar . (2008).
2. Ghods, A. and Savaj, S.H. Iranian model of paid regulated livingunrelated kidney donation. *Clin. Assoc. Nephrol.*, **1**,1136- 1145(2006).
3. Haghighi, A.N. The epidemiology of end stage renal disease in Iran in an international perspective. *Nephrol. Transplant*., **17**(1),28-32 (2002).
4. Yang, W., Lu, J., Weng, J., Jia, W. and Ji, L. Prevalence of diabetes among men and women in China. *N Engl J Med*, **362**,1090–1101 (2010).
5. Alvarez, V., Quiroz, Y., Nava, M., Pons, H. and Rodríguez-Iturbe, B. Overload proteinuria is followed by salt-sensitive hypertension caused by renal infiltration of immune cells. *Am. J. Physiol. Renal. Physiol*., **283**, 1132–1141(2009).
6. Fujita, K.I., Ishida, H., Kubota, Y. and Sasaki, Y. Toxicities of receptor tyrosine kinase inhibitors in cancer pharmacotherapy: Management with clinical pharmacology. *Curr.Drug Metab*., **18**(3), 186–198 (2017).
7. Yoshida, H., Goto, M., Honda, A., Nabeshima, T., Kumazawa, T., Inagaki, J., Yamanaka, N. and Ota, K. Pharmacokinetics of doxorubicin and its active metabolite in patients with normal renal function and in patients on hemodialysis. *Cancer Chemother. Pharmacol*, **33**(6), 450–454 (1994).
8. Okusa, M.D, Rosner, M.H. and Palevsky, P.M. Overview of the management of acute kidney injury (acute renal failure). up to date. Palevsky, PM (ed.), UpToDate, Waltham, MA. (2014).
9. Srivastava, R.N. and Bagga, A.R. Chronic renal failure, *Pediatric Nephrology,* 4th ed., 315 – 330 (2005).
10. Olgos, D., , S., Hartmann, A. , Bonsnes, S., Ueland, T., Isaksen, G.A. and Godang, K. Determinants of bone mass in end-stage renal failure patients at the time of kidney transplantation. *Clin. Transplant* , **22**(4), 462-468 (2008).
12. Andrianesis, V., Doupis, J. The role of kidney in glucose homeostasis--SGLT2 inhibitors, a new approach in diabetes treatment. *Expert Rev Clin Pharmacol*, **6**(5),519-539 (2013).
13. Koppe, L., Pelletier, C.C., Alix, P.M., Kalbacher, E., Fouque, D. and Soulage, C.O. Insulin resistance in chronic kidney disease: new lessons from experimental models. *Nephrol. Dial. Transplant*, **29**(9), 1666-1674 (2014).
14. Bachali, S., Dasu, K., Ramalingam , K. and Naidu, J.N. Vitamin D deficiency and insulin resistance in normal and type 2 diabetes subjects. *Indian J. Clin. Biochem.*, **28**(1),74-78 (2008).
15. Chadban, S.J., Briganti, E., Kerr, P.G., Dunstan, D.W., Welborn, T.A., Zimmet, P.Z. and Atkins, R.C. Prevalence of Kidney Damage in Australian Adults: The AusDiab Kidney Study. *J. Am. Soc. Nephrol.*, **14**, 131–138 (2003).
16. Imai, E., Horio, M., Iseki, K., Yamagata, K., Watanabe, T., Hara, S., Ura, N., Kiyohara, Y. and Hirakata, H. Prevalence of chronic kidney disease (CKD) in the Japanese general population predicted by the MDRD equation modified by a Japanese coefficient. *Clin. Exp. Nephrol.*, **11**, 156–163 (2007).
17. Ramirez, S.P.B., Mcclellan, W., Port, F.K. and Hsu, S.H. Risks factors for proteinuria in a large, multiracial southeast Asian population. *J. Am. Soc. Nephrol.*, **13**,1907–1917 (2003).
18. Uchino, S., Fealy, N., Baldwin, I, Morimatsu, H. and Bellomo, R. Continuous is not continuous: the incidence and impact of circuit" down-time" on uraemic control during continuous veno-venous haemofiltration. *Intensive Care Medicine*, **29**(4), 575-578 (2003).
19. Airy, M., Raghavan, R., Truong, L.D. and Eknoyan, G. Tubulointerstitial nephritis and cancer chemotherapy: update on a neglected clinical entity. *Nephrology Dialysis Transplantation*, **28**(10), 2502-2509 (2103).

20. Iwamuro, M., Kanzaki, H., Tanaka, T., Kawano, S., Kawahara, Y. and Okada, H. Lanthanum phosphate deposition in the gastric mucosa of patients with chronic renal failure. *Nihon Shokakibyo Gakkai Zasshi.*, **113**, 1216–1222 (2013).

21. Go, A.S., Chertow, G.M., Fan, D., McCulloch, C.E. and Hsu, C.Y. Chronic kidney disease and the risks of death, cardiovascular events and hospitalization .*N. Engl. J. Med.*, **351**, 1296–305 (2004).

22. Abbasi, N., Khalighi, Z., Eftekhari, Z. and Bahmani, M. Extraction and phytoanalysis of chemical compounds of Eucalyptus globulus leaf native to Dehloran, Ilam province, Iran by HS-SPME and GC-MS. *Advances in Animal and Veterinary Sciences*, **8**(6), 647-652 (2020).

23. Aidy, A., Karimi, E., Ghaneialvar, H. and Mohammadpour, S. Protective effect of Nectaroscordum tripedale extract and its bioactive component tetramethylpyrazine against acetaminophen- induced hepatotoxicity in rats. *Advances in Traditional Medicine,* **20**(3), 471-477 (2020).

24. Alizadeh, M., Safarzadeh, A., Bahmani, M., Beyranvand, F., Rafieian-Kopaei, M., Abbaszadeh, S. Brucellosis: Pathophysiology and new promising treatments with medicinal plants and natural antioxidants. *Asian Pacific J. Trop. Med.*, **11**(11), 597-608 (2018).

25. Abbaszadeh, S., Andevari, A.N., Koohpayeh, A., Naghdi, N., Alizadeh, M., Beyranvand, F. and Harsej, Z. Folklore medicinal plants used in liver disease: A review. *Int. J. Green Pharmacy*, **12**(3), 463-472 (2018).

26. Sedighi, M., Sewell, R.D.E, Nazari, A., Abbaszadeh, S., Cheraghi, M., Amini, A., Heydari, Z. and Rafieian-Kopaei, M. A review on the most important medicinal plants effective in cardiac ischemia-reperfusion injury. *Current Pharmaceutical Design*, **25**(3), 352-358 (2019).

27. Nouri, A., Heidarian, E., Amini-Khoei, H. and Abbaszadeh, S. Quercetin through mitigation of inflammatory response and oxidative stress exerts protective effects in rat model of diclofenac-induced liver toxicity. *J. Pharmacy Pharmacog. Res.*, **7**(3), 200-21 2 (2019).

28. Karimi, E., Abbasi, S. and Abbasi, N. Thymol polymeric nanoparticle synthesis and its effects on the toxicity of high glucose on OEC cells: Involvement of growth factors and integrin-linked 202 kinase. *Drug Design, Development and Therapy*, **13**, 2513-2532 (2019).

29. Bahmani, M., Jalilian, A., Salimikia, I., Shahsavari, S. and Abbasi, N. Phytochemical screening of two Ilam native plants Ziziphus nummularia (Burm.f.) Wight & Arn. And Ziziphus spina-christi (Mill.) Georgi using HS-SPME and GC-MS spectroscopy. *Plant Science Today*, **7**(2), 275-280 (2020).

30. Abbasi, N., Khosravi, A., Aidy, A. and Shafiei, M. Biphasic response to luteolin in MG-63 osteoblast-like cells under high glucose-induced oxidative stress. *Iranian Journal of Medical Sciences,* **41**(2), 118-125 (29016).

31. Karimian, M: Natural remedies for vascular diseases. *Plant Biotechnol. Persa*, **1** (1), 1-3 (2019).

32. Beiranvand, F. and Alizadeh, M. Plants for remedies of diabetes mellitus in Iran. *Plant Biotechnol. Persa*, **1** (1), 36-38 (2019).

33. Gholami-Ahangaran, M., Ostadpoor, M. and Heidari, S.H. An Overview of Cinnamon Properties Effects on Blood Glucose and Hemoglobin A1C in Diabetic People. *Plant Biotechnol. Persa*, **2** (2), 33-37 (2020).

34. Azizi, H. and Keshavarzi, M. Ethnobotanical study of medicinal plants of Sardasht, Western Azerbaijan, Iran. *Journal of Herbal Drugs*, **6**, 113-119 (2015).

35. Zolfaghari, A., Adeli, A., Mozafarian, V., Babaei, S. and Habibi-Bibalan, G. Identification of medicinal plants and indigenous knowledge of local people Arasbaran. *J. Med. Arum. Plants*, **28**, 534-50 (2013).

36. Ghasemi Pirbalouti, A., Momeni, M. and Bahmani, M. Ethnobotanical study of medicinal plants used by Kurd tribe in Dehloran and Abdanan districts, Ilam Province, Iran. *Afr. J. Tradit. Complement Altern. Med.*, **10**, 368-000 (2013).

37. Dolatkhahi, M. and Nabipour, I. Evaluation the ethnobotanical medicinal plants of epiphora region of Presian Golf northeast. *J. Med. Plants*, **2**,129- 43 (2014).

38. Khodayari, H., Amani, S.H. and Amiri, H. Ethnobotanical study of North east of Khuzistan province. *Eco- Phytochemical Journal of Medical Plants*, **4**, 12- 26 (2014).

39. Ranmanesh, M., Najafi, S.H. and Yousefi, M. Ethnobotanical study of Medicinal Plants of Sistan region. *J Herbal Drugs*, **2**, 61-8 (2010).

40. Alavi, S.Z., Rabiei, E., Saeeidi-Goraghani, H.R. and Ghordouei-Millan, G.H. Alternative and 232 Traditional uses of medicinal plants of North of Iran. *J Herbal Drugs*, **2**, 113-120 (2011).

41. Mardaninejad, S.H. and Vazirpour, M. Ethnobotany of medicinal plants by Mobarake people (Isfahan). *J. Herbal Drugs*, **3**, 111-129 (2013).

42. Aref-Tabad, M. and Jalilian, N. Ethnobotanical study of medicinal plants of Zarival region of Marivan city. *J. Med. Plants*, **14**, 55-75 (2014).

43. Abbasi, S.H., Afsharzadeh, S. and Mohajeri, A. Ethnobotanical study of medicinal plants in Natanz region (Kashan), Iran. *J. Herbal Drugs*, **3**, 157-166 (2012).

44. Asadi-Samani, M., Kafash-Farkhad, N., Azimi, N., Fasihi, A., Alinia-Ahandani, E. and Rafieian-Kopaei, M. Medicinal plants with hepatoprotective activity in Iranian folk medicine. *Asian Pac. J. Trop. Biomed.*, **5**, 146-157 (2015).

45. Delfan, B., Baharvand-Ahmadi, B., Bahmani, M., Mohseni, N., Saki, K., Rafieian-Kopaei, M., Shahsavari, S., Naghdi, N., Taherikalani, M. and Ghafourian, S. An ethnobotanical study of medicinal plants used in treatment of kidney stones and kidney pain in Lorestan province, Iran. *Journal of Chemical and Pharmaceutical Sciences*, **8** (4), 693-699 (2015).

46. Dolatkhahi, M., Dolatkhahi, A. and Nejad, J.B. Ethnobotanical study of medicinal plants used in Arjan - Parishan protected area in Fars province of Iran. *Avicenna J. Phytomed.*, **4**(6),402-12 (2014).

47. Mirdeilami, S.Z., Barani, H., Mazandarani, M. and Heshmati, G.A. Ethnopharmacological survey of medicinal plants in Maraveh Tappe region, north of Iran. *Iran. J. Plant Physiol.*, **2**(1),325-336 (2011).

48. Mosaddegh, M., Naghibi, F., Moazzeni, H., Pirani, A. and Esmaeili, S. Ethnobotanical survey of herbal remedies traditionally used in Kohghiluyeh va Boyer Ahmad province of Iran, *J. Ethnopharmacol.*, **141**(1),80- 95 (2012).

49. Khajoei Nasab, F. and Khosravi, A.R. Ethnobotanical study of medicinal plants of Sirjan in Kerman Province, Iran. *J. Ethnopharmacol.*, **154**(1),190-197 (2014).

50. Safa, O., Soltanipoor, M.A., Rastegar, S, Kazemi, M., Nourbakhsh Dehkordi, K. and Ghannadi, A. An ethnobotanical survey on hormozgan province, Iran. *Avicenna J. Phytomed.*,**3**(1),64-81 (2013).

51. Amiri, M.S. and Joharchi, MR. Ethnobotanical investigation of traditional medicinal plants commercialized in the markets of Mashhad, Iran. *Avicenna J. Phytomed.,* **3**(3),254-71 (2013).

52. Azizi, H. and Keshavarzi, M. Ethnobotanical study of medicinal plants of Sardasht, Western Azerbaijan, Iran. *J .Herbal Drugs*, **6**(2),113-119 (2015).

53. Mosaddegh, M., Esmaeili, S., Hassanpour, A., Malekmohammadi, M., and Naghibi, F. Ethnobotanical study in the highland of Alvand and Tuyserkan, Iran. *Research Journal of Pharmacognosy*, **3**(1), 7-17 (2016).

54. Mohamadi, N., Sharififar, F., Koohpayeh, A. and Daneshpajouh, M. Traditional and Ethnobotanical uses of medicinal plants by ancient populations in Khabr and Rouchon of Iran. *Journal of Applied Pharmaceutical Science,* **5** (11), 101-107 (2013).

55. Vakili Shahrbabaki, S.M.A. The Ethnobotanical Study of Medicinal Plants in (Dehe-lolo-vameghabadbidoieh) Village. Kerman, Iran. *Journal of Medicinal Plants and By-products*, **1**,105-111 (2016).

56. Moghanloo, L., Ghahremaninejad, F. and Vafadar, M. Ethnobotanical study of medicinal plants in the central district of the Zanjan county, Zanjan province, Iran. *Journal of Herbal Drugs*, **9**(3), 121-131 (2019).

57. Kouhpayeh, A., Ghasemi-Pirbalouti, A., Yazdanpanah-Ravi, M.M., Poutmohseni Nasab, E. and Arjmand, D. Traditional veterinary study (ethno-veterinary) of medicinal plants in Kerman province. *J. Herbal Drugs*, **3**, 211-216 (2011).

58. Zolfaghari, A., Adeli, A., Mozafarian, V., Babaei, S. and Habibi-Bibalan, G.H. Identification of medicinal plants and indigenous knowledge of local people Arasbaran. *J. Med. Arum. Plants*, **28**(3), 534- 550 (2013).

59. Ghasemi Pirbalouti, A., Momeni, M. and Bahmani, M. Ethnobotanical study of medicinal plants used by kurd tribe in dehloran and abdanan districts, ilam province, Iran. *Afr J Tradit Complement Altern. Med.*, **10**(2), 368-000 (2013).

60. Khodayari, H., Amani, S.H. and Amiri, H. Ethnobotanical study of North east of Khuzistan province. *Med Plants Ecophytochemistry J.* **8**; 2(4), 12-26 (2013).

61. Mardani-Nejhad, S.H. and Vazirpour, M. Ethnobotany of medicinal plants by Mobarakeh's people (Isfahan). *J. Herbal. Drugs,* **3**(2), 111-126 (2012).

62. Safa, O., Soltanipoor, M.A., Rastegar, S., Kazemi, M., Nourbakhsh Dehkordi, K.H. and Ghannadi, A. An ethnobotanical survey on hormozgan province, Iran. *Avicenna Journal of Phytomedicine* **3**(1), 64-81 (2013).

63. Naghibi, F., Esmaeili, S., Malekmohammadi, M., Hassanpour, A. and Mosaddegh, M. Ethnobotanical survey of medicinal plants used traditionally in two villages of Hamedan, Iran. 293 *Avicenna J. Phytomed.,* **1**(3), 7-14(2014).

64. Iranmanesh, M., Najafi, S.H. and Yosefi, M. Studies on Ethnobotany of important medicinal plants in Sistan. *J. Herbal Drugs*, **1**(2), 58-65 (2010).

65. Moradi, M.T., Asadi-Samani, M. and Bahmani, M. Hypotensive medicinal plants according to Ethnobotanical evidence of Iran: A Systematic Review. *International Journal of PharmTech. Research*, **9**(4), 416-426 (2016).

66. Asadi-Samani, M., Moradi, M.T., Mahmoodnia, L., Alaei, S., Asadi-Samani, F. and Luther, T. Traditional uses of medicinal plants to prevent and treat diabetes; an updated review of ethnobotanical studies in Iran. *J. Nephropathol.*, **6**(3),118-125(2017).

67. Hussein A.A., Baban, R. and Hussein, A. Prostate-specific antigen and free prostate-specific antigen/ prostate-specific antigen ratio in patients with benign prostatic hyperplasia and prostate cancer. *Baghdad J. Biochem. and Appl. Biolog. Sci.,* **31**; 1(01):18-26 (2020).

68. Al-Bedairy, I., Shamsa, M., aldeen Salim, S., Mahdi, M., Dawood, K. and Al Faisal, A. H. FOXA1 expression in Iraqi women with ER+ breast cancer: A case control study. *Baghdad J. Biochem. Appl. Biolog. Sci.,* **2**(02), 3 (2021).

69. Al-Jewari, K. J., Baban, R. S. and Manuti, J. K. Serum and urinary soluble alpha klotho levels in patients with Chronic Kidney Disease. *Baghdad J. Biochem. Appl. Biolog. Sci.,* **2**(01), 29-37 (2021).

70. Zharif, N., Santosh, F., Kiran, C. N., Fadli, A., Ibrahim, A. and Nizam, G. Synergistic effect of ethanolic extract of melastoma malabataricum leaves and antibiotics. *Int. J. Med. Toxicol. Legal Med.,* **21**(3and4), 167-170(2018).

71. Fattepur, S., Nilugal, K. C., Darshan, T. T., Bacayo, M. F. D. C., Asmani, F., Abdullah, I. and Goudanavar, P. Toxicological and pharmacological activity of ethanolic extracts of Catharanthus roseus in expermental animals. *Int. J. Med. Toxicol. Legal Med.,* **21**(3and4), 141-144 (2018).

72. Khan, J., Norfarhani, S., Sahu, R. K., Ruhi, S., Kaleemullah, M., Al-Dhalli, S. and Yusuf, E. Development and Evaluation of topical Emulgel of Aspirin using different Polymeric Bases. *Res. J. Pharmacy Technol.,* **13**(12), 6300-6304 (2020).

73. Halim, S., Mohamad, N., Toriman, M. E., Bakar, N. H. A., Adnan, L. H. M., Hashim, S. N. and Muhammad, N. A. Effects of Zamzam water alone or in combination with methadone on attenuation of spontaneous withdrawal symptoms in morphine-dependent rats: a behavioural study. *Adv. Sci. Letters,* **23**(5), 4492-4495 (2017).

74. Halim, S., Mohamad, N., Ridzuan, P. M., Zakaria, N. H. and Muhammad, N. A. In-vitro Study: Camp Overshoot Caused by Chronic Morphine Alleviated by the Synergistic Combination of Zamzam Water and Methadone in Human Primary Glioblastoma Cell Line (U-87 MG). *IIUM Med. J. Malaysia,* **18**(2), 1 (2019).

75. Halim, S., Jasmi, N. A., Ridzuan, P. M., Anna, D., Abdullah, S. and Sina, T. Novel potential Centella asiatica extract in ameliorating neurotoxicity induced oxidative stress in chronic morphine dependant rat model. *Int. J. Med. Toxicol. Legal Med.,* **23**(3and4), 79-83 (2020).