

# Ethnoveterinary in Khalil Abad (Zarrin Dasht, Fars Province)

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## Abstract

**Background and Objectives:** Ethnobotany is a branch of indigenous knowledge about the multiple roles of plants of a region according to the knowledge of local communities. In this study, we examined the indigenous knowledge of the people of a village in Fars Province, on the treatment of livestock diseases using this knowledge. The information was obtained using a classified questionnaire. **Methods:** This study was conducted from February 2017 to April 2017 in Khalil Abad, a village near Zarrin Dasht, Fars Province in Iran. First, questionnaires were designed to identify the traditional treatments for livestock diseases in Khalil Abad and then were distributed among 10 people (three women and seven men) who were traditional livestock breeders aged 60–80 years old. Meanwhile, botanical samples of the region's plants were collected, and the data on therapeutic effects were supplemented by information such as botanical name, family name, Persian name, local name, the used organs, and the methods of administration. **Results:** After reviewing the data on 27 livestock diseases in the region, 28 species of medicinal plants were found to be used in traditional treatments used by the villagers. 27 diseases were treated with herbal therapy and seven diseases by traditional method. Only one plant sample caused poisoning in the livestock. **Conclusion:** The information obtained in this study may help in uses and discovery of new drugs

**Key words:** Ethnoveterinary, herbal medicine, Iran, medicinal plant

## INTRODUCTION

Traditional veterinary medicine is one of the traditional, widely acknowledged and scientific veterinary approaches that have long been recognized by the various ethnicities. Today, traditional veterinary or ethnoveterinary refers to the use of herbs and the application of traditional methods for maintaining the health of livestock and treating sick livestock.

In general, ethnoveterinary includes the skills, experiences, methods, cultures, and indigenous beliefs of different ethnic groups, which are aimed at maintaining the health and treating livestock diseases based on plant-based substances and drugs.<sup>[12]</sup> Ethnoveterinary has been using its own unique skills, such as the use of herbs and living beings' organs as well as natural ingredients to treat their sick livestock. It may be argued that traditional medicine has been mainly derived from the testing of herbs on animals.<sup>[32-34]</sup> Nowadays, these herbs are widely used to treat animals as well as humans.<sup>[35-40]</sup> Meanwhile, the response of the animals to some plants and their instinctive

consumption of the plants to treat their diseases have been largely influential.<sup>[12]</sup> Due to the prolonged drought in Khalil Abad, a village near to Zarrin Dasht, Fars Province, and lack of profitability of agricultural economy, the villagers are also engaged in livestock farming alongside their agricultural work. Shrub vegetation and topographic condition of the village provide the opportunity for the villagers to keep cattle, and therefore use dairy products and meat to improve their economic conditions.

In a study of traditional veterinary medicine (ethnoveterinary of herbs) in Kerman Province, First, a questionnaire to collect information such as the used organs of herbs and the methods of their administration for the treatment of livestock diseases from the local residents and livestock breeders of the region was prepared.<sup>[22]</sup> According to this study, the

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identified plants, including *Ajuga chamaecistus*, were used to eliminate lice and cutaneous parasites in goats and sheep, *Cercis siliquastrum* to treat the infectious and deep wound in livestock and *Cercus siliquastrum* to treat pain and bloat in sheep and other various diseases.

Observations going back to thousands of years ago shows that in many non-Western cultures and customs, such as China, Tibet, Iran, Ayurveda in India, and traditional methods such as acupuncture and herbs have been used to treat sick animals and humans, including treating livestock by palm leaves in Sri Lanka since many years ago.<sup>[14-16]</sup>

In Malawi, indigenous knowledge systems (IKSs) and their adaptation to climate change and strategies in the agricultural sector was investigated. Most people make a living through dryland farming that is dependent on climate change. This study evaluated the role of IKS in adapting to climate variety and change.<sup>[27]</sup> Due to the existence of a variety of herbs used in traditional medicine and traditional veterinary medicine of Fars Province by local people, it will be essential and valuable to compile information on the therapeutic effects of these plants. One of the main goals of this research is to precisely identify plant species and to report herbs of Khalil Abad in Zarrin Dasht, Fars Province from an ethnobotanical perspective.

## MATERIALS AND METHODS

To conduct the current study, questionnaires were designed to investigate seven groups of diseases and syndromes (a total of 28 complications) in the livestock such as goat and sheep between January 20, 2017, and May 21, 2017, and then distributed among 10 traditional livestock breeders (three women and seven men) of 60–80 years old in Khalil Abad. Observation and interview accompanied (face to face) by gathering herbarium specimens of medicinal herbs and typical and effective impacts in treating types of diseases listed were used. The questionnaires consisted of personal information and a list of native plants' names, the used organ parts, its usage, and traditional remedy effect. There are 20 traditional livestock breeders in Khalil Abad that only 10 of them cooperate with us. The herbarium specimens obtained based on the native herbalists' information were collected from the study area. The herbarium samples obtained from data of local traditional physicians in the questionnaire were collected from the region and then they were authenticated by a botanist (Damon Razmjoi). A herbarium specimen from each plant (whole or the used part) was prepared and deposited in the herbarium unit of Botanical Laboratory of Khatam Alanbia Technology University. Finally, the data were analyzed using Excel 2010 software. Prepared medicinal plants were listed and compared with current knowledge about them. Furthermore, the frequency of ethnomedicinal use in Khalil Abad was calculated through data mentioned by traditional livestock breeders (as a percentage among 10

traditional livestock breeders). Finally, it is tried to present potential medicinal herbs for types of diseases listed treatment through these data.

## Location and Vegetation of the Region

The studied basin, Khalil Abad, is located in approximately 35 km distance to Hajiabad from the northwest, in geographical position 54° 22' 53" to 54° 30' 22" eastward and 28° 37' 55" to 28° 32' 38" northward. This region is part of the central part of Zarrin Dasht County. The boundaries and villages of the basin are illustrated in Figure 1 and 2.

The area and environment of the basin are 48.66 km<sup>2</sup> and 41.52 km, respectively. Figure 1 shows the location of Khalil Abad basin. The highlands of the basin include *Kamarghermez*, *Chador*, and *Shahneshin* mountains. The highest and lowest points of the basin have an altitude of 1813 m and 1025 m, respectively. The average rainfall of the region based on the coprecipitation maps and the gradient of precipitation changes in terms of elevation in the sub-basins A, A1, A2, B, C, D, E, F, G, H, I, J, K, and L are 289.58, 240, 299.06, 225.77, 241.27, 225, 240.89, 299.06, 225.77, 241.27, 225, and 240.89 mm, respectively. Most of the total annual rainfall occurs in winter months (61.99%) and the lowest precipitation in summer months (31.2% of the total annual rainfall). Most of the rainfall occurs between December 22 and January 20 (22.78%). The climatic grouping by Dumartin method can show the region in the best manner. Therefore, it can be argued that the climatic grouping by Dumartin method illustrates the observations better and the climate of the region is dry.

Based on the latest statistics obtained from the Health Care Home of Khalil Abad, a total of 315 focal and extended families (a population of 1198 people) lived in the village in 2010. In total, the region's income generating activities include crop activities, livestock breeding, and to a much lesser extent, and handicraft activities.

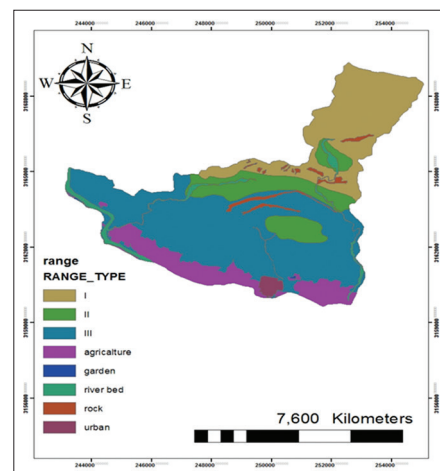


Figure 1: Location of the studied and coverage area

**Table 1: Gastrointestinal diseases, parasitic infections, and poisoning**

Botanical name	Family	Persian name	Used organ (s)	Procedure used	Therapeutic use
<i>Ficus carica</i>	Moraceae	Anjir-Vahshi	Fruit and root skin	Boiled	Gut infection
<i>Artemisia sieberi</i>	Asteraceae	Dermaneh	Leaf	Boiled	Dis-infection of gut
<i>Achillea eriophora DC.</i>	Asteraceae	Bomadaran	Flower and Leaf	Boiled	Toxicity
<i>Linum Usitatissimum</i>	Linaceae	Katan	Seed and aerial parts	Essential oil	Carminative
<i>Phlomis rosseliana</i>	Labiatae	Goosh-bare	Leaf	Boiled	Antiparasite, Antijundice
<i>Tamarix bachtiarica</i>	Tamaricaceae	Gaz	Leaf	Oral administration	Gut regulatorulator
<i>Zataria multiflora Boiss.</i>	Lamiaceae	Avishan	Leaf	Boiled	Antidiarrhea Antistomachache
<i>Thea sinensis</i>	Theaceae	Chay	Leaf	Boiled	Antidiarrhea
<i>Cassia fistula L.</i>	Caesalpinaceae	Sanaye-Maki	Seedpod and seed	Brewed, boiled	Anticonstipation
<i>Alhagi persarum Boiss.&amp; Buhse.</i>	Papilionaceae	Kharshotor	Stem and aerial parts	Oral administration	Antijaundice
<i>Salvia SP</i>	Compositae	Marveh-Talkh	Root gum	Oral administration	Antidiarrhea
<i>Fumaria officinalis</i>	Fumariaceae	Shahtareh	Aerial parts	Essential oil	Antijaundice
<i>Otostegia persica</i>	Lamiaceae	Goldar	Flower and Leaf	Boiled	Anti-jaundice

**Table 2: Skin and bacterial diseases**

Botanical name	Family	Persian name	Used organ (s)	Procedure used	Therapeutic use
<i>Linum Usitatissimum</i>	Linaceae	Katan	Seed	Positional	Fungal remover
<i>Tamarix bachtiarica</i>	Tamaricaceae	Gaz	Leaf	Positional	Antimicrobial activity
<i>Glycyrrhiza glabra</i>	Papilionaceae	Shirinbayan	Leaf and Root	Oral administration and positional	Anti-cold
<i>Rumex acetosa L.</i>	Polygonaceae	Torshak	Leaf	Positional	Antiherpes simplex
<i>Astragalus</i>	Popilionaceae	Gavan-Badkonaki	Samgh	Positional	Anti-infection, Bone maker
<i>Solenanthus circinnatus</i>	Boraginaceae	Azar-Khoob	Stem	Positional	Bone maker
<i>Picnomon acarnaCass. (L.)</i>	Asteraceae	Zard-khar	Seed and Leaf	Positional	For remove of breast inflammation
<i>Lawsonia inermis</i>	Lythraceae	Hana	Leaf	Positional	For remove of breast inflammation
<i>Citrus aurantium</i>	Rutaceae	Naranj	Fruit	Oral administration	Antiherpes simplex
<i>vitis vinifera</i>	Vitaceae	Ghooreh	Fruit	Oral administration	Antiherpes simplex

**Table 3: Fracture and sedative**

Family	Botanical name	Persian name	Used organ (s)	Procedure used	Therapeutic use
<i>Papilionaceae</i>	<i>Astragalus</i>	Gavan-Badkonaki	Gum Root and Stem	Positional	Bone maker and Anti-infection
<i>Boraginaceae</i>	<i>Solenanthus circinnatus</i>	Azar-Choob	Stem skin	Positional	Bone maker

### The Summary of Vegetation Observations

Type I (As-Co-Al): Grassland plant species are typical species of this type, namely *Astragalus arbusculinus* (*Convolvulus* sp) and *Alhagi camelorum*. This type occurs

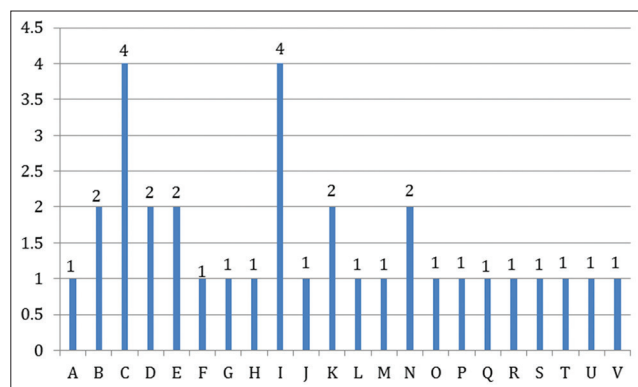
in the north of the basin and is limited to Type II from the south. The most important species of this type are *Ebenus stellata*, *Echinops robustus*, *Scariola orientalis*, *Amygdalus lycioides*, *Convolvulus* sp., *Astragalus* sp., and annual grass.

**Table 4: Tonic and lactating**

Botanical name	Family	Persian name	Used organ (s)	Procedure used	Therapeutic uses
<i>Ficus carica</i>	Moraceae	Anjir-Vahshi	Leaf	Boiled	Tonic, Milk enhancer
<i>Linum Usitatissimum</i>	Linaceae	Katan	Seed	Oral administration	Milk enhancer, Tonic
<i>Ferula assa-foetida L.</i>	Apiaceae	Anghozeh	Seed and Leaf	Boiled	Immune tonic
<i>Phlomis rosseliana</i>	Labiatae	Goosh-bare	Leaf	Oral administration	Tonic
<i>Sesamum</i>	Pedaliaceae	Konjed	Seed	Oral administration	Milk enhancer
<i>Fumaria officinalis</i>	Fumariaceae	Shatareh	Aerial parts	Essential oil	Tonic, Milk enhancer

**Table 5: Reproductive system**

Botanical name	Family	Persian name	Used organ (s)	Procedure of use	Therapeutic Uses
<i>Linum Usitatissimum</i>	Linaceae	Katan	Seed	Oral administration	Abortion prevention
<i>phoenix dactylifera</i>	Palmaceae	Nakhl	Leaf	Positional	Easy delivery in cow
<i>Capparis spinosa</i>	Capparidaceae	Lagji	Leaf and Fruit	Positional	Drying vagina



**Figure 2:** The number and composition of plant families used to treat livestock diseases. A: Moraceae and B: Asteraceae and C: Linaceae and D: Labiatae and E: Tamaricaceae and F: Lamiaceae and G: Theaceae and H: Caesalpiniaceae and I: Papilionaceae and J: Compositae and K: Fumariaceae and L: Lamiaceae and M: Polygonaceae and N: Boraginaceae and O: Lythraceae and P: Rutaceae and Q: Vitaceae and R: Moraceae and S: Apiaceae and T: Pedaliaceae and U: Palmaceae and V: Capparidaceae

Type II (Co-Al-Ech): Typical species of this type are *Convolvulus* SP, *E. roubustus*, and *A. camelorum*. The most important species of this type are *Astragalus* SP and annual grass.

Type III (Ech-As-Pe): Typical species of this type include *E. roubustus*, *A. arbusculinus*, and *Peganum harmala*. The most important species of this type are *Astragalus* SP and annual grass.

## RESULTS

Plants were classified into six groups according to the type of therapeutic use. The plants in Group 1, including *Ficus carica*, *Achillea millefolium*, *Linum usitatissimum* seed, *Artemisia*

*sieberi*, *Phlomis rosseliana*, *Tamarix bachtiarica*, *Zataria multiflora* Boiss., *Thea sinensis*, *Cassia fistula* L., *Alhagi persarum* Boiss. and Buhse., *Salvia* SP., *Fumaria officinalis*, and *Otostegia persica*, are used to treat gastrointestinal diseases, parasitic diseases, and poisoning. Group 2: Plants such as *L. usitatissimum* seed, *T. bachtiarica*, *Glycyrrhiza glabra*, *Rumex acetosa* L., *Picnoman acarna* (L.) Cass., *Lawsonia inermis*, *Citrus aurantium*, and *Vitis vinifera* are used to treat skin, localized, and bacterial diseases. Group 3: *Astragalus* and *Solenanthus circinnatus* are used as ointment and sedative in the treatment of fractures and bruises. Group 4: Plants such as *F. carica*, *L. usitatissimum* seed, *Ferula assa-foetida* L., *P. rosseliana*, *Sesamum*, and *F. officinalis* are used to enhance lactation. Group 5: Plants such as *L. usitatissimum* seed, *Phoenix dactylifera*, and *Capparis spinosa* are used to prevent miscarriage in the livestock, facilitate calving, and eliminate the moisture of the genitourinary system of the livestock. Group 6: Plants such as *P. rosseliana* and *G. glabra* are used to treat respiratory diseases. Livestock breeders use a series of traditional treatments for treating their livestock, for example, they mix animal fat with sugar to treat stomachache, or feed the livestock with the mixture of boiled *F. carica* leaf and goat milk. The mixture is also used to prevent the death of the livestock, and also *F. carica* fruit is heated and then is mixed with milk, and the mixture is used to treat diarrhea, and the boiled *O. persica* and ice water are used to treat jaundice. To treat herpes, livestock breeders wash the animal mouth with *V. vinifera* juice and *C. aurantium* juice; *P. dactylifera* leaves are burned with cattle excreta and then entered into the stomach of the livestock that has recently given birth to take out their embryo placenta when the embryo does not go out of the womb. Forage is flavored with halophytes such as *T. bachtiarica* to increase appetite and prevents blindness in the livestock. *P. rosseliana* seed is toxic and pathogenic, but its leaves and shoots are used to increase lactation and eliminate the intestinal worm. Livestock breeders use milk and salt mixture to eliminate overeating in their livestock. A type of oil locally called *Mando* is extracted from *L. usitatissimum* seeds,



**Table 6:** Respiratory diseases

Botanical name	Family	Persian name	Used organ	Uses procedure	Therapeutic uses
<i>Phlomis russeliana</i>	Labiatae	Goosh- bare	Leaf Stem	Boiled	Anti-cold
<i>Glycyrrhiza Glabra L.</i>	Papilionaceae	Shirinbayan	Root and Leaf	Boiled	Anti-cold

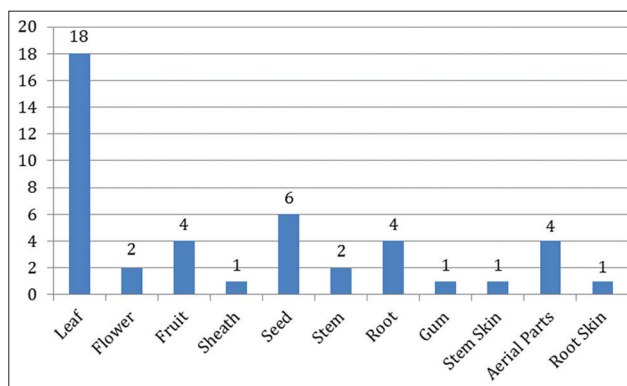
which is used to increase lactation, prevent miscarriage, and eliminate the skin parasites of the camel livestock. This oil is also mixed with milk, and the mixture is used as carminative in the goat livestock. In addition, snake is fried in oil, and then put on the livestock skin to treat baldness. *F. asafoetida* is covered in a piece of cloth and hang around the animal neck to avoid the disease. It is warmed up and pulverized, and then is put on the fracture of the livestock leg. It is also used as an ointment to treat local infections. They use powdered *P. dactylifera* leaves to treat local infections, acne, and wen. *T. sinensis* is boiled and then mixed with animal oil to eliminate diarrhea and overeating of the livestock. The mixture is also used as carminative. The mixture of *Citrullus colocynthis* + yogurt + *L. inermis* powder + *P. acarna* is used for the treatment of the livestock mastitis, and also the boiled black ewe head juice is used as carminative and to eliminate cold temper in the livestock. A type of fish is also boiled and then is used as carminative. According to Figure 1, plants of the genus Linaceae and Papilionaceae have the greatest contribution to the treatment of diseases; and among the plant organs, leaf is the most frequently used organ, followed by seed; and boiling, oral administration, and topical application are the most frequent methods of administration of the plants [Figure 3 and 4].

Of the 27 species reported in this study, only one species is toxic, which has also been reported in the flora of Iran's toxic herbs. One other species, *A. sieberi*, is toxic according to local people's experiences. Certain information such as botanical name, family, and secondary toxic compounds of the plant is given in Table 1-7.

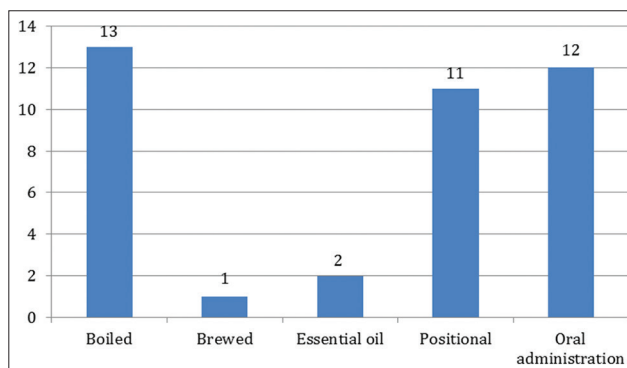
Besides that, the seed of *P. russeliana* is toxic but its stem and leaves enhance the livestock lactation. The use of plants poisonous to livestock and humans is harmful, and it is, therefore, essential to identify the herbs that have a therapeutic effect, but whose consumption leads to poisoning due to the presence of high concentrations of secondary compounds and therefore produce adverse health effects on the livestock. In a study on the use of herbs to treat 35 diseases and clinical syndromes of small ruminants in the southern regions of Ilam Province, reported 36 species of herbs, 24 of which were found to be accompanied by phytotherapy and the rest without phytotherapy.<sup>[7]</sup> 13 species of herbs were among the toxic plants according to the flora of Iran.

## DISCUSSION

In this study, there was an ethnobotanical information about medicinal herbs used in traditional medicine in the Khalil



**Figure 3:** The rates of use of different organs of plants to treat diseases



**Figure 4:** The methods of administration of plants for treatment of diseases gastrointestinal, parasitic infections, poisoning, skin, bacterial, fracture, sedative, tonic, lactating, reproductive system, and respiratory

Abad region. In India believed that the livestock plays a key role in the lives of Indian farmers. Livestock help produces fertilizers, fuels, milk, and meat as well as contribute to rural production and rural employment.<sup>[29]</sup> in a study of the indigenous knowledge of nomads regarding the treatment of domestic animals diseases in Qaleh Ganj County, sought to introduce the culture, indigenous knowledge, and traditional methods of tribes in Qaleh Ganj County in the treatment of livestock diseases.<sup>[15]</sup> The results were obtained by verbally interviewing with nomads in the region. A total of 13 species from 13 genera, as well as three traditional methods for the treatment of diseases, were identified: Cauterization, boiled river fish, and combination of previously used (burnt) oils, and plant extracts (*Calotropis procera*). The therapeutic effects of herbs in the north, south, east, west, and central regions of Iran have shown that Iran is a good place to use plants to treat diseases.<sup>[2, 17]</sup> However, the use of some herbs in different regions of Iran with similar therapeutic effects has been observed.<sup>[3, 44]</sup> Although each herb may be a source for

**Table 7: Toxic plants**

Scientific name	Family	Toxic plant	Toxic secondary compounds
<i>Artemisia herba alba</i>	Asteraceae	Dermaneh	Artemisinin

the treatment of certain diseases; research has also shown that many of these plants have antioxidant activity.<sup>[26-37]</sup> Various phytochemicals in plants may have antioxidant activities, but the property is mostly due to the presence of phenolic compounds.<sup>[6, 36]</sup> It should be noted that many diseases are treated with plants due to their antioxidant activities, other than the presence of therapeutic phytochemicals<sup>[4, 36]</sup> Phenolic compounds have various effects, especially antimicrobial.<sup>[21, 45]</sup> and anti-inflammatory activities.<sup>[24-42]</sup> The therapeutic effects of presented plants in this article seem mostly to be due to these compounds. Medicinal plants, the same as chemical compounds, other than therapeutic effects are sometimes used for prevention or treatment of toxicity due to toxic agents.<sup>[9, 14]</sup> This is also important because the toxic agents are abundant in the environment.

In this review, it should be noted that even though modern medical care is available and affordable, many traditional people are keen on restoring herbs. The use of plants in traditional medicine and their reuse in modern medical systems are worth considering for certain reasons such as low cost, lack of medical constraints, high pharmaceutical value, cultural exchange (expansion of growing contact and respect for foreign cultures), and commercial value. Mostly, global supply of herbs is fulfilled local collection, not by cultivation. Ethnobotanical studies indicate that the species that are derived from the pharmaceutical industry can be used to synthesize new drugs in chemical laboratories. The use of plants for therapeutic purposes and their commercial value will probably result in the collection and cultivation of herbs, which can lead to the creation of a new job and an opportunity for young people to start agricultural projects. The benefits that can be obtained from the economic and industrial exploitation of herbs, include improvement of the ancient tradition, which is important for the preservation of ethnic biodiversity and living, as well as for increasing local medical knowledge.

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