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Medicinal plants and secondary metabolites for leech control

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To the editor,

Leech is a parasitic animal that belongs to the phylum Annelida. Some species of Leeches are aquatic and live in freshwater rivers and lakes, marshes and paddy fields and some other species live in terrestrial and marine environments. Leeches are necrophagous, predatory or parasitic animals and a group of them Hematophagy habit. The blood sucking leech attaches to the skin and other internal organs of the body like mouth, throat, trachea and vagina by cupping and a painless bit and holes its skin or phlegm and secretes an anticoagulant enzyme into the hosts' blood streams. Each leech secretes 5–15 mL hirudin in one meal and sucks the blood^[1–3]. They, as a harmful parasite can cause some side effects like severe anemia, short-term hemorrhage, hypersensitivity and anaphylactic reactions^[1,4]. Most physicians who have practiced in remote and rural areas of Iran have complete familiarity with the leech as a foreign body in nose, nasopharynx, pharynx and larynx and also the respiration system^[5]. Leech is one of the factors of expressing zoonotic diseases^[6]. Leeches are parasite of the human, livestock, turtles, frogs, snails and earth worms and feed from them. The parasitic potential of the leech is high to the extent that even sluedges in bottom of the pool are not safe from their attacks^[1,3,4]. No standard drug has been registered in the pharmacopeia of different nations in order to treat effects of leech infestation and treatment are supportive and traditional including the use of hypertonic saline, lidocaine and vinegar that are used to remove and the leech from the bit position^[7–10]. For example, wearing socks when feet are exposed to the risk, putting dried remains of the bath soap on the bite site, putting tobacco leaves between fingers of the toe, placing some salt or bicarbonate, citrus extract, eucalyptus oil, washing place of the bit with

water and soap, using a bag of ice water and cooling place to decrease pain and inflammation, using antihistamine to decrease itching and inflammation and even using calcium hydroxide causes the tissue irritation and damage. These are traditional treatments used by people in different culture of the world in cases of infection with the leech and are not effective treatments^[11,12]. Since the ancient time using pharmaceutical plants to treat parasitic diseases has been paid attention. On one hand due to appearing adverse and undesirable effects of synthetic compounds and their incompatibility with human nature and on other hand due to high cost and drugs and the inability of many third world countries to purchase such drugs a special attention has been paid to produce drug from pharmaceutical plants that their safe therapeutic effects and inexpensive cost of them have been proved^[13,14].

The leech is inherently aggressive and causes much infection. There are several reports about different animal infections including cow, sheep, ducky, hen, dog, goat and lamb with the leech^[15–17]. By the end of the year 2009 no scientific study was conducted about the effect of pharmaceutical plants on leech. It has stated in the resources of the Iran traditional medicine that the tobacco plant has anti-leech effect. In the traditional medicine decoction of the tobacco plant is used to repel leech^[18]. Also the *Satureja khuzistanica* Jamzed plant has been defined as the anti-leech plant^[18]. In recent years authors have examined the effect of various extracts of many local pharmaceutical plants on the *Limnatis nilotica* leech. It has been determined that the tobacco plant has the anti-leech and strong disinfection effect on the leech^[6,19]. The nicotine substance, one of the effective tobacco substances, has very strong effect on the leech death^[20,21]. The *Allium sativum* L. extract has suitable cytotoxicity effect on the leech^[22,23].

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Also the olive plant extract has a good effect on the leech death and paralysis^[24]. The *Zingiber officinale* is of plants that has the disinfection and anti leech effect^[25,26]. The *Vitis vinifera* has been determined as a plant with the antiparasitic effect on leech^[27]. Afsintin (*Artemisia* spp.) causes the leech death^[28]. Also *Artemisia kermanensis* has the strong effect on the leech death^[28]. *Matricaria chamomilla* is an anti leech plant^[29]. It seems that anti-parasitic plants have the suitable effect due to having secondary active compounds. With regard to importance of Leech infestation, it seems necessary to conduct applied and pharmacologic researches related to this subject in order to produce natural and effective drugs.

Conflict of interest statement

We declare that we have no conflict of interest.

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