A review of the most important native medicinal plants of Iran effective on gastric acid

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ABSTRACT

Gastrointestinal diseases such as gastric acid hypersecretion are highly prevalent. Gastrointestinal diseases manifest frequently with gastric and duodenal ulcers, gastritis, and dyspepsia which are due to impaired gastric acid secretion. Given the frequency of developing gastrointestinal diseases such as gastric acid hypersecretion and consequently gastric ulcer, the aim of this review article is to report the native medicinal plants of Iran that are used to decrease or neutralize gastric acid. Ziziphora clinopodioides, Achillea wilhelmsii, Allium sativum, Amirkabiria odoratissim, Heracleum persicum L. and Medicago sativa are the most native medicinal plants of Iran used to treat gastric acid hypersecretion. Certain compounds such as pulegon, cisisoepulegon, cineol, thymol, alpha and beta-pinene, piperitenone, terpenoids, flavonoids, allicin, tannin, terpenoids, saponin, sterol, and leucoanthocyanin, 3, 4, and 7-trihydroxy flavonol, caffeic acid, and fetalid existing in these plants may be the main agents for reducing gastric acid.

KEY WORDS: Gastric acid, medicinal plants, Iran.

1. INTRODUCTION

One group of diseases that are increasing in prevalence are gastrointestinal diseases, most of which manifest with gastric and duodenal ulcers, gastritis, and dyspepsia. Peptic ulcers refer to ulcers of gastric diseases are diseases affecting the stomach and inflammation of the stomach by infection is called gastritis. Another common condition is gastric ulceration, peptic ulcers (Kasper Dennis, 2005). These diseases have various pathogenesis, an infection caused by a bacterium called Helicobacter pylori which acts by various mechanisms is very important (Shirzad, 2015; Salimzadeh, 2015; Razavi, 2015; Bagheri, 2013; 2014; 2015; 2016; Azadegan-Dehkordi, 2015; Zandi, 2013, 2014; Rahimian, 2014). However, to varying degrees, gastric acid hyper-secretion is the main cause of peptic ulcers (Kasper Dennis, 2005).

Although medicinal plants have long been used to treat various diseases, most of their chemical compounds and pharmacological effects have not yet been identified, although numerous trials have recently been done on them (Bagheri, 2013; Bahmani, 2014; 2015; Saki, 2014; Asadbeigi, 2014; Karamati, 2014; Delfan, 2014; 2015). Phenolic and nitrogenic compounds, vitamins, terpenoids such as carotenoids, triterpenes, and alkaloids are some of the effective bioactive compounds of the medicinal plants. Some of these compounds can exert strong antioxidant effects. Antioxidants play an important and fundamental role in the lives of human beings and in modification of various diseases (Bahmani, 2012; 2013; 2014; 2015; Ghasemi Pirbalouti, 2013; Delfan, 2014).

Given highly frequent incidence of gastrointestinal diseases such as gastric acid hypersecretion and consequently gastric ulcer, the aim of this review article is to report the native medicinal plants of Iran that are used to reduce or neutralize gastric acid.

2. MATERIALS AND METHODS

The search terms-gastric acid, extract, essential oil, medicinal plants, and Iran-were used to search for the relevant articles indexed in some databases including Information Sciences Institute, Web of Science, PubMed, Scopus, Google Scholar, and Scientific Information Databases.

3. RESULTS

The review of the findings demonstrated that Ziziphora Clinopodioides, Achillea wilhelmsii, Allium Sativum, Amirkabiria odoratissim and Heracleum persicum L. were some of the most important native medicinal plants of Iran that are used to reduce gastric acid (Table 1).
<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Family</th>
<th>Persian name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ziziphora Clinopodioides</td>
<td>Lamiaceae</td>
<td>Avisha-Barik</td>
<td>An interventional, experimental study on mice demonstrated that <em>Z. clinopodioides</em> extract in base condition compared inhibited the secretion of gastric acid significantly. Vagotomy caused removal of the inhibitory effect due to <em>Z. clinopodioides</em> on gastric secretion. Two mg/kg body weight (BW) of this extract exerted an inhibitory effect on gastric secretion. The hyposecretory effect of one mg/kg BW of the extract on gastric acid was significant compared to control group in vagus nerve stimulation</td>
</tr>
<tr>
<td>Achillea wilhelmsii</td>
<td>Asteraceae</td>
<td>Boomadaran</td>
<td><em>A. wilhelmsii</em> extract in base condition significantly inhibited gastric secretion in a dose-dependent manner. Vagotomy caused removal of the extract inhibitory effect on gastric acid. Two mg/kg of <em>A. wilhelmsii</em> extract exerted an inhibitory effect on gastric secretion. The hyposecretory effect of the extract on gastric acid secretion was not significant compared to the control group in vagus nerve stimulation</td>
</tr>
<tr>
<td>Allium Sativum</td>
<td>Amaryllidaceae</td>
<td>Sir</td>
<td>100 mg/kg of methanolic <em>A. sativum</em> extract caused a significant increase in the secretion of gastric acid and pepsin in the mice compared to control group. Electrical stimulation of vagus nerve in the control <em>A. sativum</em> group caused a significant increase in the secretion of gastric acid and pepsin</td>
</tr>
<tr>
<td>Amirkabiria odoratissim</td>
<td>Umbellifera</td>
<td>Karafs-Kohi</td>
<td>16.2 and 100 mg/kg of metabolic <em>A. odoratissim</em> extract caused a significant decrease in the secretion of gastric acid in the first and second base in the mice of both groups treated with <em>A. odoratissim</em> compared to control group</td>
</tr>
<tr>
<td>Heracleum persicum L.</td>
<td>Apiaceae</td>
<td>Kalpoureh (Maryam-Nokhodi)</td>
<td>Comparison of mean of the first and second samples of each 5, 10, and 20 mg/mL concentrations in treatment group alone was derived significant in vagotomized conditions. Comparison of each one of these conditions demonstrated that in the treatment group, there was a significant difference in gastric acid secretion between base condition and vagotomy and also between vagotomy and vagus nerve stimulation</td>
</tr>
<tr>
<td>Medicago sativa</td>
<td>Fabaceae</td>
<td>Yonjeh</td>
<td>250 mg/kg of hydroalcoholic <em>M. sativa</em> caused decrease in the secretion of gastric acid with therapeutic effects</td>
</tr>
</tbody>
</table>

**DISCUSSION**

According to the findings *Ziziphora Clinopodioides, Achillea wilhelmsii, Allium Sativum, Amirkabiria odoratissim* and *Heracleum persicum* L. are some of the most important native medicinal plants of Iran that are used to reduce gastric acid.

In traditional medicine, *Z. clinopodioides* is used to treat gastrointestinal diseases, stomachache, and common cold and as carminative, stomach tonic, anti-inflammatory, sedative, and antipyretic (*Zargari*, 1997; *Naghibi*, 2005). *Z. clinopodioides* contains certain compounds such as pulegon, cis-isopulegon, cineol, thymol, alpha and beta-pinene, pipirtenone, terpenoids, and flavonoids (*Sonboli*, 2006; *Salehi*, 2005; *Hansel*, 1998; *Oganesvan*, 1991).

Allicin is the main compound of *A. sativum* (*Cho*, 2006). This plant and most of other plants from this family are effective against a wide variety of diseases (*Rafieian-kopaei*, 2013; *Moghim*, 2014; *Bahmani*, 2013). *H. persicum* was found to contain tannin, terpenoid, saponin, sterol, flavonoid, and leucoanthocyanin (*Hansel*, 1998). *A. odoratissim* contains 3, 4, and 7-trihydroxy flavonol, caffeic acid, and fetalid (*Dapkhahi*, 2008). These compounds appear to be the main factors in reducing gastric acid.
Oxidative stress is involved in the pathogenesis of gastric inflammation carcinogenesis and ulcerogenesis, especially in H. pylori infections. Free radicals which induce oxidative stress have been considered as the main cause of stomach stress ulcers. Psychological and physical stress, surgical intervention and Helicobacter pylori (H. pylori) infection all lead to oxidative stress in the stomach. Oxidative stress stimulates production of additional reactive oxygen species and causes decline in antioxidant defense system (Pan, 2008). Hence, antioxidants have been proposed to be effective in prevention and treatment of gastric complications such as gastric ulcers. The plants presented here all have antioxidant activity, therefore, they might be effective in gastric ulcer by their antioxidant properties, other than reducing stomach acid. There are numerous other plants which have antioxidant activity (Nasri, 2014; Rafieian-Kopaei, 2013, 2014; Nasri, 2013, 2014; Baradaran, 2013, 2014; Ghaed, 2012; Asadi SY, 2013; Parsaei, 2013; Amirmohammadi, 2014; Bahmani, 2014; Taghikhani, 2014; Taghikhani, 2012; Heidarian, 2013; Sharafati, 2011). which have positive effects in gastric complications which worth examining in this regard. Oxidative stress is also involved in the pathogenesis various other diseases including cancer, diabetes, atherosclerosis, Alzheimer and Parkinson diseases (Shirzad, 2009, 2011; Azadmehr, 2011; Nasri, 2013, 2014, 2015; Setorki, 2013; Akhlaghi, 2011; Baradaran, 2012; Moradi, 2013; Rabiei, 2013, 2014; Rahimian, 2013; Rahnama, 2015; Bahmani, 2014, 2015, 2016; Sarrafchi, 2016; Shayganni, 2015; Rafieian-Kopaei, 2011, 2014; Mirhosseini, 2014; Forouzan, 2012; Asadi-Samani, 2014; Shirani, 2011; Hosseini, 2014). Therefore, the plants with antioxidant activity might also be effective in these diseases.

4. CONCLUSION

Therefore, the plants with antioxidant activity might also be effective in these diseases.

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