

FLUORIDE CONTENT OF POPULAR PERSIAN HERBAL DISTILLATES

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ABSTRACT: The fluoride ion (F) concentration levels of the 20 most popular herbal distillates sold in Iran were determined. The mean F content of the samples was 50 µg/L with a range of not detectable-340 µg/L. The estimated maximum daily, weekly, and monthly intakes of F were 34, 238, and 1020 µg/day respectively. The results of this study showed that the low concentration levels of F found in Persian herbal distillates should not normally significantly increase the F intake of consumers.

Keywords: Fluoride content of herbal distillates; Iran; Persian herbal distillates.

INTRODUCTION

Numerous and varied medical benefits have been claimed for herbal distillates and the use of medicinal herbs and herbal decoctions has increased significantly in recent years.¹⁻³ The main producing countries of herbal distillates are Iran, Turkey, and Egypt.⁴ These countries are destinations for many tourists and they may use herbal distillates as a drink. The World Health Organization estimated that nearly 80% of the populations of developing countries relied on herbs for primary health care.⁵ With this worldwide increase in the use of herbal distillates, consideration of their health implications is important.⁶ The fluoride ion (F), a widely distributed element in the environment, is of special concern, because it can cause a wide range of adverse health effects.⁷⁻¹¹ Many studies have been done in Iran of the F content in drinking water, fish, air, and sea water¹²⁻¹⁸ as well as research on its removal from drinking water.¹⁹⁻²³ However, to the best of our knowledge, no reports have been published on the F content of herbal distillates and the present study was undertaken to investigate this area.

MATERIALS AND METHODS

Twenty of the most popular herbal distillates were purchased from herbal distillate distribution shops in Bushehr, Iran. All of the purchased herbal distillates were produced in Meymand city, the main city in Iran for producing herbal distillates. All the herbal distillates bottles were stored in a dark place at room temperature in their original sealed plastic containers until the F analysis. The F analysis was made by the standard SPADNS method using a Spectrophotometer (M501 Single Beam Scanning UV/VIS, UK).

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RESULTS AND DISCUSSION

The claimed therapeutic properties and F contents of the herbal distillates are shown in the Table 1.

Table 1. Claimed therapeutic properties of the analyzed herbal distillates and their fluoride ion (F) concentration levels ($\mu\text{g F/L}$)

| Common name | Scientific name | F ($\mu\text{g/L}$) | Claimed therapeutic properties |
|----------------|----------------------------------|-----------------------|---------------------------------------------------------------|
| Fenugreek | <i>Trigonella foenum-graecum</i> | 100 | Treatment of digestive problems and antidiabetic |
| Walnut | <i>Juglans regia</i> | 10 | Anti-diarrhea, hypoglycemia |
| Alfalfa | <i>Medicago sativa</i> | *ND | Fattening, slimming treatment, blood purification |
| Yarrow | <i>Achillea</i> | 70 | Anticonvulsants, febrifuge |
| Lavender | <i>Lavandula stoechas</i> | *ND | Amplifier neurology soothing, Anticonvulsants |
| Fennel | <i>Foeniculum vulgare</i> | 10 | Antiseptic, palliative, and anti-inflammatory effects |
| Sycamore | <i>Platanus orientalis</i> | *ND | Improving blood circulation to brain and heart |
| Aloe vera | <i>Aloe vera</i> | 10 | Amplifier, blood purifier |
| Olive | <i>Olea europaea</i> | *ND | Disposal of gallstones, appetizer |
| Nettle | <i>Urtica</i> | 60 | Treatment of respiratory, anti-diarrheal, anti-inflammatory |
| Licorice | <i>Glycyrrhiza glabra</i> | *ND | Impact on the digestive system, treating swelling and ulcers |
| Orange blossom | <i>Citrus sinensis</i> | 80 | Invigorating for the skin, relaxing effect on mind and body |
| Fumitory | <i>Fumaria officinalis</i> | 30 | Biliary disorders, eye irritation |
| Dog-rose | <i>Rosa canina</i> | 50 | Carminative, skin care |
| Camelthorn | <i>Alhagi maurorum</i> | 60 | Blood purifier, kidney detergent |
| Peppermint | <i>Mentha</i> | 340 | Improvement of upset stomach and indigestion, skin irritation |
| Pussy willow | <i>Salix aegyptiaca</i> | *ND | Mild sedative, treating skin |
| Chicory | <i>Cichorium intybus</i> | 40 | Treatment of liver and gallbladder disorders |
| Rose | <i>Rosa damascene</i> | 100 | Mild sedative, skin treatments |
| Herbal mixture | - | 50 | Sedative, used for upset stomach |
| Minimum value | | *ND | |
| Maximum value | | 340 | |
| Mean value | | 50 | |
| Std Deviation | | 74.46 | |

*None Detected

The mean F content of the samples was 50 µg/L with a range of not detectable-340 µg/L. The highest F content in the herbal distillates was 340 µg/L in peppermint, whereas F was not detected in 6 samples: alfalfa, lavender, sycamore, olive, licorice, pussy willow. The daily consumption of herbal distillates by local residents is normally less than one teacup (100 mL).⁴ The estimated daily, weekly, and monthly intakes of F for all the herbal distillate samples were calculated (Table 2).

Table 2. The estimated daily, weekly, and monthly intakes of the fluoride ion (F, µg) *per capita* for the herbal distillate samples

| Common name | Scientific name | Estimated F intake (µg) | | |
|----------------|----------------------------------|-------------------------|--------|---------|
| | | Daily | Weekly | Monthly |
| Fenugreek | <i>Trigonella foenum-graecum</i> | 10 | 70 | 300 |
| Walnut | <i>Juglans regia</i> | 1 | 7 | 30 |
| Alfalfa | <i>Medicago sativa</i> | - | - | - |
| Yarrow | <i>Achillea</i> | 7 | 49 | 210 |
| Lavender | <i>Lavandula stoechas</i> | - | - | - |
| Fennel | <i>Foeniculum vulgare</i> | 1 | 7 | 30 |
| Sycamore | <i>Platanus orientalis</i> | - | - | - |
| Aloe vera | <i>Aloe vera</i> | 1 | 7 | 30 |
| Olive | <i>Olea europaea</i> | - | - | - |
| Nettle | <i>Urtica</i> | 6 | 42 | 180 |
| Licorice | <i>Glycyrrhiza glabra</i> | - | - | - |
| Orange blossom | <i>Citrus sinensis</i> | 8 | 56 | 240 |
| Fumitory | <i>Fumaria officinalis</i> | 3 | 21 | 90 |
| Dog-rose | <i>Rosa canina</i> | 5 | 35 | 150 |
| Camelthorn | <i>Alhagi maurorum</i> | 8 | 56 | 240 |
| Peppermint | <i>Mentha</i> | 34 | 238 | 1020 |
| Pussy willow | <i>Salix aegyptiaca</i> | - | - | - |
| Chicory | <i>Cichorium intybus</i> | 4 | 28 | 120 |
| Rose | <i>Rosa damascene</i> | 10 | 70 | 300 |
| Herbal mixture | | 5 | 35 | 150 |

The estimated maximum F daily intake for a single herbal distillate was 34 µg/day for peppermint with the corresponding weekly and monthly intakes being 238 µg/week and 1020 µg/month, respectively. Finally, in view of the increasing awareness of toxic effects of a high fluoride intake, particularly in children, it is

highly recommended that low-F bottled drinking water^{12,13} is used to prepare herbal drinks in regions with elevated F levels in the drinking water sources.⁹

CONCLUSIONS

The results of this study showed that the low concentration levels of F found in Persian herbal distillates should not normally significantly increase the F intake of consumers. Nevertheless, it is highly recommended that low-F bottled drinking water is used to prepare herbal drinks in regions with elevated F levels in the drinking water sources.

ACKNOWLEDGEMENTS

The authors are grateful to the Bushehr University of Medical Sciences for their financial support and the laboratory staff of the Environmental Health Engineering Department for their cooperation.

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