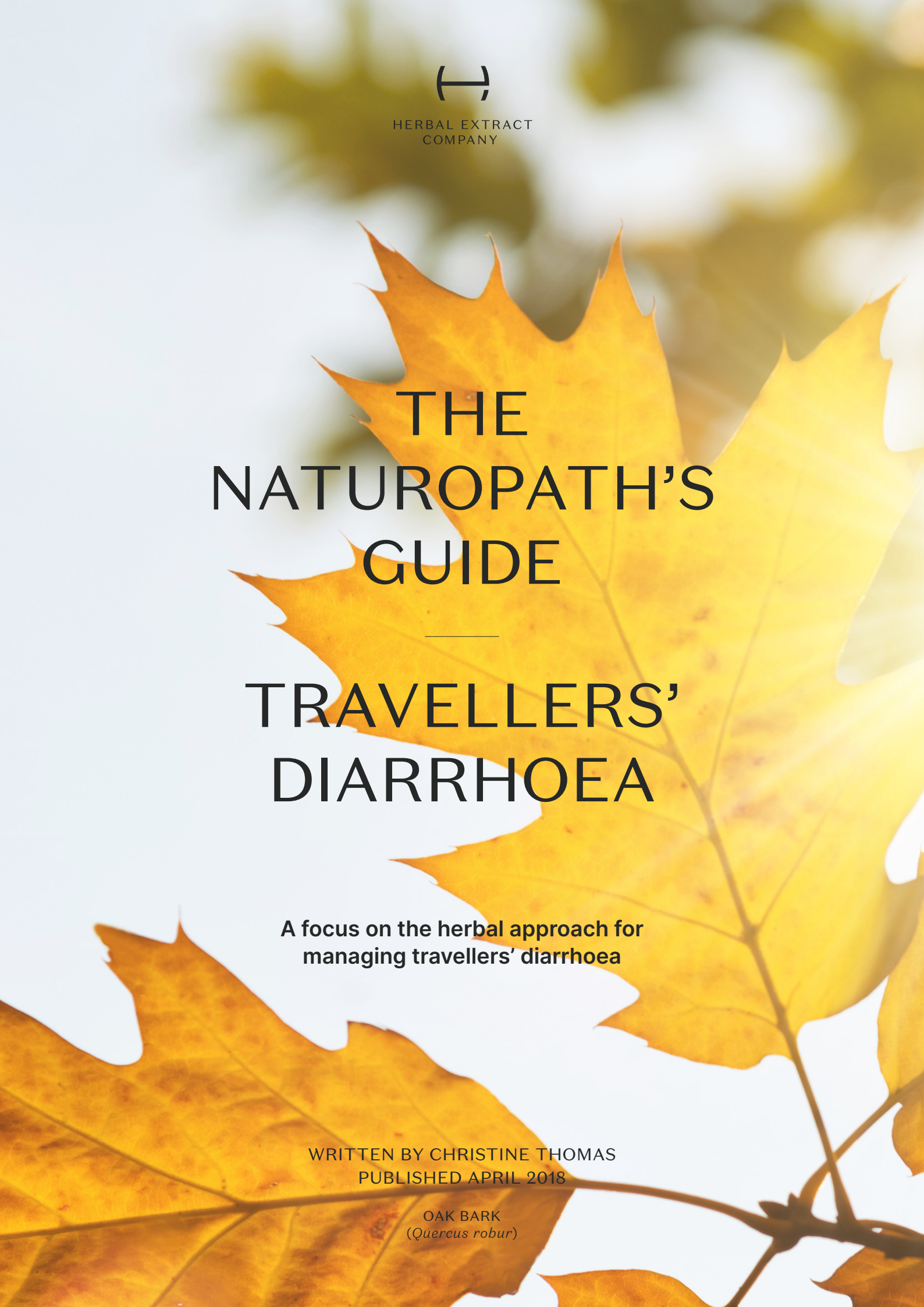

HERBAL EXTRACT COMPANY

# THE NATUROPATH'S GUIDE

# TRAVELLERS' DIARRHOEA

**A focus on the herbal approach for managing travellers' diarrhoea**

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OAK BARK
(*Quercus robur*)

# TRAVELLERS' DIARRHOEA

Bali Belly, Montezuma's Revenge, the Turkey Trots or the Rangoon Runs, whatever the alias travellers' diarrhoea is no laughing matter.

Travellers' diarrhoea remains one of the most common illnesses experienced by international travellers. Coupled with this there is a growing recognition of antibiotic resistance acquisition associated with travellers' diarrhoea and self-treatment abroad, so it is important for the population to be educated to avoid this negative impact.

## *Condition Overview*

Travellers' diarrhoea is an acute stomach and intestinal infection, usually bacterial gastroenteritis, that is caused by eating contaminated food or water. It is often used as a generic term for any illness, ranging from an upset stomach to loose stools, during or after travel. With a growing increase in international travel it affects millions of travellers globally every year, especially those who travel to the (sub)tropics or from developed to developing and low-income countries. It is not only the disease most commonly encountered by travellers to (sub) tropical destinations but also the most common health complaint at post travel consultations, and complications of travellers' diarrhoea often present to gastroenterologists. In fact recent research has highlighted the causative role of travellers' diarrhoea in the development of post infectious irritable bowel syndrome. Travellers' diarrhoea is usually a self-limiting condition that clears up after a few days and is rarely life threatening. It is believed that natives of high-risk countries have become accustomed to the bacteria and have developed immunity to them so they aren't affected in the same way. Micro-organisms that can cause travellers' diarrhoea include:

- **Bacteria:** *Escherichia coli (E. coli)*, primarily enterotoxigenic (estimated to be responsible for nearly 30% of cases), diarrhoeagenic, enteropathogenic and enteroaggregative strains. Other bacterial causes of traveller's diarrhoea include *Campylobacter jejuni* (Southeast Asia e.g. Thailand), *Salmonella* species, *Shigella* species, enteroinvasive and enterohaemorrhagic *E. coli*, *Aeromonas* spp., *Plesiomonas shigelloides*, *Arcobacter* spp., enterotoxigenic *Bacteroides fragilis* and *Vibrio* spp.
- **Parasites:** including *Giardia intestinalis*, *Entamoeba histolytica* and *Cryptosporidium parvum*.
- **Viruses:** particularly norovirus and rotavirus.
- **Microsporidiosis:** fungi such as *Enterocytozoon bieneusi* and *Encephalitozoon intestinalis*.

Although these bacteria can be considered causative pathogens, travellers' diarrhoea may be multifactorial and a reaction to many microbial strains foreign to the intestinal ecosystem at once.

## *Common Symptoms*

The onset of symptoms will typically occur one to two weeks after arrival at the destination, though travellers can develop symptoms throughout their stay or shortly after arrival.

- abrupt onset of diarrhoea (three or more unformed stools per 24 hours plus at least one additional symptom below)
- mild temperature
- nausea and vomiting
- loss of appetite
- urgent need to have a bowel movement
- general malaise (weakness or discomfort)
- explosive and painful gas
- abdominal bloating, cramps and pain

## *Risk Factors*

Consuming contaminated food is a major cause of travellers' diarrhoea. Contaminated water is another common cause. Avoidance of high-risk foods and drink is an oft-cited means of reducing the risk of traveller's diarrhoea although there is little direct evidence that such behaviour modification reduces disease incidence. It can be a cumbersome strategy and even when fully enforced is not 100% effective.

The risk of travellers' diarrhoea is higher where sanitation and hygiene standards are poor such as in the developing nations of Latin America, Africa, the Middle East and Asia. Travellers' diarrhoea is more common in young adults than older adults likely due to a lack of vigilance in avoiding contaminated food combined with a more adventurous lifestyle such as backpacking. Some patients followed by gastroenterologists are at higher risk of developing it. Children, elderly, pregnant women, chronically ill patients and those on immunosuppressive medications are at higher risk of complications, such as acute dehydration, if they contract travellers' diarrhoea. Prophylaxis and treatment of these populations remains challenging and requires a tailored approach.

The strength of the gap junctions between mucosal cells may affect susceptibility to E. coli and other intestinal pathogens. Variations in lactoferrin, osterprotegerin and interleukin 10 genes may slightly increase the risk of travellers' diarrhoea. Specific genes have also been identified that control the biological rhythms of intestinal motility and promote more activity on awakening in the morning and less activity while asleep at night. Some researchers have proposed that travellers are more susceptible to diarrhoea because of disruption of the biological clock, including intestinal motility rhythms.

## *How To Get The Correct Diagnosis*

Travellers' diarrhoea is usually diagnosed by obtaining a thorough travel history including timeline and itinerary, diet and water consumption at their destination, illnesses in other travellers and possible sexual exposures. In most self-limited cases physical examination will show mild, widespread abdominal pain which is tender on palpation. Dehydration should be assessed through skin turgor and capillary refill. In more severe cases patients may have severe abdominal pain, high fever and evidence of tachycardia or hypotension. Laboratory investigation is typically not required in most cases. In patients with concerning features such as with high fever, blood in the stool or an urgent need to evacuate, stool studies can be obtained.

## *Conventional Treatment & Prevention*

Patient and travel related factors affect travellers' diarrhoea development risk and guide doctors with their prophylaxis and treatment. The best defence is prevention. Although specific vaccines are being developed they have not yet had a major impact on travellers' diarrhoea and understanding their roles and limitations is especially important for doctors.

Treatment aims to ease some of the symptoms and prevent dehydration. Options may include:

- Plenty of water to avoid dehydration.
- Oral rehydration drinks to replace lost salts and minerals.
- Antibiotics to kill a bacterial infection.
- Antinausea drugs.
- Avoiding antidiarrhoea drugs if a high fever is present because preventing the passage of stools will only keep a bacterial infection and its poisons inside the body for longer.

Although most cases of travellers' diarrhoea are self-limiting, and mild to moderate in severity, diarrhoea can limit a tourist's itinerary or business activities. Consequently travellers, particularly in developing countries, are frequently prescribed an antibiotic to self-treat diarrhoea should it develop. In recent years research showing antibiotic mediated disruption of the microbiome, and subsequent colonisation with resistant organisms, has raised concerns about travellers as vehicles for spreading resistance globally as well as the possible individual health consequences of acquisition of these resistant organisms. In pretravel counselling doctors are therefore encouraged to include information about this risk balanced against the potential benefits of antibiotic use.

Subsequently, the expert panel mentioned above gave new recommendations for the prophylaxis for travellers' diarrhoea:

- Antimicrobial prophylaxis should not be used routinely but should be considered for travellers at high risk for health-related complications of travellers' diarrhoea.
- Bismuth subsalicylate (BSS, an antidiarrhoeal agent) may be considered for any traveller to prevent travellers' diarrhoea.
- When antimicrobial prophylaxis is indicated, rifaximin (antibiotic) is recommended for all regions.
- Fluoroquinolones (antibiotics) are not recommended for prophylaxis of travellers' diarrhoea.

For treatment:

- Antibiotic treatment is not recommended in patients with mild travellers' diarrhoea. Loperamide (known as Imodium, an antidiarrhoeal agent) or BSS may be considered to treat mild travellers' diarrhoea.
- For moderate travellers' diarrhoea antibiotics, including azithromycin, may be used. Regarding fluoroquinolones the emergence of resistance to this class of drug, particularly in Southeast Asia, combined with the potential for reduced diversity of intestinal microbiota (dysbiosis) and adverse musculoskeletal consequences (tendon rupture), contribute uncertainties to the risk-benefit assessment. Regarding rifaximin it may be used but clinicians should exercise caution when providing it for therapy in regions, or with itineraries, in which the risk for invasive pathogens is high. Loperamide may be used as adjunctive therapy for moderate to severe travellers' diarrhoea and may be considered for use as monotherapy in moderate travellers' diarrhoea.
- For severe travellers' diarrhoea antibiotics should be used. Azithromycin is preferred including for dysentery. Fluoroquinolones and rifaximin may be used to treat severe, nondysenteric travellers'

*Definitions for classifying travellers' diarrhoea*

| | |
|---|---|
| **Mild** | Diarrhoea that is tolerable, not distressing, and does not interfere with planned activities |
| **Moderate** | Diarrhoea that is distressing or interferes with planned activities |
| **Severe** | Diarrhoea that is incapacitating or completely prevents planned activities; all dysentery (passage of grossly bloody stools) is considered severe |
| **Persistent** | Diarrhoea lasting two weeks or longer |

diarrhoea. Single-dose antibiotic regimens may be used to treat moderate or severe travellers' diarrhoea.

- Follow-up and diagnostic testing: Microbiologic testing is recommended in returning travellers with severe or persistent symptoms or in those who do not respond to therapy. Molecular testing, aimed at a broad range of clinically relevant pathogens, is preferred when rapid results are clinically important or nonmolecular tests have failed to establish a diagnosis.

*" Use of herbal medicines can bolster the body's defences against infections, decrease the intensity of the infection or help prevent the illness."*

Graviola
*(Annona muricata)*

| INTERVENTION | Astringent | Anti-inflammatory | Antimicrobial (antibacterial, antiviral, antifungal, antiprotozoal) | Carminative | Antispasmodic | Immune enhancing |
|---|---|---|---|---|---|---|
| Agrimony | ✓ | ✓ | | | | |
| Astragalus | | ✓ | ✓ | | | ✓ |
| Barberry | ✓ | ✓ | ✓ | | | ✓ |
| Black Walnut | ✓ | ✓ | ✓ | | | |
| Chamomile | | ✓ | ✓ | | ✓ | |
| Ginger | | ✓ | | ✓ | ✓ | ✓ |
| Golden Seal | ✓ | | ✓ | | | |
| Graviola | | ✓ | ✓ | | ✓ | |
| Meadowsweet | ✓ | ✓ | ✓ | | | |
| Oak Bark | ✓ | | ✓ | | | |
| Paw Paw | | ✓ | ✓ | | | |
| Sage | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## *Natural Therapies For Treatment & Prevention*

The main tools of pharmaceutical treatment (antibiotics and antidiarrhoeal agents) can be effective, and are required among certain high-risk groups, but their side effects leave many travellers looking for an alternative. While treatment of travellers' diarrhoea is based on rehydration therapy and rest, and with regard to prophylaxis nothing replaces common sense when travelling, herbal medicines have a role in treating and assisting the body in avoiding infection. Use of herbal medicines can bolster the body's defences against infections, decrease the intensity of the infection or help prevent the illness.

Pathogenic bacteria are harmful to the intestinal cells, damaging and inflaming them, but other factors may weaken or strengthen the ability of intestinal mucosal cells to resist the number of pathogenic bacteria. The susceptibility may have less to do with systemic immune function and more to do with intestinal health and a well-established intestinal flora ecosystem. The strength of the intestinal mucosa may discourage bacteria from adhering. Therefore for a preventative technique to work it must rest upon a solid foundation of health. Prior to travel removing gastrointestinal tract damaging factors, such as non-steroidal anti-inflammatories and alcohol, will help to improve overall gut health. A key strategy to maintaining gut membrane health is by supporting secretory Immunoglobulin A (IgA) supply. Secretory IgA is an important factor in gut immunology and barrier function, and is the most abundant class of antibody found in the intestinal lumen of humans and most other mammals. It is designed to prevent the entry of unwanted foreign proteins into the body and has long been recognised as a first line of defence in protecting the intestinal epithelium from pathogens and toxins. Among other gut healing strategies which follow naturopathic principles there are certain herbs, probiotic strains, fermented foods and bone broths which may help normalise secretory IgA levels and enhance the immune function.

## *Potential Treatment Plans*

| | | | | | |
|---|---|---|---|---|---|
| **Prophylaxis prior to departure** | Astragalus | Green Tea | Turmeric | | |
| **Prophylaxis while travelling** | Barberry | Garlic | Ginger | Graviola | Paw Paw |
| **Gastroenteritis infection with nausea/vomiting** | Chamomile | Ginger | Liquorice | Meadowsweet | Peppermint |
| **Gastroenteritis infection with diarrhoea** | Agrimony | Chamomile | Golden Seal | Liquorice | Raspberry |
| **Griping, cramping and gas** | Chamomile | Fennel | Peppermint | Wild Yam | |
| **Parasitic infection e.g. giardia** | Black Walnut | Oak Bark | Sage | Wormwood | |

## *Desired Herbal Actions and Potential Herbs Include:*

Intestinal health and immune function may be supported prior to travel with anti-inflammatory herbs and immune enhancing herbs such as turmeric *(Curcuma longa)*, reishi *(Ganoderma lucidum)* and astragalus *(Astragalus membranaceus)*.

Herbs for common intestinal pathogens include barberry *(Berberis vulgaris)*, golden seal *(Hydrastis canadensis)*, cinnamon *(Cinnamomum verum)*, graviola *(Annona muricata)* and wormwood *(Artemisia absinthium)*.

Bacterial endotoxins commonly promote excessive secretion of fluids and electrolytes associated with absorption difficulties and damage to the mucosal cells, causing abundant watery fluid in the intestinal lumen. Therefore, when it is necessary to check excessive fluid losses, therapy for secretory diarrhoea may involve symptomatic treatment such as astringent and tannin containing herbs including agrimony *(Agrimonia eupatoria)*, oak bark *(Quercus robur)*, raspberry leaf *(Rubus idaeus)* and witch hazel *(Hamamelis virginiana)*.

Abdominal pain and bloating can be addressed using a combination of carminatives and antispasmodics which may have antimicrobial effects of their own. Useful carminatives include peppermint *(Mentha piperita)* and fennel *(Foeniculum vulgare)*.

Commonly prescribed gastrointestinal tract antispasmodics include chamomile *(Matricaria chamomilla)*, wild yam *(Dioscorea villosa)*, lemon balm *(Melissa officinalis)* and ginger *(Zingiber officinale)*.

Agents that are soothing to the intestinal mucosa such as liquorice *(Glycyrrhiza glabra)* and slippery elm *(Ulmus rubra)* may be useful ingredients promoting repair and protection of intestinal cells.

Nausea may be alleviated by peppermint.

Barberry
*(Berberis vulgaris)*

## *Herbal Support Could Include:*

| HERB NAME | DESCRIPTION | ACTIONS |
|---|---|---|
| Agrimony<br>*(Agrimonia eupatoria)*<br>  | The characteristic compounds of agrimony are the tannin constituents, consisting mainly of proanthocyanidins (condensed tannins) with a small proportion of ellagitannins. Tannin-containing herbal preparations, in general, have traditional uses in the treatment of diarrhoea.<br><br>***INDICATIONS***<br>Mild non-specific acute diarrhoea, especially in children | Antioxidant<br>Anti-inflammatory<br>Astringent<br>Diuretic |
| Astragalus<br>*(Astragalus membranaceus)*<br>  | In an in vitro antibacterial study astragalus demonstrated good inhibitory activity against the diarrhoeal bacterial pathogens *Escherichia coli, Salmonella enteritidis, Shigella* and *Campylobacter*. Astragalus strengthens the movement and muscle tone of the small intestine (especially the jejunum) in animal tests which may account for its clinical application in a variety of common digestive symptoms.<br><br>***INDICATIONS***<br>Diarrhoea, viral and bacterial infection, immune system dysfunction, to increase vitality | Immune Enhancer<br>Modulator<br>Stimulant and Restorative<br>Antiviral<br>Antibacterial<br>Antimicrobial<br>Anti-inflammatory |
| Barberry<br>*(Berberis vulgaris)*<br>  | In traditional medicine extracts of berberine containing herbs are used in the treatment of diarrhoea of different origins. Recent studies have shown that berberine and its derivatives have significant biological effects on gastrointestinal and other functions and may become therapeutic for the treatment of diarrhoea, gastroenteritis and inflammatory conditions.<br><br>***INDICATIONS***<br>Specific for intestinal infections from pathogenic organisms, diarrhoea, gastrointestinal tract problems, cholera, dysentery, fever | Bitter<br>Immunomodulator<br>Antimicrobial<br>Anti-inflammatory |

## *Herbal Support Could Include: (Cont.)*

| HERB NAME | DESCRIPTION | ACTIONS |
|---|---|---|
| Black Walnut<br>*(Juglans nigra)*<br>  | Based on anecdotal evidence black walnut has been used to relieve diarrhoea due to a normalising effect that juglone may exert on intestinal tissue. Black walnut also contains tannins which have astringent properties and, therefore, reduce secretions and may relieve irritation and improve tissue firmness.<br><br>***INDICATIONS***<br>Intestinal parasites such as pinworm, ringworm and tapeworm, fungal, bacterial and viral infections, diarrhoea | Astringent<br>Anthelmintic (Bitter)<br>Vermifuge<br>Antiviral<br>Antifungal<br>Anti-inflammatory |
| Chamomile<br>*(Matricaria chamomilla)*<br>  | In a prospective, randomised, multicentre, double-blind, parallel group trial, 79 children (ages six months to five years) with acute, non-complicated diarrhoea received chamomile for three days and experienced shorter duration of symptoms.<br><br>***INDICATIONS***<br>Symptomatic treatment of gastrointestinal complaints such as diarrhoea, bloating, minor spasms, dyspepsia, impaired digestion, colitis, colic, diverticulitis, constipation (children), Crohn's disease, infantile colic and flatulence, adjuvant in the treatment of inflammatory conditions of the gastrointestinal tract including irritable bowel syndrome, travel sickness | Anti-inflammatory<br>Antibacterial<br>Antiviral<br>Antifungal<br>Mild Sedative<br>Cholagogue<br>Bitter Tonic (Digestive)<br>Antispasmodic<br>Spasmolytic |
| Ginger<br>*(Zingiber officinale)*<br>  | Interferes with the colonisation of cells by enterogenic bacteria thus reducing diarrhoea and reducing bacterial load.<br><br>***INDICATIONS***<br>Bacterial diarrhoeal conditions especially with cramping (cholera, dysentery, E. coli etc.), nausea, vomiting, stomach cramping, fever (stimulates sweating), gastrointestinal discomfort, colic, bloating | Carminative<br>Antidiarrhoeal<br>Antispasmodic<br>Anti-inflammatory<br>Analgesic<br>Immunomodulatory<br>Antiemetic |

## *Herbal Support Could Include: (Cont.)*

| HERB NAME | DESCRIPTION | ACTIONS |
|---|---|---|
| Golden Seal<br>*(Hydrastis canadensis)*<br>  | Goldenseal was famously used by the Eclectic Physicians during cholera and dysentery outbreaks. People with these infections end up dying from severe dehydration due to copious fluid loss through diarrhoea. Taking this herb dramatically stopped the watery diarrhoea.<br><br>***INDICATIONS***<br>Specific for intestinal infections from pathogenic organisms, diarrhoea, gastrointestinal tract infections, dysentery, poor appetite, worms and parasites, fever, liver congestion and gallbladder problems, ulcerative colitis | Bitter<br>Mucous Membrane Tonic<br>Astringent<br>Antimicrobial<br>Vermifuge<br>Digestive Aid |
| Graviola<br>*(Annona muricata)*<br>  | Researchers suggest graviola could be employed in the treatment of various bacterial infectious diseases, including diarrhoea, after pre-clinical studies demonstrated antibacterial activity against *Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumoniae, Proteus mirabillis, Bacillus cereus, Streptococcus pyogenes, Bacillus subtilis, Salmonella typhimurium* and *Klebsiella pneumonia*.<br><br>***INDICATIONS***<br>Gastric upset, diarrhoea, indigestion, bacterial and parasitic infections | Antibacterial<br>Antidysenteric<br>Anthelmintic<br>Antispasmodic<br>Antiparasitic<br>Anti-inflammatory |
| Meadowsweet<br>*(Filipendula ulmaria)*<br>  | Traditionally used as a treatment for diarrhoea based on the herb's appreciable tannin content. Bacteriostatic activity has been reported in vitro against *Staphylococcus aureus, S. epidermidis, Escherichia coli, Proteus vulgaris* and *Pseudomonas aeruginosa*.<br><br>***INDICATIONS***<br>Diarrhoea, ulcers, pain, stomach aches, fevers, indigestion | Astringent<br>Antibacterial<br>Anti-inflammatory<br>Gastroprotective<br>Antidiarrhoeal<br>Diaphoretic |
| Oak Bark<br>*(Quercus robur)*<br>  | Oak bark contains between 10 and 20 per cent of tannins which are astringents. These compounds bind with tissue proteins making them impermeable to bacterial invasion and infection while at the same time strengthening the tissues.<br><br>***INDICATIONS***<br>Diarrhoea, vomiting | Astringent<br>Antimicrobial |

## *Herbal Support Could Include: (Cont.)*

| HERB NAME | DESCRIPTION | ACTIONS |
|---|---|---|
| Paw Paw<br>*(Carica papaya)*<br>  | Paw paw leaves contain carpaine, a substance which kills microorganisms that often interfere with the digestive function.<br><br>***INDICATIONS***<br>Viral, bacterial and fungal infection, poor digestion | Anthelmintic<br>Antiparasitic<br>Antibacterial<br>Antiviral<br>Antifungal<br>Anti-inflammatory<br>Digestive stimulant |
| Sage<br>*(Salvia officinalis)*<br>  | Several lines of evidence support the antimicrobial effects of sage. The ethanolic extract shows strong bactericidal and bacteriostatic effects against both Gram-positive and Gram-negative bacteria.<br><br>***INDICATIONS***<br>Loss of appetite, gastritis, flatulence, bloating, dyspepsia, to promote digestion, painful intestinal cramping | Bitter<br>Carminative<br>Antimicrobial<br>Antibacterial<br>Antifungal<br>Astringent<br>Antispasmodic<br>Immunomodulatory<br>Anti-inflammatory |

## *Conclusion*

Travellers' diarrhoea will continue to challenge patients and practitioners despite the use of sanitation advice, prophylactic medicines and treatment with herbs and antibiotics. Its effects may extend beyond the time of travel such as post infectious complications and exacerbation of pre-existing disease. People intending to travel to at-risk countries should be counselled regarding prevention measures and may be given a travel pack that includes medications for self-treatment should they become ill. It is suggested that future research should focus on strategies for reducing exposure to pathogens, early detection and targeted treatments.

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