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THERAPEUTIC POTENTIAL OF HERBAL FORMULATIONS IN TREATMENT OF IRRITABLE BOWEL SYNDROME (IBS)

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ABSTRACT

Irritable bowel syndrome (IBS) isa chronic digestive disorder with symptoms like abdominal pain and cramps, excess gas, bloating, change in bowel habits such as harder, looser, or more urgent stools than normal, constipation and /or diarrhea. The etiology of IBS is still unknown. Based on the different mechanisms in etiology, treatment focuses on controlling symptoms of IBS.The use of complementary and alternative medicine (CAM) has increased considerably in gastroenterology. Use is particularly high for conditions such as inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS), reflux esophagitis, and peptic ulcer, where there remains an unmet necessary need to treat the underlying process or control symptoms. Thus, natural products with broad biological activity, the best efficacy, and safe profiles are promising to replace or reduce the use of chemical medicines.Consequently, there is a great need for scientific analysis of herbal products with pharmacological effects to discover alternative bioactive phytocompounds.Herbal medicines can have therapeutic effects in management and treatment of IBS. In the present study attempts have been made to review important herbal products/ formulations showing therapeutic effects in treatment of irritable bowel syndrome(IBS) and their possible mechanisms of action.

***Keywords*:** Herbal medicines; Irritable bowel syndrome (IBS); Possible mechanisms of action

INTRODUCTION

Irritable bowel syndrome (IBS) is a chronic digestive disorderwith symptoms like abdominal pain and cramps,excess gas,bloating,change in bowel habits such as harder, looser, or more urgent stools than normal,constipation and /or diarrhea . [1] It is one of the most common gastrointestinal disorders worldwide, affecting an estimated 11% of the global population.[2]The prevalence of IBS in children and adolescents is high. Various studies have reported prevalence to be approximately 8 to 12% in children, and 5 to 17% in adolescents. Higher prevalence of IBS has been observed in more developed countries like Singapore (8.6%)

and Japan (9.8%) compared with India with the lowest prevalence (4.2%)[3].Certain foods, medicines, emotional stress and lifestyles are some factors that can trigger IBS. Research studies have shown that pharmacological treatments of IBS covering tricyclic antidepressants, selective serotonin reuptake inhibitors, antispasmodics, 5-hydroxytryptamine-3 receptor (5-HT3) antagonists, 5-HT4 agonists, antibiotics, probiotics and melatonin [6-14] have not been found much effective due to involvement of numerous factors such as visceral hypersensitivity, abnormal gut motility, intestinal microbiota, inflammation and immune disturbance, genetic factors, abnormal gas handling, psychosocial factors, intestinal infections, central nervous system, and serotonin [1,4,5] in pathophysiology of IBS and a very significant placebo effect[15] causing effective therapy of IBS to be more complex. Because of various factors involved in its pathophysiology and disappointing results from conventional IBS medications, the treatment of IBS is challenging, and use of complementary and alternative medicines especially herbal therapies is increasing. Traditional herbal therapies have been used for a long time to treat gastrointestinal disorders including irritable bowel syndrome (IBS) . The present study has focused on the important herbal products / formulations for thetreatment of Irritable BovelSyndrome (IBS)and their possible mechanisms of action.

HERBAL PRODUCTS /FORMULATIONS FOR IBS

Aloe Vera

Aloe vera leaves contain a transparent gel which is most used as a curativeeffect.[16]Aloe vera is commonly used in the treatment of IBS, especially the constipation-predominant subtype.[17]Few studies conducted on patients of IBS to evaluate therapeutic efficacy of Aloe Vera have shown that Aloe vera can be beneficial in controlling IBS symptoms.[18,19,20,21]. However, more placebo-controlled studies with larger patient population are needed to confirm its therapeutic potential in treatment of IBS.

Artichoke

Artichoke leaf extract (ALE) may be useful in IBS treatment as evidenced by few studies conducted in IBS patients[22,23] where a significant improvement in IBS occurrence of 26.4% ($p < 0.001$) was noticed. In another study based on active metabolites, the antispasmodic activity of cynaropicrin, as a sesquiterpene lactone from Cynara scolymus, has been observed in the treatment of IBS.[24] These studies reflected the therapeutic potential of ALE in treatment of IBS.However, more placebo-controlled studies with larger patient population may

prove to be useful in developing Artichoke leaf extract (ALE) as drug of choice in improving the IBS symptoms.

Fumaria officinalis

The results of a randomized placebo-controlled clinical trial , where 106 IBS patients were divided into three treatment groups of Curcuma xanthorriza, Fumaria officinalis and placebo for 18 weeks , revealed that the pain related to IBS was reduced in the fumitory and placebo group (p=0.81) , the flatulence caused by IBS had also improved in the curcuma and placebo group (p=0.48) but it had increased in fumitory group. In this study it has also been observed that no significant change was seen in psychological and other IBS symptoms among the three treatment groups[25] suggesting that Fumaria and turmeric showed no therapeutic effects over placebo in patients with IBS. However more clinical studies are needed to confirm therapeutic potential of Fumaria officinalisis in the treatment of IBS.

Curcuma longa

Curcuma longa (Turmeric) has been traditionally used since ancient times for many gastrointestinal disorders like digestion, abdominal pain, bloating, and distension. A pilot study conducted on IBS patients to assess the therapeutic efficacy of Curcuma longa (Turmeric) has shown an improvement in symptoms after treatment suggesting that Curcuma longa (Turmeric) may be useful in treatment of IBS .[26]Turmeric (Curcuma longa) has been found to possess significant pharmacological properties such as anti-inflammatory, antioxidant, antibacterial and spasmolytic activities .[27] Studies have revealed that therapeutic potential of Curcuma longa (Turmeric) in gastrointestinal disorders such as IBS, might be mediated through a calcium channel blockade in hyperactive states of the gut and airways and the therapeuticefficacy of curcuma in treatment of IBS may be due toits antibacterial, anti-inflammatory, and spasmolytic activities.[28] However, more clinical studies involving large number of IBS patients are needed to establish its efficacy in IBS treatment and its use for IBS as alternative or complementary medicine.

Mentha piperita

Mentha piperita has been used as traditional medicine in diverse disease conditions including gastrointestinal disorders.[29]Several clinical studies have revealed that peppermint oil (enteric-coated) exhibited beneficial effect in improvement of symptoms of IBS without producing adverse effects [30,31,32,33,34] suggesting that peppermint oil (enteric-coated)may be used as safe and effective therapeutic in treatment of IBS. Research studies have found that the peppermint oil has anti-inflammatory,antimicrobial and antispasmodic properties followed by ability to reduce gastric mortality [35,36,37]which may be responsible in producing therapeutic action of peppermint oil in IBS. However, more clinical studies are required to establish its effectiveness in treatment of IBS and to understand its mechanism of action.

Plantago psyllium

Psyllium has been used to reduce symptoms of constipation in IBS.Several clinical studies have shown that psyllium as a dietary fiber may be beneficial in patients with IBS in primary care.[38, 39,40] However more clinical studies may prove the usefulness of Psyllium as fiber therapy in IBS and to understand its mechanism of action.

Carmint

Carmint is a poly-herbal formulation containing extracts of three medicinal herbs namely mentha spicata, melissa officinalis, and coriandrum sativum. Carminthas been found to exhibit pharmacological activities such as antispasmodic, carminative, and sedative properties.[41] In a clinical study, it has been observed that this poly-herbal product has the ability to reduce the abdominal pain in IBS patients.[41]It appears that the therapeutic efficacy of Carmint in reducing symptoms like abdominal pain in IBS patients might be mediated through its pharmacological actions like antispasmodic, carminative and sedative properties.However, more clinical studies covering large number of IBS patients are needed to establish the therapeutic efficacy of carmint in treatment of IBS and to understand its mechanism of action.

Cynara scolymus

The leaf extract of Cynara scolymus has been found to produce beneficial effect in IBS patients as confirmed by clinical studies where the severity of symptoms like dyspepsia, alternating constipation/diarrhea etc. were significantly reduced and the tolerability of Cynara scolymus extract has also been observed to be very good. [42,43] Further, the research studies have shown that Cynara scolymus can affect intestinal microbiota.[44] and has antispasmodic activity[45] which might be responsible for the action of the leaf extract of Cynara scolymus in

reducing the severity of symptoms of IBS. However, more clinical studies employing large number of IBS patients may prove to be useful to establish Cynara scolymus as alternative or complementary medicine in prevention and treatment of IBS.

Maranta arundinacea

In a clinicalstudy,it has been observed that powdered root of Maranta arundinacea (Arrowroot) has ability to reduce the symptoms of IBS such as diarrhea with a long-term effect on constipation, and abdominal pain.[46]Thus it can be beneficial in treatment of IBS. More clinical studies on IBS patients are needed in order to establish the therapeutic potential of powdered root of Maranta arundinacea (Arrowroot) in treatment of IBS.

Paeonia lactiflora

The root of Paeonia lactiflora is used in many herbal preparations for treatment of IBS. Studies have shown that Paeoniflorin is one of the principle active ingredients of root of Paeonia lactiflora . The results of an experimental study conducted on rats, as animal model,has revealed that Paeoniflorin is having dose- dependent analgesic activity [47]which might be responsible for producing beneficial effect in the treatment of IBS and reducing the symptoms of IBS .However ,further clinical studies employing large number of IBS patients are needed to evaluate the therapeutic potential of Paeonia lactiflora in treatment of IBS and to understand its mechanism of action.

A Chinese herbal medicine (CHM)

A Chinese herbal medicine (CHM) is a poly -herbal formulation consisting of twenty different herbswhich areCodonopsispilosulae (root) , Agastachesseupogostemi (whole plant), Ledebouriellasesloidis (root) , Coicislachryma-jobi (seed) , Bupleurum chinensis (whole plant) , Artemisia capillaries (whole plant) , Atractylodismacrocephalae (rhizome) , Magnolia officinalis (bark), Citrus reticulate, Zingiber officinale (rhizome), Fraxinus spp. (bark), Poria cocos (sclerotium), Angelica dahurica (root), Plantago spp. (seed), Phellodendron spp. (bark), Glycyrrhiza uralensis (root), Paeonia lactiflora (root), Saussurealappa (root), Coptidis spp. (rhizome), Schisandra spp. (fruit) . This poly-herbal formulation hasbeen found to be significantly effective to reduce the symptoms of IBS as is evident by the results of a randomized, double-blind, placebo-controlled trial [48] suggesting that this poly-herbal formulation can be used as alternative or complimentary medicine in prevention and treatment of IBS.However, more

clinical studies are needed to establish its therapeutic efficacy in treatment of IBS and to understand its mechanism of action.

Padma Lax

Padma Lax is a complex Tibetan herbal formulations consisting of many herbs which are Aloe barbadensis A. ferox (extract), Jateorhizapalmata (root) , Marsdeniacondurango (bark), Rhamnus frangula (bark), Gentiana lutea (root), Inula helenium (rhizome) , Terminalia chebula (fruit), Piper longum (fruit), Rhamnus purshiana. (bark), Rheum palmatum (root), Strychnos nux-vomica (seed), Zingiber officinale (root). : Aloe barbadensis A. ferox (extract), Jateorhizapalmata (root) , Marsdeniacondurango (bark), Rhamnus frangula (bark), Gentiana lutea (root), Inula helenium (rhizome) , Terminalia chebula (fruit), Piper longum (fruit), Rhamnus purshiana. (bark) , Rheum palmatum (root), Strychnos nux-vomica (seed), Zingiber officinale (root). The results of a double-blind randomized pilot study[49]has shown that this poly-herbal formulation has ability to produce significant improvement in constipation, severity of abdominal pain, daily activities, incomplete evacuation, abdominal distension and flatus/flatulence in IBS patients . Thus, PadmaLax can be used for the treatment of IBS. However, more clinical studies are needed to understand the mechanism of action of producing therapeutic efficacy of Padma Lax in prevention and treatment of IBS.

STW 5

STW 5 (Iberogast) is a poly-herbal formulation consisting of hydroethanolic extracts of nine medicinal herbs which Iberis amara (whole plant), Chelidonium majus (root), Silybum marianum (fruit) , Melissa officinalis (leaf) , Carum carvi (fruit) , Glycyrrhiza glabra (root), Angelica sinensis (root), Matricaria recutita (flower) , Mentha piperita (leaf) . This poly-herbal formulation has been found to be effective in the treatment of functional gastrointestinal disorders like IBS. Several clinical studies employing IBS patients have been conducted and the results of the studies have revealed that STW 5 is effective in significant reduction in the total abdominal pain and the IBS symptom scores compared with placebo [50] suggesting that this poly-herbal formulation can be used in treatment of IBS as alternative or complementary medicine. In addition, STW 5-II, a poly herbal formulation consisting of herbs namely Iberis amara (whole plant), Melissa officinalis (leaf), Carum carvi (fruit) , Glycyrrhiza glabra (root), Matricaria recutita (flower) , Mentha piperita (leaf) , like STW 5 showed more significant reduction in the total abdominal pain and the IBS symptom scores compared with

placebo.Further, in several studies, different mechanisms have also been proposed for therapeutic potential of STW 5 in treatment IBS.[51, 52, 53, 54,55,56] However more clinical studies are needed on therapeutic efficacy of STW 5 in reduction of IBS symptoms employing large number of patients in order tosunderstand its mechanism of action and to use this poly-herbal product for the treatment of IBS as alternative or complementary medicine.

A traditional Chinese medicine (TCM)

A traditional Chinese medicine (TCM) is composed of many herbs namely Atractylodesmacrocephala (rhizome), Astragalus membranaceus (root), Paeonia lactiflora (peeled root, fried), Atractylodes chinensis (rhizome), Bupleurum chinense (root), Citrus reticulata (peel), Saposhnikoviadivaricata (root), Paniculata (twigs), Punica granatum (rind), Portulaca oleracea (above-ground parts) , Coptis chinensis (rhizome) . This poly-herbal formulation has been studied for therapeutic potential in treatment of diarrhea-predominant IBS patients where no significant effect in reduction of symptoms of IBS could be noticed.[57]However, more clinical studies employing larger group of IBS patients with varying symptoms are needed to prove the efficacy of TCM in treatment of IBS and to reduce IBS symptoms. Such clinical studies may also throw light on the mechanism of action of TCM in producing therapeutic response towards IBS.

Tong-xie-ning

The therapeutic efficacy of Tong-xie-ning (TXNG) , which is a traditional Chinese medicine composed of four different medicinal herbs namely Paeonia lactiflora (root), Atractylodesmacrocephala (rhizome), Citrus reticulate (green unripe exocarp), Allium macrostemon (bulb) , has been assessed in diarrhea predominant-IBS patients by a prospective, randomized, double-blind, placebo-controlled trial . The results of this clinical study have revealed that TXNG producedsignificant effect in reduction of symptoms like frequency and the duration of abdominal pain, improvement in IBS related stool, decrease in stool frequency, improvement in stool passage.[58] Thus, this poly-herbal formulation can be used in the treatment of IBS. Further, moreclinical studies

on IBS patients may be useful in understanding the mechanism of action of efficacy of this poly-herbal medicine in IBS .

Tong-Xie-Yao-Fang

Tong-Xie-Yao-Fang (TXYF) ,which is a traditional Chinese medicine composed of four different herbs namely Atractylodesmacrocephala (rhizome), Paeonia lactiflora (root), Citrus sinensis (dried old peel) , Ledebourielladivaricata (root) , has been evaluated for its therapeutic efficacy in reducing the symptoms of IBS and its therapeutic response has beencompared to that of Myarisan, a probiotic formulation, in treating diarrhea-predominant IBS. The results of thestudyhave revealed that there was no significant difference between the two groups in terms of the total efficacy or the scores of symptoms before and after treatment.This study has also indicated a decrease in the number of activated mast cells in the Tong-Xie-Yao-Fang (TXYF) group after treatment showing a significant difference as compared with that before treatment as well as with that in the Myarisan group after treatment. Thus,the mechanism of action of TXYF might be through adjustment of mast cells activation to decrease visceral hypersensitivity.[59]Further this poly-herbal formulation has also been found to exhibit dose-dependent analgesic activity.[60] However , more IBS patients centric clinical studies are needed to evaluate the therapeutic efficacy of Tong-Xie-Yao-Fang (TXYF) in order to use this poly-herbal formulation as alternative/complementary medicine in prevention and treatment of IBS.

C-IBS and DA-IBS formulations

C-IBS (a formula designed to treat constipation-predominant IBS) is a poly-herbal formulation composed of three herbs namely Lactulose Ulmus fulva (bark), Glycyrrhiza glabra (root), Avena sativa (bran) . DA-IBS (a formula designed to treat diarrhea-predominant and alternating bowel habit IBS) is a poly-herbal formulation composed of four herbs namely Vaccinium myrtillus (fruit), Ulmus fulva (bark) , Cinnamomum zeylanicum (bark) , Agrimonia eupatoria (aerial part) .A clinical study has been conducted to assess the therapeutic efficacy of C-IBS and DA-IBS where DA-IBS formula produced beneficial effect in reduction of symptoms like straining, abdominal pain, bloating, flatulence and increase in bowel movement frequency . Global IBS symptoms were also

demonstrated in patients using this formula. C-IBS formula produced a 20% increase in bowel movement frequency and significant reductions in symptoms such as straining, abdominal pain, bloating, and global IBS symptom severity, as well as improvements in stool consistency .[61]However more IBS patients centric controlled clinical studies/trials are needed to evaluate the efficacy of both formula C-IBS and DA-IBS so that these poly-herbal products may be effectively used in prevention and treatment of IBS. Such clinical studies may also be useful in understanding mechanism of action towards the effectiveness of these poly-herbal combinations in controlling the symptoms of C-IBS and DA-IBS thereby suggesting them as complementary or alternative medicine in treatment of Irritable Bowel Syndrome.

Bowel Care

Bowel Care (BC) is a poly-herbal formulation composed of three herbs namely bel leaves (*Aegle marmelos*, fam. *Rutaceae*), psyllium seed husk (*Plantago ovata*, fam. *Plantaginaceae*) and garden cress seeds (*Lepidium sativum*, fam.*Cruciferae*). It is a formulation designed to treat and improve many gastro-intestinal problems like irritable Bowell syndrome (IBS) (both diarrhea predominant and constipation predominant), chronic constipation, intermittent diarrhea, colitis, stress induced ulcerative colitis, ulcers.

Bowel Care (BC) , an organic poly-herbal formulation composed of above mentioned herbs, has been found to have various significant pharmacological properties such as laxative/antidiarrheal, anti-inflammatory,antibacterial, anthelmintic, antifungal, metabolic regulator(hypoglycemic, hypocholestrelomiant, preventive of gallbladder stones and colon cancer, regulator of appetite and weight and to treat various IBS symptoms and other disorders including constipation, irritable bowel,diarrhea,entero-colitis,ulcerative colitis, gastro-duodenal ulcers,dyslipidemia ,diabetes.In cases of gastritis and enteritis Bowel Care acts as a natural antacid also. If given along withBrahmi, it is almost curative of ulcerative colitis.[62, 63]

The three herbs namely bel leaves, garden cress and psyllium present in Bowel Care (BC) have significant therapeutic actions in disease conditions. Research studies have demonstrated that Bel leavesexhibit soothing effect on bowel and reduce the unnecessary movement of the intestines. The bel leaves juice has also been shown to possess anti- dysentery, anti-inflammatory, analgesic, anti-pyretic, anti-diabetic and anti-asthmatic properties.[64]

The bel leaves are astringent, and digestive when dried, or laxative and febrifuge when fresh; are useful in ophthalmia, deafness, catarrh, weakness of heart and inflammations.[65]Belleaves contains marmelosin, a furocumarin that is the major active constituent (0.5%), agreen, yellow oil (0.6%) with specific odor (found in

fresh leaves), some alkaloids like aegelin,aegelinin, etc.[66] Alkaloids are, at least in part, responsible for its mode of action inthe management of acute dysentery and abdominalpain.[67] The bel leaves have anthelmintic property whereas garden cress and psylliumhave lubricatingproperties.

These herbs in combination have potential to prevent the absorption of toxins present in the gut and act as intestinal cleansers. Studies have revealed that Garden cress seeds are also galatogogue, aperient [68], and exhibit chemo-preventive and antibacterial actions. Besides its digestive action, psylliumis a good metabolic regulator, balancing both glucid and lipid metabolism. Thus, it may be helpful in the treatment of diabetes, dyslipidemia and metabolic syndrome.

Clinical studies have shown that Bowel Care (BC) is effective in treatment of Irritable Bowel Syndrome (IBS) [62] and it can be used in treatment of IBS as complimentary/alternative medicine.However , more clinical studies on larger patient population are needed to establish its therapeutic efficacy in treatment of IBS and to understand its mechanism of action.

DISCUSSION

The use of complementary and alternative medicine (CAM) has increased considerably in gastroenterology. Use is particularly high for conditions such as inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS), reflux esophagitis, and peptic ulcer, where there remains an unmet necessary need to treat the underlying process or control symptoms. Thus, natural products with broad biological activity, the best efficacy, and safe profiles are promising to replace or reduce the use of chemical medicines.Consequently, there is a great need for scientific analysis of herbal products with pharmacological effects to discover alternative bioactive phytocompounds.Peptic ulcer is a common digestive tract disease globally, associated with an imbalance between gastric protective factors and aggressive physical, chemical or psychological factors on the mucosal epithelium. These aggressive factors include gastric acid secretion, stress, cigarette smoking, alcohol drinking, and long-term use of non-steroidal anti-inflammatory drugs (NSAIDs) which can lead to gastric mucosal damage. Despite the dominance of synthetic drugs in the management of most human diseases, including gastric ulcers, a large proportion of the world is now directed towards traditional medicine. This may be, in part, due to the incidence of side effects, drug interactions, microbial resistance, and high cost during chemical therapy.On the other hand, inflammatory bowel disease (IBD), represented mainly by Crohn's disease (CD) and ulcerative colitis (UC), are emerging pathologies whose epidemiological increase seems to be related to the unhealthy lifestyle and industrialization. People with IBD are more motivated to use CAM because of the ongoing symptoms of IBD and concerns about adverse effects from the use of immunosuppressive drugs.

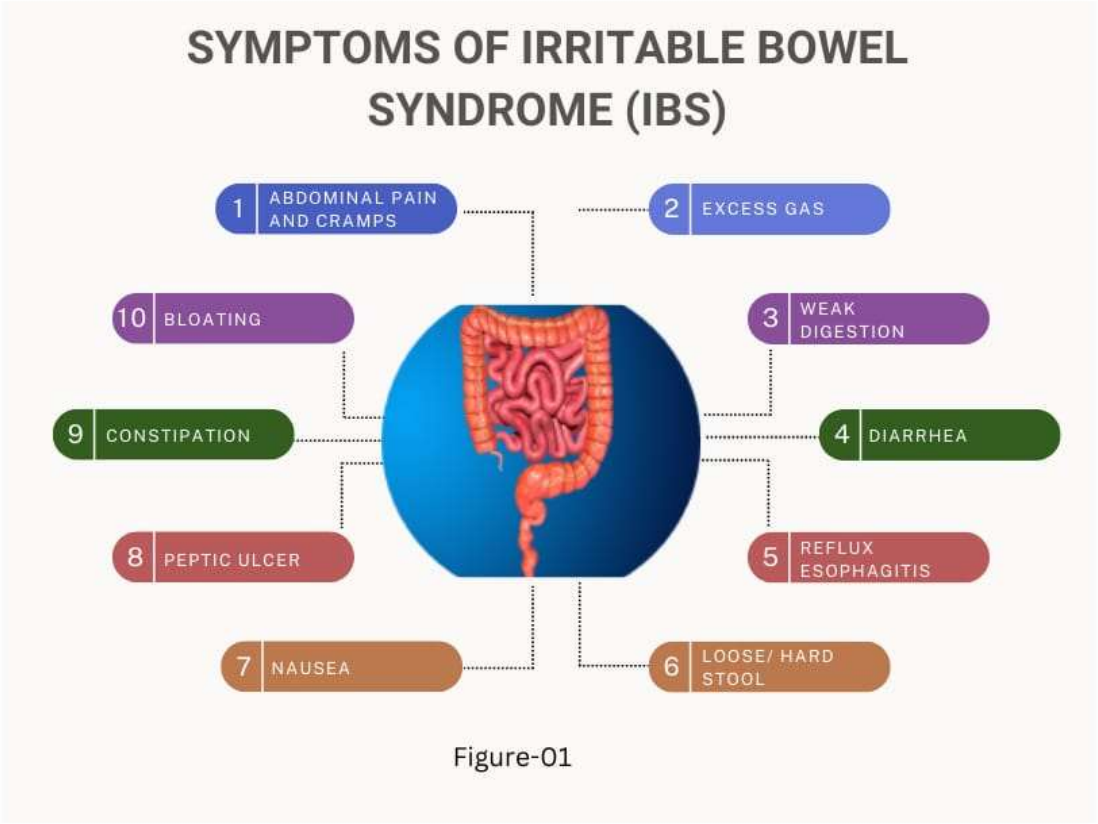
SYMPTOMS OF IRRITABLE BOWEL SYNDROME (IBS)
1 ABDOMINAL PAIN AND CRAMPS
2 EXCESS GAS
10 BLOATING
3 WEAK DIGESTION
9 CONSTIPATION
4 DIARRHEA
8 PEPTIC ULCER
5 REFLUX ESOPHAGITIS
7 NAUSEA
6 LOOSE/ HARD STOOL

Figure-01

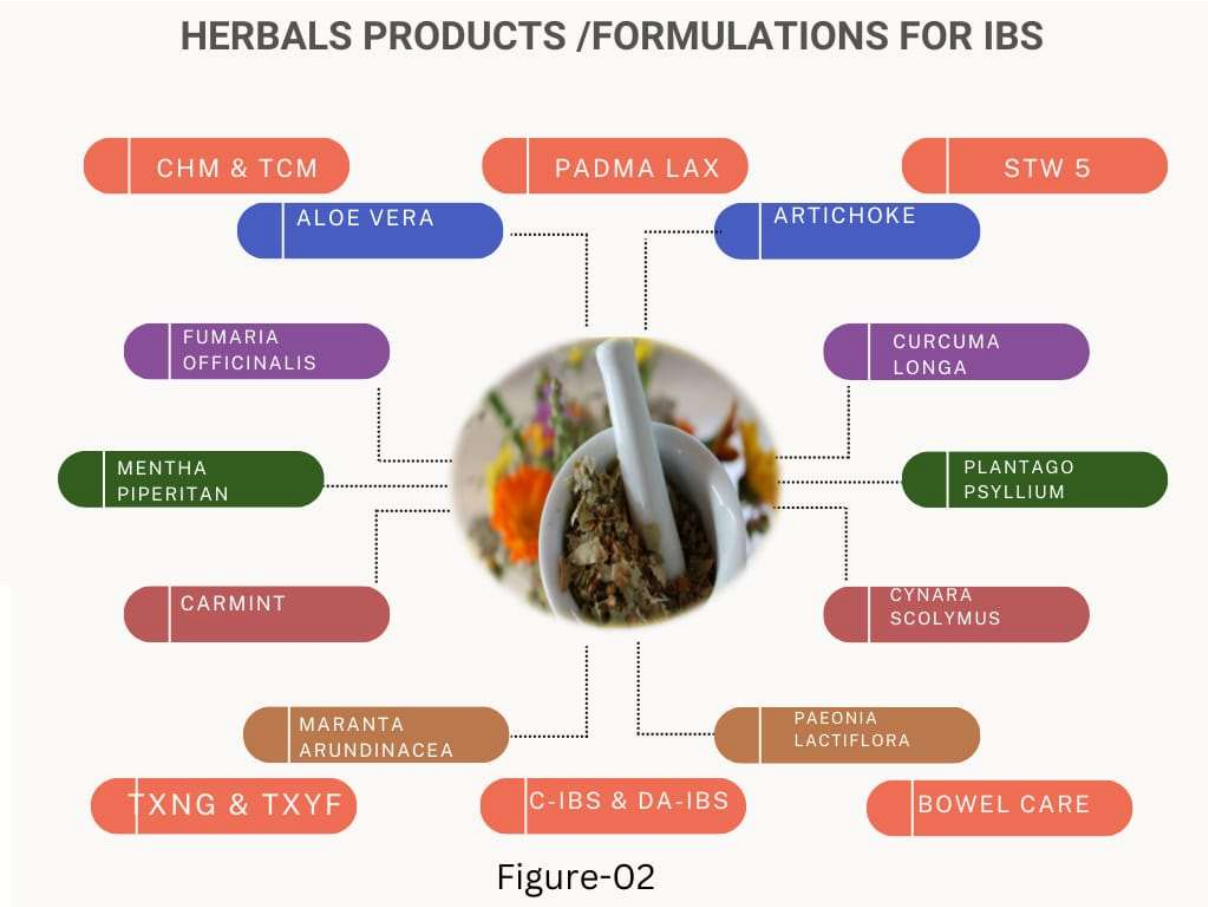

Figure-02

Traditional herbal therapies have been used for a long time to treat gastrointestinal disorders including irritable bowel syndrome, and their effectiveness from clinical research evidence needs to be systematically reviewed. Many herbal preparations/ products like Aloe vera leaves , Artichoke leaf extract ,Fumaria officinalis,Curcumalonga,Mentha piperita, Plantago psyllium, Carmint, Cynara scolymus,Maranta arundinacea,Paeonia lactiflora,A Chinese herbal medicine (CHM), Padma Lax ,STW 5, A traditional Chinese medicine (TCM), Tong-xie-ning,Tong-Xie-Yao-Fang,C-IBS and DA-IBS formulations, Bowel Care have been found to possess therapeutic potential in reducing the symptoms of IBS and are being used in treatment of IBS. Poly-herbal formulations like Carmint, A Chinese herbal medicine (CHM), Padma Lax , STW 5, A traditional Chinese medicine (TCM), Tong-xie-ning, Tong-Xie-Yao-Fang,C-IBS and DA-IBS formulations, Bowel Care containing many herbs have been found to be more effective as evidenced by the results of clinical studies conducted on IBS patients . According to various parameters that affect the pathophysiology of IBS, it is believed that compound preparations containing several herbs can be more beneficial than single products. Different clinical trials must be done to evaluate the effects of herbal preparations in IBS. However, more

placebo controlled clinical studies/trials of these formulations on larger IBS patients population are needed to assess their therapeutic potential in order to use these formulations in treatment of IBS as alternative or complementary medicine and also to understand their mechanism of action.

. CONCLUSION

Irritable bowel syndrome (IBS) is a chronic digestive disorder with symptoms like abdominal pain and cramps, excess gas, bloating, change in bowel habits such as harder, looser, or more urgent stools than normal, constipation and /or diarrhea . The etiology of IBS is still unknown. Nowadays, IBS patients are widely found to usecomplementary and alternative medicines, especially herbal supplements.Thus, natural products with broad biological activity, the best efficacy, and safe profiles are promising to replace or reduce the use of chemical medicines.Consequently, there is a great need for scientific analysis of herbal products with pharmacological effects to discover alternative bioactive phytocompounds.The present study has focused on afew herbal preparations showing therapeutic potential in reducing the symptoms of irritable bowel syndrome (IBS) and its treatment .Theirpossiblemechanisms of action have also been explored . According to various parameters that affect thepathophysiology of IBS, it is believed that compound preparations containing several herbs can be more beneficial than single products. However, different clinical trials on large populations of IBS patients must be done to evaluate the therapeutic effects of herbal preparations in IBS.Although theincludedclinicaltrials did not report serious adverse effects from using herbal medicines, more research is needed to determine the safety of herbal medicines. It may be emphasized that herbal preparations must be organic in nature and free from pesticides, herbicides and toxic chemicals. Herbal medicines might be promising for the treatment of irritable bowel syndrome (IBS). However, it is premature to recommend herbal medicines for routine use in irritable bowel syndrome. Herbs have a slow, multistep-induced mechanism of action. That is why a short clinical study may not show the therapeutic efficacy of an herbal preparation. Long term clinical trials are more adequate and more likely to analyze pharmacological effects of herbs. The Ayurvedic medicinal formulations prepared according with Ayurvedic Materia Medica should be put to careful, reliably designed and ethically valid clinical trials without waiting for preclinical data. Testing the herbs in larger followed by theirgood quality control insurance with standard practices and well-designed clinical

trials is needed in order to establish sound evidence for their use in management of IBS and to understand their mechanisms of action.

REFERENCES

1. Chang JY, Talley NJ. Current and emerging therapies in irritable bowel syndrome: from pathophysiology to treatment. Trends Pharmacol Sci. 2010;31:326–334. [PubMed] [Google Scholar]

2. Grundmann O, Yoon SL. Irritable bowel syndrome: epidemiology, diagnosis and treatment: an update for health-care practitioners. J Gastroenterol Hepatol. 2010;25:691–699. [PubMed] [Google Scholar]

3. Gwee KA, Lu CL, Ghoshal UC. Epidemiology of irritable bowel syndrome in Asia: something old, something new, something borrowed. J Gastroenterol Hepatol. 2009;24:1601–1607. [PubMed] [Google Scholar]

4. Barbara G, De Giorgio R, Stanghellini V, Cremon C, Salvioli B, Corinaldesi R. New pathophysiological mechanisms in irritable bowel syndrome. Aliment Pharmacol Ther. 2004;20 Suppl 2:1–9. [PubMed] [Google Scholar]

5. Karantanos T, Markoutsaki T, Gazouli M, Anagnou NP, Karamanolis DG. Current insights in to the pathophysiology of Irritable Bowel Syndrome. Gut Pathog. 2010;2:3. [PMC free article] [PubMed] [Google Scholar]

6. Rahimi R, Nikfar S, Rezaie A, Abdollahi M. Efficacy of tricyclic antidepressants in irritable bowel syndrome: a meta-analysis. World J Gastroenterol. 2009;15:1548–1553. [PMC free article] [PubMed] [Google Scholar]

7. Rahimi R, Nikfar S, Abdollahi M. Selective serotonin reuptake inhibitors for the management of irritable bowel syndrome: A meta-analysis of randomized controlled trials. Arch Med Sci. 2008;4:71–76. [Google Scholar]

8. Darvish-Damavandi M, Nikfar S, Abdollahi M. A systematic review of efficacy and tolerability of mebeverine in irritable bowel syndrome. World J Gastroenterol. 2010;16:547–553. [PMC free article] [PubMed] [Google Scholar]

9. Ford AC, Talley NJ, Spiegel BM, Foxx-Orenstein AE, Schiller L, Quigley EM, Moayyedi P. Effect of fibre, antispasmodics, and peppermint oil in the treatment of irritable bowel syndrome: systematic review and meta-analysis. BMJ. 2008;337:a2313. [PMC free article] [PubMed] [Google Scholar]

10. Rahimi R, Nikfar S, Abdollahi M. Efficacy and tolerability of alosetron for the treatment of irritable bowel syndrome in women and men: a meta-analysis of eight randomized, placebo-controlled, 12-week trials. Clin Ther. 2008;30:884–901. [PubMed] [Google Scholar]

11. Ford AC, Brandt LJ, Young C, Chey WD, Foxx-Orenstein AE, Moayyedi P. Efficacy of 5-HT3 antagonists and 5-HT4 agonists in irritable bowel syndrome: systematic review and meta-analysis. Am J Gastroenterol. 2009;104:1831–1843; quiz 1844. [PubMed] [Google Scholar]

12. Rezaie A, Nikfar S, Abdollahi M. The place of antibiotics in management of irritable bowel syndrome: a systematic review and meta-analysis. Arch Med Sci. 2010;6:49–55. [PMC free article] [PubMed] [Google Scholar]

13. Nikfar S, Rahimi R, Rahimi F, Derakhshani S, Abdollahi M. Efficacy of probiotics in irritable bowel syndrome: a meta-analysis of randomized, controlled trials. Dis Colon Rectum. 2008;51:1775–1780. [PubMed] [Google Scholar]

14. Mozaffari S, Rahimi R, Abdollahi M. Implications of melatonin therapy in irritable bowel syndrome: a systematic review. Curr Pharm Des. 2010;16:3646–3655. [PubMed] [Google Scholar]

15. Duracinsky M, Chassany O. [How can an effective drug to treat irritable bowel syndrome be successfully developed?] Gastroenterol Clin Biol. 2009;33 Suppl 1:S26–S34. [PubMed] [Google Scholar]

16. Grindlay D, Reynolds T. The Aloe vera phenomenon: a review of the properties and modern uses of the leaf parenchyma gel. *J Ethnopharmacol.* 1986;16(2–3):117–51. doi: 10.1016/0378-8741(86)90085-1. [PubMed] [CrossRef] [Google Scholar]

17. Spanier JA, Howden CW, Jones MP. A systematic review of alternative therapies in the irritable bowel syndrome. *Arch Intern Med.* 2003;163(3):265–74. doi: 10.1001/archinte.163.3.265. [PubMed] [CrossRef] [Google Scholar]

18. Hutchings HA, Wareham K, Baxter JN, Atherton P, Kingham JG, Duane P, et al. A randomized, cross-over, placebo-controlled study of Aloe vera in patients with irritable bowel syndrome: effects on patient quality of life. *ISRN Gastroenterol.* 2011;2011:206103. doi: 10.5402/2011/206103. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

19. Odes HS, Madar Z. A double-blind trial of a celandin, Aloe vera and psyllium laxative preparation in adult patients with constipation. *Digestion.* 1991;49(2):65–71. doi: 10.1159/000200705. [PubMed] [CrossRef] [Google Scholar]

20. Davis K, Philpott S, Kumar D, Mendall M. Randomized double-blind placebo-controlled trial of aloe vera for irritable bowel syndrome. *Int J Clin Pract.* 2006;60(9):1080–6. doi: 10.1111/j.1742-1241.2006.00980.x. [PubMed] [CrossRef] [Google Scholar]

21. Khedmat H, Karbasi A, Amini M, Aghaei A, Taheri S. Aloe vera in treatment of refractory irritable bowel syndrome: Trial on Iranian patients. *J Res Med Sci.* 2013;18(8):732. [PMC free article] [PubMed] [Google Scholar]

22. Walker AF, Middleton RW, Petrowicz O. Artichoke leaf extract reduces symptoms of irritable bowel syndrome in a post-marketing surveillance study. *Phytother Res.* 2001;15(1):58–61. [PubMed] [Google Scholar]

23. Bundy R, Walker AF, Middleton RW, Marakis G, Booth JC. Artichoke leaf extract reduces symptoms of irritable bowel syndrome and improves quality of life in otherwise healthy volunteers suffering from concomitant dyspepsia: a subset analysis. *J Altern Complement Med.* 2004;10(4):667–9. doi: 10.1089/acm.2004.10.667. [PubMed] [CrossRef] [Google Scholar]

24. Emendörfer F, Emendörfer F, Bellato F, Noldin VF, Cechinel-Filho V, Yunes RA, et al. Antispasmodic activity of fractions and cynaropicrin from Cynara scolymus on guinea-pig ileum. *Biol Pharm Bull.* 2005;28(5):902–4. [PubMed] [Google Scholar]

25. Brinkhaus B, Hentschel C, Von Keudell C, Schindler G, Lindner M, Stützer H, et al. Herbal medicine with curcuma and fumitory in the treatment of irritable bowel syndrome: a randomized, placebo-controlled, double-blind clinical trial. *Scand J Gastroenterol.* 2005;40(8):936–43. [PubMed] [Google Scholar]

26. Bundy R, Walker AF, Middleton RW, Booth J. Turmeric extract may improve irritable bowel syndrome symptomology in otherwise healthy adults: a pilot study. *J Altern Complement Med.* 2004;10(6):1015–8. doi: 10.1089/acm.2004.10.1015. [PubMed] [CrossRef] [Google Scholar]

27. Miquel J, Bernd A, Sempere JM, Díaz-Alperi J, Ramírez A. The curcuma antioxidants: pharmacological effects and prospects for future clinical use. A review. *Arch GerontolGeriatr.* 2002;34(1):37–46. doi: 10.1016/S0167-4943(01)00194-7. [PubMed] [CrossRef] [Google Scholar]

28. Gilani AH, Shah AJ, Ghayur MN, Majeed K. Pharmacological basis for the use of turmeric in gastrointestinal and respiratory disorders. *Life Sci.* 2005;76(26):3089–105. doi: 10.1016/j.lfs.2004.12.021. [PubMed] [CrossRef] [Google Scholar]

29. Rahimi R, Abdollahi M. Herbal medicines for the management of irritable bowel syndrome: a comprehensive review. *World J Gastroenterol.* 2012;18(7):589–600. doi: 10.3748/wjg.v18.i7.589. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

30. Liu JH, Chen GH, Yeh HZ, Huang CK, Poon SK. Enteric-coated peppermint-oil capsules in the treatment of irritable bowel syndrome: a prospective, randomized trial. *J Gastroenterol.* 1997;32(6):765–8. doi: 10.1007/BF02936952. [PubMed] [CrossRef] [Google Scholar]

31. Cappello G, Spezzaferro M, Grossi L, Manzoli L, Marzio L. Peppermint oil (Mintoil) in the treatment of irritable bowel syndrome: a prospective double blind placebo-controlled randomized trial. *Dig Liver Dis.* 2007;39(6):530–6. doi: 10.1016/j.dld.2007.02.006. [PubMed] [CrossRef] [Google Scholar]

32. Merat S, Khalili S, Mostajabi P, Ghorbani A, Ansari R, Malekzadeh R. The effect of enteric-coated, delayed-release peppermint oil on irritable bowel syndrome. *Dig Dis Sci.* 2010;55(5):1385–90. doi: 10.1007/s10620-009-0854-9. [PubMed] [CrossRef] [Google Scholar]

33. Khanna R, MacDonald JK, Levesque BG. Peppermint oil for the treatment of irritable bowel syndrome: a systematic review and meta-analysis. *J Clin Gastroenterol.* 2014;48(6):505–12. doi: 10.1097/MCG.0b013e3182a88357. [PubMed] [CrossRef] [Google Scholar]

34. Grigoleit HG, Grigoleit P. Peppermint oil in irritable bowel syndrome. *Phytomedicine.* 2005;12(8):601–6. doi: 10.1016/j.phymed.2004.10.005. [PubMed] [CrossRef] [Google Scholar]

35. Logan AC, Beaulne TM. The treatment of small intestinal bacterial overgrowth with enteric-coated peppermint oil: a case report. *Altern Med Rev.* 2002;7(5):410–7. [PubMed] [Google Scholar]

36. Grigoleit HG, Grigoleit P. Pharmacology and preclinical pharmacokinetics of peppermint oil. *Phytomedicine.* 2005;12(8):612–6. doi: 10.1016/j.phymed.2004.10.007. [PubMed] [CrossRef] [Google Scholar]

37. Hiki N. Peppermint oil reduces gastric motility during the upper gastrointestinal endoscopy. *Nihon Rinsho.* 2010;68(11):2126–34. [PubMed] [Google Scholar]

38. Bijkerk CJ, de Wit NJ, Muris JW, Whorwell PJ, Knottnerus JA, Hoes AW. Soluble or insoluble fibre in irritable bowel syndrome in primary care? Randomised placebo controlled trial. *BMJ.* 2009;339:b3154. doi: 10.1136/bmj.b3154. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

39. Bijkerk CJ, Muris JW, Knottnerus JA, Hoes AW, de Wit NJ. Systematic review: the role of different types of fibre in the treatment of irritable bowel syndrome. *Aliment Pharmacol Ther.* 2004;19(3):245–51. doi: 10.1111/j.0269-2813.2004.01862.x. [PubMed] [CrossRef] [Google Scholar]

40. Ford AC, Talley NJ, Spiegel BM, Foxx-Orenstein AE, Schiller L, Quigley EM, et al. Effect of fibre, antispasmodics, and peppermint oil in the treatment of irritable bowel syndrome: systematic review and meta-analysis. *BMJ.* 2008;337:a2313. doi: 10.1136/bmj.a2313. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

41. Vejdani R, Shalmani HR, Mir-Fattahi M, Sajed-Nia F, Abdollahi M, Zali MR, et al. The efficacy of an herbal medicine, Carmint, on the relief of abdominal pain and bloating in patients with irritable bowel syndrome: a pilot study. *Dig Dis Sci.* 2006;51(8):1501–7. doi: 10.1007/s10620-006-9079-3. [PubMed] [CrossRef] [Google Scholar]

42. Bundy R, Walker AF, Middleton RW, Marakis G, Booth JC. Artichoke leaf extract reduces symptoms of irritable bowel syndrome and improves quality of life in otherwise healthy volunteers suffering from concomitant dyspepsia: a subset analysis. J Altern Complement Med. 2004;10:667–669. [PubMed] [Google Scholar]

43. Walker AF, Middleton RW, Petrowicz O. Artichoke leaf extract reduces symptoms of irritable bowel syndrome in a post-marketing surveillance study. Phytother Res. 2001;15:58–61. [PubMed] [Google Scholar]

44. Costabile A, Kolida S, Klinder A, Gietl E, Bäuerlein M, Frohberg C, Landschütze V, Gibson GR. A double-blind, placebo-controlled, cross-over study to establish the bifidogenic effect of a very-long-chain inulin extracted from globe artichoke (Cynara scolymus) in healthy human subjects. Br J Nutr. 2010;104:1007–1017. [PubMed] [Google Scholar]

45. Emendörfer F, Emendörfer F, Bellato F, Noldin VF, Cechinel-Filho V, Yunes RA, Delle Monache F, Cardozo AM. Antispasmodic activity of fractions and cynaropicrin from Cynara scolymus on guinea-pig ileum. Biol Pharm Bull. 2005;28:902–904. [PubMed] [Google Scholar]

46. Cooke C, Carr I, Abrams K, Mayberry J. Arrowroot as a treatment for diarrhoea in irritable bowel syndrome patients: a pilot study. Arq Gastroenterol. 2000;37:20–24. [PubMed] [Google Scholar]

47. Zhang XJ, Li Z, Leung WM, Liu L, Xu HX, Bian ZX. The analgesic effect of paeoniflorin on neonatal maternal separation-induced visceral hyperalgesia in rats. J Pain. 2008;9:497–505. [PubMed] [Google Scholar]

48. Bensoussan A, Talley NJ, Hing M, Menzies R, Guo A, Ngu M. Treatment of irritable bowel syndrome with Chinese herbal medicine: a randomized controlled trial. JAMA. 1998;280:1585–1589. [PubMed] [Google Scholar]

49. Sallon S, Ben-Arye E, Davidson R, Shapiro H, Ginsberg G, Ligumsky M. A novel treatment for constipation-predominant irritable bowel syndrome using Padma Lax, a Tibetan herbal formula. Digestion. 2002;65:161–171. [PubMed] [Google Scholar]

50. Madisch A, Holtmann G, Plein K, Hotz J. Treatment of irritable bowel syndrome with herbal preparations: results of a double-blind, randomized, placebo-controlled, multi-centre trial. Aliment Pharmacol Ther. 2004;19:271–279. [PubMed] [Google Scholar]

51. Krueger D, Gruber L, Buhner S, Zeller F, Langer R, Seidl S, Michel K, Schemann M. The multi-herbal drug STW 5 (Iberogast) has prosecretory action in the human intestine. Neurogastroenterol Motil. 2009;21:1203–e110. [PubMed] [Google Scholar]

52. Simmen U, Kelber O, Okpanyi SN, Jaeggi R, Bueter B, Weiser D. Binding of STW 5 (Iberogast) and its components to intestinal 5-HT, muscarinic M3, and opioid receptors. Phytomedicine. 2006;13 Suppl 5:51–55. [PubMed] [Google Scholar]

53. Müller MH, Liu CY, Glatzle J, Weiser D, Kelber O, Enck P, Grundy D, Kreis ME. STW 5 (Iberogast) reduces afferent sensitivity in the rat small intestine. Phytomedicine. 2006;13 Suppl 5:100–106. [PubMed] [Google Scholar]

54. Ammon HP, Kelber O, Okpanyi SN. Spasmolytic and tonic effect of Iberogast (STW 5) in intestinal smooth muscle. Phytomedicine. 2006;13 Suppl 5:67–74. [PubMed] [Google Scholar]

55. Schemann M, Michel K, Zeller F, Hohenester B, Rühl A. Region-specific effects of STW 5 (Iberogast) and its components in gastric fundus, corpus and antrum. Phytomedicine. 2006;13 Suppl 5:90–99. [PubMed] [Google Scholar]

56. Michael S, Kelber O, Hauschildt S, Spanel-Borowski K, Nieber K. Inhibition of inflammation-induced alterations in rat small intestine by the herbal preparations STW 5 and STW 6. Phytomedicine. 2009;16:161–171. [PubMed] [Google Scholar]

57. Leung WK, Wu JC, Liang SM, Chan LS, Chan FK, Xie H, Fung SS, Hui AJ, Wong VW, Che CT, et al. Treatment of diarrhea-predominant irritable bowel syndrome with traditional Chinese herbal medicine: a randomized placebo-controlled trial. Am J Gastroenterol. 2006;101:1574–1580. [PubMed] [Google Scholar]

58. Wang G, Li TQ, Wang L, Xia Q, Chang J, Zhang Y, Wan MH, Guo J, Cheng Y, Huang X, et al. Tong-xie-ning, a Chinese herbal formula, in treatment of diarrhea-predominant irritable bowel syndrome: a prospective, randomized, double-blind, placebo-controlled trial. ZhanghuaYixueZazhi. 2006;119:2114–2119. [PubMed] [Google Scholar]

59. Pan F, Zhang T, Zhang YH, Xu JJ, Chen FM. Effect of TongxieYaofang Granule in treating diarrhea-predominate irritable bowel syndrome. Chin J Integr Med. 2009;15:216–219. [PubMed] [Google Scholar]

60. Hu X, Xu D, Zhao Y, Yang X, Meng J, Shen H, Guo J. The Alleviating Pain Effect of Aqueous Extract from Tong-Xie-Yao-Fang, on Experimental Visceral Hypersensitivity and Its Mechanism. Biol Pharm Bull. 2009;32:1075–1079. [PubMed] [Google Scholar]

61.Hawrelak JA, Myers SP. Effects of two natural medicine formulations on irritable bowel syndrome symptoms: a pilot study. J Altern Complement Med. 2010;16:1065–1071. [PubMed] [Google Scholar]

62. Herbal Medicine : science embraces tradition : a new insight into ancient AyurvedaAuthor: Narendra Singh; Marilena Gilca Publisher: Saarbrucken, Germany : Lambert Academic Pub., ©2010.pp 90-95

63. Garg A., Abbas S.S., Singh V., Singh N.: A clinical study on ayurvedic formulations Bowel care on chronic abdominal disorder, Abstracts of the 2nd World Congress on Biotechnological Developments of Herbal Medicine, organized by International Institute of Herbal Medicine and National Botanical Research Institute, Lucknow, Feb 20-22, 2003

64. Singh, R.S. VanaushadhiNidarshika (Ayurvedic Pharmacopoeia) Utter Pradesh Hindi Sansthan, (Hindi Samiti Prabhag) Rajshree Purushottamdas Tandon Hindi Bhawan, Mahatma Gandhi Marg, Lucknow.Print. Jeewan Shiksha Mudralaya Pvt. Ltd., Golghar, Varanasi. 2nd Edn. pp 278. 1983

65. Kirtikar, K.R. and Basu, B.D. Indian Medicinal Plants 2 nd ed. Pub. Lalit Mohan Basu. M.B. 49,Leader Road, Allahabad, India. 1: pp 499, 1933

66. Sharma, P.V. DravyagunaVigyana (Vegetable Drugs) Pub. Chaukhambha Bharti Academy, GokulBhawan, K. 37/109, Gopal Mandir Lane, Varanasi, India. 2: 455, 1999

67. Thakur R.S., Puri H.S., Husain A.: Major medicinal plants of India, CIMAP, p.35, 1989

68. Chopra R.N., Nayar S.L., Chopra I.C.: Glossary of Indian Medicinal Plants (including the Supplement). Council of Scientific and Industrial Research, New Delhi, 1986