Therapeutic actions of gamma-oryzanol as a novel food supplement

Business, Industries

Irritable bowel syndrome (IBS) is a common gastrointestinal disorder in which the individual experiences episodes of symptoms arising from the large intestines, without the presence of any definite disorder. It is characterized by the presence of a number of symptoms such as abdominal pain, bloating, discomfort, defective bowel habits, diarrhoea constipation, production of gas, distended abdomen, sensation of having evacuated incompletely, presence of mucous in the stools, etc. The symptoms tend to decrease when the individual passes stools and worsens when the individual consumesfood.

Several other non-specific symptoms such as nausea, vomiting, chest pain, increased urination, incomplete bladder evacuation, tiredness, malaise, etc, are also experienced. The incidences range from 7% to 17%, and the mean prevalence including undetected cases is 2. 9 to 6. 5%. The incidence is higher in females than males (61-68%). The findings seem to be similar in Australia, US and Europe. The incidence according to the sub-types includes constipation type is 16%, diarrhoea type is 21% and alternate type is 63%. In America, one out of every five adults develops IRB, but the incidences seem to be greater (Tack, J. 006, 701-709). The exact cause for IBS is still not understood. The intestinal wall consists of several layers of muscles that propel the digested food from the stomach to the rectum. This takes place in a co-ordinated fashion, such that the relaxation and contraction of the muscles propel the food in the right direction. However, in IBB, the contractions are more forceful and prolonged causing several symptoms such as abdominal pain, production of gas, diarrhoea, etc. Sometimes, the

contractions may be weak and very short, leading to the stools becoming hard and dry.

As the disease is seen with higher incidences in certain families, potential genetic factors are also being suggested. Several factors such as alternations in the nerve control to the muscles, changes in the control of sensations to the muscles, intestinal dysbiosis, hormonal problems (because the symptoms tend to worsen around the menstrual period in women), etc. The symptoms may tend to worsen especially on consumption of certain foods (such as caffeine products or alcohol), stress, or certain illness (Mayo Clinic, 2005, Introduction, Causes & Risk Factors).

Studies have shown that eating certain food substances and avoiding others may in fact help to lower the symptoms of IBS. Patients seeking dietary advice benefit a lot from consumption of a specific diet and avoidance of certain substances. Some patients may benefit from elimination of certain food substances and slow reintroduction into the diet. The individual should avoid consuming large amounts of food at one time. Instead, smaller doses should be consumed more often (NDDIC, 2006). Individuals with the diarrhoea subtype may have symptoms especially when they consume lactose or dairy products, excessive amounts of fruits or sorbitol.

Individuals with the constipation subtype may experience symptoms whenever they avoid fibre and water in their diet, as the stools become hard and dry. Some individuals may experience symptoms of excessive gas production, bloating and flatulence, whenever they consume beans, cabbage, cauliflower or uncooked broccoli. Consumption of low to moderate

amounts of fat in the diet may help to reduce the symptoms of IBB, because fat stimulates the intestinal sensations and motor activities (Mertz, H. R. , 2003). Although fibres lack the experimental data, it has been recommended as a therapy for individuals suffering from IRB.

Fibres are carbohydrates that are not digestible, but can be broken down by certain bacteria present in the intestines. Fibres are of 2 types, namely, soluble fibre and insoluble fibres. The soluble fibres are present in several fruits such as citrus fruits, apples and beans, and also in certain vegetable such as psyllium. These soluble fibres dissolve in the water and form a gel-like substance. It helps to evacuate the stools, and thus can be utilised in both the diarrhoea and constipation subtypes. Psyllium supplements are also available in supplements.

Insoluble fibres on the other hand, add bulk to the stools, make them softer and help it to be evacuated easily. They are present in wheat bread, bran and several vegetables (AAFP, 2006). So far, three placebo controlled studies have been performed on psyllium, but only one comprehensive trial has been completed. Psyllium helped to reduce the stool transit time, and also improved the easy, frequency and consistency of the stools, compared to placebo. However, side-effects may also develop including allergy, defective absorption after administration of certain drugs and obstruction of the intestines.

Peppermint oil also showed some amount of benefit in IBS, by reducing smooth muscle contraction, and had a more superior effect compared to a placebo (Sheisenger, M. H. , 2006, Gastrointestinal Disorders Addressed by

CAM Therapies). Bran received a lot of enthusiasm for use in IBS in the 1970’s and 1980’s. It was recommended routinely by the gastroenterologist. However, RCT’s show only limited benefits. When administered to 14 patients, the symptoms of pain, discomfort, elimination of mucous containing stools, had decreased, compared to those not being administered a high fibre diet.

In another RCT, bran tablets and placebo tablets were being administered to patients belonging to 2 groups. Constipation had reduced in the case group. Some individual may not tolerate bran and may instead benefit from consuming whole wheat bread (Bouchier, A. , 1984, 872-873). Some individuals may give complaints of gas production and bloating whenever they consume a diet rich in fibres. This usually occurs when the fibre content is food is suddenly being increased. Such symptoms are usually temporary and slowly reduce, as the individual gets used to the higher fibre content in the diet.

The individual should eat a high fibre diet by consuming a variety of foods. Fibre supplements including Metamucil or Citrucel should be consumed gradually, along with plenty of water (NDDIC, 2006). Studies have shown that individuals developing pain may also benefit from high fibre content as they tends to keep the intestines mildly distended. In this way, stools can be emitted painlessly. The fibre content should be increased by 2 to 3 grams a day. Besides, increasing the fibre content, the individual should also consume large quantities of water a day, as it helps to reduce both diarrhoea and constipation.

Six to eight glasses of water should be consumed in a day. The individual should avoid sodas, as they increase the gas production and cause a lot of discomfort (NDDIC, 2006). Excessive amounts of fat and caffeine can cause the intestines to contract excessively resulting in development of severe abdominal cramps. Others foods such as alcohol, chewing gum, and cocoa should also be avoided. Chewing gum may increase the intake of air into the digestive tract. The individual should have an idea of the foods that cause problem, and should hence avoid them after discussing with the physician (AAFP, 2006).

Probiotics are food supplements that contain microorganisms which are potentially beneficial forhealth. These substances ensure that the gut is being colonised by friendly organisms. In the early part of the 20th century, Metchinkoff discovered that certain bacterium when consumed in the form of foods such as yoghurt could help improve the micro-flora present in the intestines. Studies conducted in individuals suffering from demonstrated that such patients generate large quantities of hydrogen gas and volatile short-chain fatty acids, suggesting a disturbance in the gut microflora (P&G Health Sciences Institute, 2005).

RCT’s conducted on individuals with IBS consuming Lactobacillus plantarum showed that several symptoms such as abdominal discomfort and flatulence were relieved. Probiotics adjust the intestinal microflora to a more health state. Many researchers feel that IBS may be caused due to significant changes in the intestinal microflora. Another study showed that individuals with IBS having their intestinal microflora removed through colonic lavage

and having microflora inserted from a healthy donor benefited with a reduction in the symptoms.

Streptococcus faecium (brand name Pareghurt) contained in freeze-dried cultures help to improve the symptoms in about 81% of the patients. Studies may not show significant benefits of alternative therapies, but some amount of advantages can be obtained (Hasler, W. L. , 1999, 1900). Probiotics administered in the form of Bifidobacterium infantilis, Lactobacillus plantarum and VSL # (a combination of micoorganisms), seemed to produce prominent effects, although they seemed to vary from one individuals to another.

This may be due to variations in the dose, presence of ineffective bacteria, or other factors (Tallej, N. J. , 2006). Probiotics are also effective in reducing diarrhoea. Previous meta-analysis conducted with Lactobacillus strains have demonstrated that probioitcs help to reduce diarrhoea following administration of antibiotics. Another trial conducted utilising a different bacteria (S. boulardii) showed that the bacteria contained an enzyme which helped to destroy a toxin secreted by another microorganism that caused diarrhoea (Sheisenger, M. H. 2006, Gastrointestinal Disorders Addressed by CAM Therapies).

Some of the probiotics available in the market today contain different strains of lactobacillus bacteria. These strains colonise different areas of the intestinal mucosa, encourage synthesis of several vitamins required by the body, prevent the disease-causing microorganisms from colonising the gut and also helps in the digestion of food (as these bacteria contain beneficial

enzymes). Some bacteria such as Bifidobaceria additionally help in metabolism of bile acids (P&G Health Sciences Institute, 2005).

Probiotics do seem to be very useful when consumed often as a supplement in IBS as such individuals may have a disturbed intestinal microflora. However, further studies need to be conducted until more consistent results are being obtained. At present the results obtained from studies are inconsistent, because the factors that could be playing an important role in the manner in which these probiotics act are not clearly understood. Gamma-oryzanol is a steryl ferulates mixture obtained from brown rice bran oil.

It has a number of beneficial activities in the body, and especially has very good antioxidant effect. The oil is also being utilised in sunscreen. The oil acts as an organic radical scavenger which was able to reduce oxidation of lipids. Several tests conducted in the laboratory using several scavenging systems such as scavenging DPHH radical, and OH or O2- scavenging radicals have demonstrated the antioxidant properties of gamma-oryzanol. Oxidation acceleration tests were being performed to compare the effect of gamma-oryzanol with other antioxidants such as BHA and BHT.

The antioxidant properties of gamma-oryzanol may be attributed to the presence of large amounts of PUFA. Small quantities of gamma-oryzanol added to other oils helps to prevent lipid oxidation (Juliano C. , 2005, 146-154). Studies conducted on the on gamma-oryzanol demonstrate that it may beneficial to reduce any disturbance in the functioning of the autonomic

nervous system. Stress-related ulcers were reduced to some extent in animal administered gamma-oryzanol (Itaya, K. et al, 1976, 474-481).

Studies have also demonstrated that gamma-oryzanol produces a stimulating and as well as a inhibiting effect on the movements of the gastric and ileal mucosa. This is produced due to the effect of gamma-oryzanol on the central nervous system (Mizonishi, T. , 1980, 47-55). Due to the mucosa-protective function, anti-oxidant effect, and control over bowel movements, gamma-oryzanol, has shown some beneficial effect in helping to reduce the symptoms of IBS. However, detailed human studies need to be conducted in order to determine the precise effect that gamma-oryzanol can produce.