A formula to help the elimination of toxins and support the liver and skin.

| Burdock, Sarparilla, Calendula, Schisandra, Echinacea, Nettle, Globe Artichoke. |

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**Formula Aim:** To assist in the removal and protection from toxin build up. This can be acute or chronic and a variety of disease states can develop. These may have far reaching effects but most commonly involve digestion, skin and nerves. Detoxifying herbs will help protect the body, support elimination pathways, bind to, block and remove toxic build up.

The herbs that can assist are:

- tones gut wall, reduces leak gut (Calendula, Burdock, Nettle)
- support gut immunity (Echinacea)
- improves microflora balance (Burdock)
- reduces inflammation including in the gut (Calendula, Globe Artichoke, Nettle, Sarsaparilla, Schisandra)
- protection from damage due to toxins (Burdock, Schisandra)
- elimination of toxins through hepatic support (Calendula, Globe Artichoke, Sarsaparilla, Schisandra)
- binds to toxins for removal (Sarsaparilla)
- increase peripheral circulation (Calendula)
- stimulate lymphatic drainage (Calendula)
- enhance diuresis (Globe Artichoke, Nettle)
- immune modulation (Echinacea)
- nerve tonic (Schisandra)

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**Burdock Root (Arctium Lappa)**

Burdock is used as a blood purifier and a key ingredient in detoxification. It has been used for the treatment of cancer, skin conditions (such as eczema, psoriasis and acne), respiratory, bladder and kidney problems and to soothe the gastrointestinal tract. The bitter constituents in the root may also explain the use of burdock to improve digestion.

**Mechanisms of action.**

**Protection against cellular damage and anticancer activity:**

- In vitro studies demonstrated that the aqueous extract of burdock root decreased mutations in cells exposed to toxic chemicals (Morita et al., 1984). In addition, animals that consumed burdock root were protected against several toxic chemicals (Kimura et al., 1980; Dombradi and Foldeak, 1966; Foldeak and Dombradi, 1964; Morita et al., 1985).
- Quercetin, a natural flavone found in burdock produced a 50% inhibition (Wattenberg and Leong, 1970). Isoflavone derivatives such as genistein and biochanin A, nobiletin and tangeretin, which are naturally occurring flavones in burdock root, have been shown to induce apoptosis of tumour cells and cytostatic effects in cell lines. In vivo isoflavones suppressed the tumour growth of cell lines in nude mice (Yanagihara...
et al., 1993). The tannins in burdock also induce macrophage response and act as immunomodulators; in certain tumour cells in mice, they exhibit strong antitumour effect (Miyamoto et al., 1993).

Modification of intestinal microflora by inulin:

- Harborne and Herbert, 1993 found around 75% of the carbohydrate content of the plant is stored in the root as a complex fructan, gamma-glucoside-fructose ester, known as inulin.
- A clinical study found that an increased intake of oligofructose and inulin significantly increased bifidobacteria and decreased numbers of potential pathogens (Gibson et al., 1995). An increase in oligosaccharides was reported to lead to a selective qualitative change in caeco-colonic microbial flora (i.e. bifidogenic change) (Roberfroid, 1993; Gibson et al., 1995). Inulin is not digested in the stomach but fermented almost exclusively by colonic bifidobacteria and bacteroides. The complete fermentation increases faecal bacterial biomass, decreases colonic pH, and increases fermentation products such as short chain fatty acids that positively affect the metabolism of lipids (Jensen et al., 1997; Hidaka et al., 1986; Kies, 1985; Hoverstad and Bjorneklett, 1984). Beneficial intestinal bacteria have been found to stimulate the immune system and effectively suppress tumour cells (Fernandes and Shahani, 1990; Shahani et al., 1989).

Free radical scavenger activity:

- In 1995 Maruta et al., discovered the root contained at least five powerful flavonoid-type antioxidants (i.e. caffeoylquinic acid derivatives) and several polyphenols that are more powerful antioxidants than vitamin C.
- Yamaguchi et al., (2001) found that of 18 vegetables they tested, the highest antioxidant activity was found in burdock root (490.0 ìmol Trolox eq./100 g) followed by broccoli (468.3 ìmol).
- Administration of a crude extract of A. lappa significantly decreased carrageenan-induced rat paw oedema. The extract also reduced hepatotoxicity induced by the toxic substance, carbon tetrachloride. The research suggests that Arctium lappa possesses free radical scavenging activity and strong antioxidant activity (Lin et al., 1996; Duh, 1998).

Anti-diabetic properties:

- The high levels of inulin in burdock root, provide a natural carbohydrate that helps to keep blood sugar levels constant (Silver and Krantz, 1931).
- Older studies suggest that inulin has the ability to lower hyperglycaemia, and the mechanism is thought to be due to the action of inulin on the reserve of insulin and internal secretions of the pancreas (Root and Banker, 1925; Yamashita et al., 1984; Luo et al., 1996).
- Inulin has been shown by Gibson et al., 1995 to:
  - improve bowel habits
  - improve stool composition
  - decrease intestinal transit time
  - improve glucose tolerance
  - reduce glucose and starch absorption
  - reduce intraluminal pH
  - change the composition of caeco-colonic microbial flora towards a potentially healthier bifidobacteria microflora
  - increase the production of short chain fatty acids
  - reduce blood cholesterol.
References


Calendula Flower (Calendula ofﬁcinalis)

Calendula helps the body to rapidly eliminate toxins through its ability to boost liver function, increase peripheral circulation and stimulate lymphatic drainage.

Actions:
Lymphatic, Hepatic, Anti-inﬂammatory, Astringent, Vulnerary, Anti-microbial.

Lymphatic Stimulant
- Calendula has been used to treat infections which have associated swollen and inflamed
lymph nodes (Burgess, 1995; Mills, 1994). In this role it encourages lymphatic drainage (Trickey, 1998).

- Calendula is used in the treatment of conditions that are marked by lymphatic involvement (Fisher, 1966)
- The British Herbal Pharmacopoeia (1983) considers it specifically indicated for enlarged and inflamed lymph nodes as it is not only a lymphatic tonic but also improves the lymphatic drainage action.

Choleretic and Hypolipidaemic Effects

- Calendula improves the flow of bile. It acts on the hepatocytes causing them to produce less concentrated bile (Burgess, 1995). This hepatic activity contributes to its depurative action.
- In addition, the saponins in Calendula have been shown to lower both triglyceride and cholesterol levels. This is thought to be the result of the saponins binding to cholesterol or of direct effects on cholesterol metabolism. It is likely that Calendula’s flavonoids may also be involved in this effect (Steinegger and Hansel, 1988).

Anti-inflammatory Effects

- Calendula has proven to be effective in the treatment of inflammatory conditions of the upper gastro-intestinal tract (Burgess, 1995).
- Triterpene alcohols are the constituents that exert these anti-inflammatory effects (Cosmital, 1987).
- In inflammatory conditions calendula decreases tissue swelling by increasing capillary perfusion of tissue (Kingsbury 2007).

Vulnerary

- The triterpene alcohols and carotenoids in Calendula extracts have been shown to accelerate the healing process (Burgess, 1995, Trickey, 1998; Boucaud-Maitre et al., 1988). They promote the normal development of granulation tissue (Burgess,1995). Other constituents found in this herb aid in this effect.
- Calendula’s ability to improve blood flow to the affected area and inhibit microbial growth would certainly enhance its vulnerary action (Burgess,1995).

Anti-bacterial, Anti-fungal and Anti-viral Effects

- Both aqueous (Hinsdale and Lord, 1921; Spaich, 1977) and ethanolic (Chaplinska and Golovkin,1963) extracts of Calendula are reported as being effective against a range of bacteria, fungi and viruses (Trickey, 1998).
- The constituents responsible for these effects are its glycosides and triterpenoid saponins. They act by inhibiting the growth of fungi and bacteria and the multiplication of viruses.
- In humans, Calendula has been used both internally and externally to treat acne, sebaceous cysts and furunculosis (Burgess, 1995; British Herbal Pharmacopoeia, 1983). Its antiseptic effects reduce scarring and pitting associated with acne.

References:

7. Hinsdale, AE; Lord, SN (1921) J Amer Inst Homeopathy 13, p747-753

Globe Artichoke Leaf (Cynara scolymus)

The traditional use of artichoke relates mainly to improving liver function. Artichoke leaf is choleretic (bile increasing), hepatoprotective, cholesterol-reducing, and diuretic (Kirchhoff et al., 1994).

Modern use in Germany is as a choleretic (Bundesanzeiger, 1998; Meyer-Buchtela, 1999) for its lipid-lowering, hepato-stimulating, and appetite-stimulating actions (Hansel et al., 1992–1994; Meyer-Buchtela, 1999).

Actions:
Antidyseptic, Anti-inflammatory, Anticholestatic, Antiemetic, Cholagogue, Choleretic, Diuretic, Hepatoprotective, Hepatic trophorestorative and Hypcholesterolaemic

Antidyseptic Effect
Cynara has been shown to cause significant improvement in the symptoms of dyspepsia such as nausea, vomiting, abdominal pain, constipation, belching and fat intolerance. (Wegener, 1995).

Antiemetic Effect
Dyspeptic human patients experienced relief from nausea, bloating and heart burn when treated with a herbal formula containing Cynara extract (Kupke et al., 1991).

Anti-inflammatory Effect
The dicaffeoylquinic acids found in Cynara have been shown to exert anti-inflammatory effects in vitro (De Feo et al., 1995).

Choleretic and Cholagogue Effects
Cynara extracts have been shown to stimulate significant increases in bile production and secretion, without later impairing the excretory function of the liver, an adverse side effect induced by traditional choleretics such as bile salts (Preziosi et al., 1989; Hammerl and Pilcher, 1957). It also causes an increase in the excretion of cholesterol and solids in the bile (Preziosi and Loscalzo, 1958) and increases faecal bile acid excretion (Schreiber et al., 1970). This effect has been demonstrated in vivo in rats and humans and in vitro (Kraft, 1997).

Diuretic Effect
Cynarin has been shown to stimulate diuresis. In doing so it enhances the excretion of water.

Hepatoprotective and Hepatorestorative Effects
The cynarin and caffeic acids found in Cynara have been shown to protect hepatocytes against toxic substances both in vitro and in vivo. This is due to its antioxidant properties.
Oral doses of Cynara extracts stimulate liver repair and regeneration in rats (Gebhardt, 1995a; Gebhardt, 1995b; Maros et al., 1966).

**Hypolipidaemic Effect**

Cynarin has been shown to inhibit cholesterol synthesis by the liver (Preziosi and Loscalzo, 1958). Accordingly it reduced plasma cholesterol levels in hyperlipidaemic rats. Cynara extracts also inhibit increases in serum lipid levels and the development of atherosclerotic plaques in rats fed an atherogenic diet (Samochowiec, 1959, Samochowiec, 1962).

Cynara exerts its hypolipidaemic effects by inhibiting cholesterol synthesis and acting as a free-radical scavenger and thereby inhibiting LDL oxidation (Samochowiec, 1962). The lutoelin found in Cynara is thought to be involved in these effects.

**References:**

15. Samochowiec L (1962) Fol Biol, 10, p75-83

**Echinacea Root (Echinacea purpurea)**

**Immune stimulation.**

Echinacea is an excellent herb to add to this formulation as it has the ability to promote the non specific immune system; cytokines, lymphocytes and phagocytosis.

Coeugniet 1987, Bauer 1996 found the reputed immune-enhancing effects of echinacea are thought to be mainly directed toward nonspecific immune mechanisms including phagocytic activity, macrophage activation, and NK cell activity. These effects have been demonstrated for alcoholic extracts of the roots of *E. purpurea*. Several trials have shown that the most potent immuno-stimulation occurs with the ethanolic preparations.

Research by Miller 2005 highlighted the effects of Echinacea in supporting the nonspecific arm of the immune response, which is most important for healing. Yaodi et al., 2008 confirmed that *Echinacea purpurea* had obvious immunological enhancement.

Studies have demonstrated that the alkylamides and caffeic acid derivatives strongly activate the monocyte-phagocyte system. By activating this portion of the immune system, immune
surveillance is enhanced and resistance to infection is increased.

Sullivan et al., 2008, demonstrated *Echinacea purpurea* extract activated the innate immune response, stimulating production of IL-6, TNF, IL-12, and NO from macrophages in vitro. Along with evidence of enhanced macrophage function Steinmuller et al., 1991 found that oral echinacea reduced bacterial burden during infection by *Listeria monocytogenes*, demonstrating its efficacy in vivo.

Echinacea has good coverage against Staphylococcus and Streptococcus, both of which can cause infections in open wounds. Echininoside and caffeic acid possess antibacterial activity against *Staphylococcus aureus, Corynebacterium diphtheria, and Proteus vulgaris*. *Staphylococcus aureus* is a major cause of wound infections. The polyacetylenes in Echinacea are effective against Streptococcus infections and have been found to have anti-fungal properties, as well.

The polysaccharide fraction of Echinacea has been shown to bind to the T lymphocyte surface receptor in a way which stimulates the production of interferon and other immune modulators. It appears that the immune-stimulating effects of Echinacea result from polysaccharides surrounding tissue cells and thereby providing protection from bacterial and pathogenic invasion (Newall, et al., 1996).

**Connective Tissue Support.**

Sasagawa et al., 2006 has shown Echinacea to inhibit the breakdown of hyaluronic acid by the enzyme hyaluronidase. Hyaluronic acid is a mucopolysaccharide which fills the intercellular spaces of the body and acts as “cement” to hold cells together. Hyaluronidase causes the “cement” or connective tissue to become “leaky” allowing the organism of infection greater access to the body and bloodstream. Through the inhibition of this enzyme, Echinacea helps the connective tissue retain its integrity and keeps the infection localized.

In addition to the stabilization of hyaluronic acid, the polysaccharide components of Echinacea have been shown to promote tissue regeneration by stimulating fibroblasts (Enbergs & Woestmann, 1986). Fibroblasts manufacture ground substance found within connective tissue. Fibroblasts are abundant in the tendons of muscles and the ligaments of joints and stimulation of these fibroblasts may enhance healing of soft tissue injuries.

Over a number of years Crop & Food Research in Otago, New Zealand has done work on the distribution of alkamides in Echinacea and have shown that the highest concentrations are in the roots. Interestingly the market prices for raw herbs also reflect this.

**References**

Nettle Leaf (*Urtica dioica*)

*Also known as*: Stinging Nettle

Nettles are one of the most widely applicable plants we have. They strengthen, support and detoxify the whole body and are considered to be blood purifying. They are nutritive, have assisted in cases of rheumatism and arthritis and are specific in cases of childhood eczema. As an astringent they have traditionally been used for nose bleeds or to relieve the symptoms of haemorrhage and diarrhoea. As a diuretic they have been used to decrease blood pressure, reduce swelling, and flush out and protect from kidney and bladder stones.

**Actions:**

Alterative, antiallergic, antilithic, antiprostatic (root), antirheumatic, astringent, depurative, diuretic, galactagogue, hypoglycemic, hypotensive, kidney tonic, nutritive, rubefacient, styptic, and tonic.

**Cellular Effect**

- The immediate reaction to the nettle sting is believed to be due to a histamine reaction. The persistence of the sensation is due to the presence of substances directly toxic to nerves or capable of secondary release of other mediators. Acetylcholine is also present in the hairs and contributes to the stinging reaction.

**Renal function**

- Increases the production of urine
- Increases the excretion of uric acid

**Immune Function Effect**

- Antibacterial action which depresses the growth of staphylococci
- Decreases inflammation
- Assists eliminative function

**Hormone and Sexual Function Effect**

- Improves lactation
- Improves glucose tolerance
- Reputed to increase female libido
- Nettle root improves prostatic problems i.e. enlarged prostate (BPH)
- A study of humans using a daily dosage of Saw Palmetto and Nettle root for 12 weeks, showed a 26% increase in maximum urinary flow, 29% increase in mean urinary flow, 45% reduction in residual urine, and 50% reduction in nocturia. There was also noted a 62% reduction in Dysuria and a 53% decrease in post-voiding dribbling.

**Effect on the Cardiovascular System**

- Its diuretic action assists its hypotensive action through decreasing blood volume and hence blood pressure
- A recent trial has shown nettle to increase blood B₁₂ levels
Respiratory System

- The antiallergic action may alleviate allergic asthma and allergic rhinitis.

Musculo-skeletal function

- Tonic for the hair texture and growth
- Used to relieve gout related arthritis and rheumatism through its action of assisting the removal of uric acid
- Studies have shown that the anti-inflammatory activity of nettle leaf extract may offer a powerful approach for inhibiting joint and bone destruction in arthritis and slowing its progression
- A man with osteoarthritis and joint narrowing self-prescribed nettle leaves to the region after NSAID therapy did not ease the pain. The counter irritation of fresh nettle leaves over several weeks produced a remarkable improvement and reduction of pain. He was able to decrease the application of nettle to once every few days.
- A trial comparing nettle leaf extract to NSAID therapy exhibited a similar efficacy in reducing pain and improving motility.
- A study was undertaken over a 3-week period to research the efficacy of a nettle leaf preparation in 8955 patients with arthritis, results indicated that 82% of patients felt that the treatment had relieved their symptoms, 38% could have their NSAID therapy reduced and 26% no longer required NSAID therapy.

Sarsaparilla Root (Smilax spp.)

Sarsaparilla species have been used all over the world in many different cultures for similar conditions (gout, arthritis, fevers, digestive disorders, skin disease and cancer).

Sarsaparilla is considered an excellent tonic and a blood purifier. A blood purifier or depurative refers to an agent that cleanses and purifies. It has been used to promote good circulation, clear toxins, balance the glandular system, stimulate metabolism and hormone production, improve male sexual potency and to aid building muscle mass.

More recently Sarsaparilla has been used to combat psoriasis, eczema, warts and other skin infections.

Actions:

Alterative, anti-inflammatory, depurative, hepatoprotective, tonic.

The mechanism of action of sarsaparilla is largely unknown, although the plant does contain several saponins and has been shown to be clinically effective in the treatment of psoriasis. Clinical research has validated the traditional use of sarsaparilla for skin conditions such as psoriasis, eczema, acne, and leprosy.

- Thurman (1942) reported in the New England Journal of Medicine that Sarsaparilla improved the condition of psoriasis dramatically. The results of a controlled study of ninety-two patients given an endotoxin-binding saponin (sarsaponin) from sarsaparilla greatly improved the psoriasis in 62 percent of the patients and resulted in complete clearance in 18 percent.

One of the possible mechanisms of action in psoriasis is sarsaparilla's blood cleansing properties. Individuals with psoriasis have been found to have high levels of endotoxins circulating in the bloodstream (endotoxins are cell wall fragments of normal gut bacteria). Sarsaponin, one of sarsaparilla's main saponins, was found to bind to these endotoxins and remove them, thus improving psoriasis (Liu et al., 2006).
Evidence seems to support sarsaparilla as an endotoxin binder. This endotoxin-binding action is probably why the root has been used for centuries as a "blood purifier." Other health conditions associated with high endotoxin levels include eczema, arthritis, and ulcerative colitis. Endotoxins are cell wall constituents of bacteria that are absorbed from the gut. Normally, the liver filters out these and other gut-derived compounds before they reach the general circulation. If the amount of endotoxin absorbed is excessive or if the liver is not functioning adequately, the liver can become overwhelmed, and endotoxins will spill into the blood.


References

Schisandra Berry (Schisandra chinensis)

Actions:
Adaptogen, Antidepressant, Antifatigue, Anti-inflammatory, Antioxidant, Anti-tumour, Hepatoprotective, Nervine tonic, Uterine Stimulant

Adaptogenic and Antifatigue Effects

Schisandra has been shown to increase human endurance (Fulder, 1980) and reduce fatigue in racehorses and show-jumping horses (Ahumada et al., 1991; Ahumada et al.,1989). Research suggests that it improves the efficiency and "biological age" of cells. Schisandra increased the RNA, glycogen and enzymes in the kidneys and gonads of mature rabbits to values found in three month old rabbits (Peng et al., 1989). The same study found that it also increased the number of reproductive cells in both male and female gonads.

In the randomised, double-blind, crossover study referred to above race horses were given either Schisandra or a placebo 30 min before an 8min race over 5.6km. Show horses were taken over a 700m obstacle course with 12 jumps. In both cases the horses that received Schisandra had lower heart rates and respiratory frequencies, increased plasma glucose and decreased lactate levels. The effects were more marked in the race horses. The authors of this study suggested that Schisandra caused lower synthesis of lactate in muscle under anaerobic condition and improve lactate clearance by the liver (Ahumada et al.,1991). Circuit times were improved in the show-jumping horses.
Antioxidant and Anti-inflammatory Effects

Schisanhenol and schisandrin B have been shown to have potent antioxidant properties *in vitro* (Xue *et al.*, 1992; Lin *et al.*, 1992). Another study found that the antioxidant activity of seven lignans from Schisandra was greater than that of the same volume of vitamin E (Lu and Liu, 1992). Research has shown that, *in vitro*, Gomisin C inhibits the respiratory burst of rat neutrophils (Wang *et al.*, 1994).

Anti-tumour Effect

Gomisin A has repeatedly been shown to inhibit tumour development in research models (Ohtaki *et al.*, 1994; Yasukawa *et al.*, 1992; Miyamoto *et al.*, 1991). This inhibitory effect has been induced in skin and liver tumours in rats and mice. It has been suggested that Gomisin A induces its effects by improving liver function, reversing abnormal cell multiplication (Ohtaki *et al.*, 1994). Other studies have shown that it enhances the excretion of carcinogens and reverses cytokinesis. Schisandra’s anti-tumourgenic activity is thought to be linked to its anti-inflammatory activity.

Hepatoprotective and Hepatorestorative Effects

It is this action for which Schisandra is most well known. Various models in which liver damage was induced using substances such as carbon tetrachloride and acetaminophen, have repeatedly shown that Schisandra and its isolated constituents (especially its lignans) have hepatoprotective and hepatorestorative effects (Bone and Morgan, 2000; Hikino and Kiso, 1988). Most involve Schisandra altering the activity of various hepatic enzymes.

These studies have been conducted both *in vitro* and *in vivo*. The results (summarised in Bone and Morgan, 2000) show that its modes of action include:

- antioxidant activity with the liver (sustaining hepatic glutathione (GSH), ascorbic acid and alpha-tocopherol levels and enhancing GSH redox status).
- facilitation of GSH regeneration via the glutathione reductase catalysed and NADPH-mediated reactions.
- inhibiting the activation of the hepatotoxin and binding of its metabolites to liver microsomes.
- stimulating the production of enzymes involved in detoxification.

Schisandra has also been shown to stimulate liver regeneration after partial hepatectomy in rats (Kubo, 1992). Another study found Schisandra to be more effective than vitamin E in treating people suffering from chronic viral hepatitis. Symptoms such as sleeplessness, fatigue, abdominal tension and diarrhoea were reduced to a greater extent in patients taking Schisandra (Bone and Morgan, 2000).

Nervine Tonic and Anti-depressant Effect

Although in isolation Schisandra lignans have been shown to have a depressive effect on the CNS (Li, 1989), the whole extract has a stimulating effect (Bone and Morgan, 2000; Bone, 1996). Schisandra has been shown to have an antidepressant effect (Hancke *et al.*, 1986) and improve learning ability in mice (Fulder, 1980). In humans, Schisandra has been shown to improve mental efficiency, the sensitivity of sight and hearing, increase the speed of adaptation to the dark, enlarge the visual field and increase the discrimination of skin receptors (Chang and But, 1987). The same authors state that Schisandra lignans improve activities requiring concentration and fine coordination in humans (Chang and But, 1987).

Uterine Stimulant Effect

Schisandra stimulates uterine contraction (Chang and But, 1987).
References:

16. Yasukawa K et al. (1992) Oncology, 49, p68.