**ANISE: one plant – many benefits!**

by: Dr. Wendy Pearson

*Anise* (*Pimpinella anisum*) is an annual plant that grows wild from Ontario to North Carolina, across to Oklahoma. It is widely cultivated for its aromatic properties, found principally in the root and seeds.

The plant contains a number of compounds, which have demonstrated activity in in vitro and in vivo research, including coumarins, essential oils (Orav et al. 2008; Leung 1980) and flavonoids. The plant also contains about 50% carbohydrate, 16% lipids and phytosterols (Newall 1996).

**DOSAGE AND ADMINISTRATION**

Fruit essential oil: 0.5 mL essential oil/kg BW (i.p.) (Pourgholami et al. 1999).

Aqueous extract: 250-500 mg/kg BW (p.o.) (Al Mofleh et al. 2007)

**TRADITIONAL USES**

Anise is an Indian herb used primarily as an expectorant and a tonic for coughs. The Greeks used it to prevent seizures, and it was one of the world’s earliest perfumes. Anise was recommended by Hippocrates to help clear mucous from the respiratory system, and the Roman naturalist Pliny recommended chewing fresh anise seed for fresh breathe and as a digestive aid after large meals. The herb was used extensively throughout the Roman Empire as female tonic, promoting milk production, stimulation menstrual flows, facilitating birth, and increasing libido.

**PHARMACOLOGY**

The bioactivity of *P. anisum* is likely related to the presence of anethole as a constituent of the volatile oil. Anethole is structurally similar to adrenaline (Albert-Puleo 1980), which is vasodilatory to a number of muscle systems, including skeletal muscle and heart muscle, and has a stimulating effect on CNS respiratory regulation. The dimers of anethole are structurally similar to a number of oestrogenic compounds, including stilbene and stilboestrol. The presence of anethole, and the structural characteristics of this compound likely contribute to the observed effects of *P. anisum*.

**Anti-ulcer**

An aqueous extract of *P. anisum* was provided to rats (250 – 500 mg/kg BW) in a single dose 30 min prior to challenge with ulcerogenic agents (including ethanol, NaOH and indomethacin). The extract provided significant protection against occurrence and severity of gastric ulcers possibly via a prostaglandin-mediated mechanism, and/or through its anti-secretory and antioxidative properties (Al Mofleh et al. 2007). Methanolic extract of *P. anisum* seeds has an MIC of 100 µg/mL against *Helicobacter pylori* *in vitro* (Mahady et al. 2005). Other authors report a significantly lower MIC of 200 – 400 pg/mL against *H. pylori* (Robles-Zepeda et al. 2011).

**Antispasmodic**
An extract was prepared from the essential oil of the fruit of *P. anisum* and provided to mice (0.25 – 1.0 mL/kg BW; single dose) challenged with seizure-inducing agents (Pourgholami et al. 1999). Convulsions and mortality was significantly reduced at doses > 0.25 ml/kg BW. Antispasmodic activity is also reported for a hydroethanolic extract of *P. anisum* on rat smooth muscle in vitro (5-50 µg/mL) (Tirapelli et al. 2007). Similarly, a methanolic extract and essential oil of *P. anisum* significant reduced spasms of trachea chains *in vitro*, probably via inhibition of muscarinic receptors (Boskabady and Ramazani-Assari 2001).

**Antibiotic**

A lignin-carbohydrate-protein complexes derived from *P. anisum* seeds directly inhibited herpes simplex virus types 1 and 2 (HSV-1 and -2), human cytomegalovirus (HCMV) and measles virus (Lee et al. 2011). The complexes also interfered with the ability of viruses to adsorb to the surface of host cells. There also resulted a significant increase in nitric oxide and cytokines (IL-1 and IL-10). These data support the use of complexes from *P. anisum* against infectious viral diseases. In addition to antiviral activity, a methanolic extract of *P. anisum* (200 µg/mL) also enhanced activity of antibiotic drugs (including chloramphenicol, neomycin, doxycycline, cephalaxin and nalidixic acid) against drug-resistant bacteria (Danish and Aburjai 2010). The essential oil and methanolic extract of *P. anisum* has also shown strong antibiotic activity against Staphylococcus aureus, Bacillus cereus and Proteus vulgaris (Al-Bayati 2008).

**Performance enhancement (immunomodulation)**

One hundred and sixty, day old broiler chicks were reared to market weight with water containing *P. anisum* [0, 20, 30 and 40 mL of 6% (w/v)] (Durrani et al. 2007). Anise extract (40 mL/L) significantly improved mean weight gain, feed conversion ratio, and dressing weight. There also resulted an increase in mean antibody titer against Infectious Bursal Disease in this group, as well as an improvement in gross economic return.

**Insecticidal**

Essential oil of *P. anisum* has shown marked direct cidal action against head lice when combined with coconut oil (Burgess et al. 2007; Mumcuoglu et al. 2002). The oil also kills house dust mites (1.11 µg/cm²) more effectively than conventional acaricidal chemicals (Lee 2004). The essential oil is also highly toxic to larvae of blow flies (Khater et al. 2011) and mosquitoes (Prajapati et al. 2005).

**TOXICITY AND ADVERSE EFFECTS**

Aniseed and anise oil has been reported as irritating to the skin in some individuals (Mitchell and Rook 1979; Sax 1979); a reaction that was attributed to anethole. The isolated oil of anise is very toxic and ingestion can cause nausea, seizures and fluid in the lungs (Bang et al. 2008). An LD50 value of 0.93 (1.11–0.79) ml/kg was obtained for the essential oil of *P. anisum* (Pourgholami et al. 1999).
CONTRAINDICATIONS
Anise is reported to stimulate spontaneous abortion (Duke 1985), and its use is contraindicated in pregnant mares.

WARNINGS AND PRECAUTIONS
Horses should never be fed purified oil of anise.

DRUG INTERACTIONS
Anise may increase the risk of bleeding or potentiate the effects of warfarin therapy (Heck et al. 2000).

REFERENCES


