W. J. Beal
Botanical Garden

Of interest this week at Beal...

Pot Marigold
Calendula officinalis

Family: the Sunflower family, Asteraceae
Also called Calendula, or English marigold

Pot marigold or Calendula, *Calendula officinalis,* is an annual, or weak perennial, from the Mediterranean region that has been cultivated as a food and medicinal plant since the Middle Ages. It prefers plentiful sunlight but rather cool temperatures, in spite of its sensitivity to frost. Cultivated varieties can reach from 12 - 30 inches (30.5-76 centimeters) in height and become bushy measuring about as wide as tall. While the lower leaves are rather oval, they become narrower and more sharply tipped as they ascend the stems.

The medicinal properties of Calendula derive principally from several aspects of its biochemical products. First, its edible flowers, that range from vibrant orange varieties to those of mainly yellow, are a rich source of carotene pigments. In a 2003 paper by Pintea, *et al.,* the list of carotenoids included flavoxanthin, lutein, rubixanthin, β-carotene, γ-carotene, and lycopene. They also noted that higher yields were found in the orange flowering varieties than in the yellow varieties. It is notable that while all known carotenes have abundant antioxidant capabilities, lycopene, named for its occurrence in tomatoes is developing a reputation for a possible role in male prostate health.

Another valuable component is its unique conjugated triene-containing fatty acid known as calendic acid (named for its occurrence in calendula). It has been found to act as a signaling molecule that in some experiments (Chardigny, J. M., *et al., 2003)* have caused body fat losses and increased protein expression in rodents. In a 2006 article in *Anticancer Research,* Yasui, Y. *et al.,* discovered that β-calendic acids could reduce the viability, and sometimes caused the self-destruction of a widely used line of human colon cancer cells (Caco-2).

Besides its health implications, the high oxidation rate of calendic acid makes it ideal for paints and binders as well as a reactive diluent that could replace tung oil in commercially produced resins. Because of its calendic acid, calendula is being explored as a crop plant.

Pot marigold, Calendula officinalis, *has recently attracted interest because of the unique oil produced within its ornate seeds (below). Pot marigold seeds contain approximately 20 percent oil, and of this oil, up to 60 percent is calendic acid, a conjugated triene-containing fatty acid that has been shown to be valuable in mammalian physiology, as well as useful to industry.*

Perhaps the most well-known applications of calendula are in the world of anti-inflammatory creams and preparations, capitalizing on a role it has had for centuries. The most active components in this arena appear to be a host of oleane-type triterpene glycosides (at least ten in number). These compounds have been shown not only to be powerful anti-inflammatory medications both in experiments and in the history of its clinical uses, but in addition appear to have anti-cancer properties of their own.