Rhaponticum carthamoides:
Anabolic effect of whole extract is superior to individual Ecdysterones

Treasures of Siberian Phytomedicines:
Rhaponticum carthamoides

Dr. Zakir Ramazanov
National Bioscience Corporation
Chester NY 10918, USA
Phone: 845-469-6143; Fax: 845-469-1983
Medicine@frontiernet.net

Introduction: Rhaponticum carthamoides (Willd) Ijin, also know as Leuzea, or Maral root, is plant indigenous to the Lake Baikal region and distributed throughout Eastern Siberia. Traditionally the Siberians consumed the Leuzea tea mixed with Rhodiola rosea root for a long time as a natural stimulant, in cases of tiredness and general weakness after illness and energizing remedy after the long Siberian winter.

After more than 25 years of research and clinical studies, *Rhaponticum* carthamoides radix et rhizome has been added to the Official Russian Pharmacopoeia that recommends "the herb for increasing work efficiency, athletic performance and recovery after muscular workloads". *Rhaponticum carthamoides* extract were included to the most popular Russian beverages such as "Baikal" and "Sayani". Elite Russian and Bulgarian athletes have long used Rhaponticum extract to stimulate muscle growth.

Phytochemistry: Key active constituents responsible for specific anabolic effect of *Rhaponticum carthamoides* is a mixture of compounds called, "levseins". Levseins represents a complex of more than 10 ecdysterones including 20-beta-ecdysterone, makisterone C, 24-dehydromakisterone A, carthamosterone, polypodyne B and ajugasterone C.

Pharmacology: According to Russian researchers the Leuzea extract stimulates muscle protein synthesis by increasing the activity of the polyribosomes. Polyribosomes are the cellular compartments where the actual protein synthesis takes place. Researchers extracted and purified various ecdysteroids from Leuzea and found that the ecdysteroids increased the mass of the developing quails in a dose-dependent manner, with the rate of increase proportional to the ecdysteroids content. It was evident that the plethora of growth-promoting, vitamin-like effects induced by Leuzea is mediated by ecdysteroids. However it is important to point out that the mixture of ecdysterones was found to be responsible for enhancement of muscle protein synthesis. The research indicated that the whole extract of *Rhaponticum carthamoides* containing mixture of levseins possess much superior physiological activity compared with the activity of purified individual constituents (Seifulla 1999). Results indicated that 0.5mg/kg body weight is the optimal dosage of 20-beta-ecdysterone in any sport and performance formula.

Rhaponticum carthamoides - A Powerful Natural Anabolic

Back in the '70s, the Soviet sports teams were caught using numerous steroids. In 1976 Soviet scientists discovered two substances that had traditional historical use behind them. One was a plant called Rhaponticum carthamoides, the active ingredient of which is called beta-ecdysterone. The Soviets manufactured a synthetic version of this powerful substance for their athletes with great success. Soon after, the U.S. version called Mesobolin circulated on the underground market for a long time. In back-to-back studies with animals, the Rhaponticum extract was actually superior to synthetic steroids like Dianabol at inducing endurance and muscle cell growth (Syrov et al. 1976, 1992).
The examination of the difference in action between beta-ecdysterone and synthetic steroids revealed that the latter go directly to the nucleus of a cell to tell the blueprint, the DNA, to produce more RNA. Then the RNA tells the ribosome to produce more protein. Beta-ecdysterone, on the other hand, goes directly to the ribosome and increases what is called translation, the rate at which new protein is being made (Syrov et al. 1984).

It does not increase transcription, the message sent from the DNA; it accelerates translation, or direct protein synthesis (Syrov et al. 1984). Levseins doubles the rate of translation and is very safe. Aside from increasing the rate of muscle growth, this same plant sterol strengthens kidney and liver function and is an enormous boon to people with dysfunctions in these particular areas, the opposite of the effects of synthetic steroids, which can lead to both kidney and liver damage.

Левзея сафлоровидная

Ecdysteroids are hormones controlling cell proliferation, growth and the developmental cycles of insects and other invertebrates. They are occasionally present in various unrelated plants for no apparent reason; no phytohormonal function has yet been identified. In certain cases, ecdysteroids are accumulated to high levels in leaves, roots or seeds. Some ecdysteroids-containing plants have been known as medicinal plants for centuries. A pharmacological preparation from this plant, "Ekdisten", is already available as a commercial preparation for its anabolic, tonic and other physiological effects. It remained problematic, however, whether ecdysteroids were truly responsible for these effects, because Leuzea contains a number of other biologically active compounds in addition to ecdysteroids.

The effect of 20-day administration of Leuzea extract on humoral immunity of track and field runners for distances of 5,000 and 10,000 m was studied (Azizov and Seifulla 1997). Intensive cyclic physical activity induced a significant decrease of IgG and IgA in blood serum of the athletes as well as the complement C3 component on the 10th and 20th days. Leuzea extract contributed to restoration of the lowered IgG, IgA, and C3 concentration. The working capacity of the athletes grew by 10 to 15% in this case. Seifulla et al. (1993) demonstrated that the Leuzea extract in combination with L-Carnitine and Acetyl-L-Carnitine when used for 10 days significantly increased the maximum running speed and endurance, whereas DL-Carnitine failed.

Leuzea extract considerably increases the working capacity of tired skeletal muscles and increases their content of glycogen, ATP and Creatine Phosphate (Petrov et al. 1984). The most popular sports formula traditionally includes the extracts of *Leuzea and Rhodiola rosea* (Seifulla 1999). Several Leuzea based phytomedicines "Leveton", "Elton", "Ecton" and "Adapton" registered and protected by over a dozen patents known are the most popular among professional athletes, including Olympic and World champions as well as among ordinary Russians. A drug prepared from Leuzea and Rhodiola rosea should be more widely used not only by professional athletes, but also in the everyday life of healthy persons as a tonic for increasing intellectual and physical work capacity. It could successfully be used against fatigue and for improving the learning and memory processes without harmful effects on the organism (Petrov et al. 1984).

Standardization: There are about 120 phyto-ecdysterones known, from more than 80 species of plants (Lafont 1998). Among more than dozed plant species containing ecdysterones only *Rhaponticum carthamoides* extract undergone through a complete human clinical trials and phytochemical research. Research pointed out that superior anabolic effect of *Rhaponticum carthamoides* extract is determined by content of all levseins (ecdysterones) rather then a single 20-beta-ecdysterone, which is abundant in plants outside of Rhaponticum genus. The presence of ecdysterones was reported in some fungi. The use of "20-beta-ecdysterone" content, as indication of superiority one extract over another is not more than just simple "old traditional" attempt to substitute original *Rhaponticum carthamoides* extract with inferior plant extract.

Toxicity: From more than 80 species of plants containing phyto-ecdysterones only Leuzea extract was shown very safe for humans at even high dosages. The extract did not produce mortality after administration of very large doses (up to 4 g/kg). After administration of relatively high doses above 10 g/kg, there occurred some functional changes in CNS, manifested by weakening of some reflexes, a decrease in muscle tone, an increase of the narcotic effects of chloral hydrate and a tendency towards impaired learning and memory. It is always a good idea to remember that taking "more is not always good" for you.

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