Greentek21 Co., Ltd

PROJECT NAME (Ingredient Trade Name): SFE Danggui Extract **Active Ingredient Scientific Name: Decursin, decursinol angelate** **Submission Date: 2010. 4. 14**
Description of Product: "SFE Danggui Extract" is extracted from dried root of *Angelica gigas* Nakai (Cham-Danggui in Korean) using supercritical carbon dioxide fluid as solvent. Being rich in the content of decursin (DN) and decursinol angelate (DA) without hazardous solvent, it can be applicable to various nutraceuticals or health functional foods for the treatment of cancer, anemia, sedative, anodyne, dysmenorrheal, amenorrhea, menopausal syndromes, abdominal pain, injures, migraine headaches , arthritis, and amnestic.

1. Supporting Evidence (Efficacy/Functionality):

Provide all supporting literature and research studies, publications, protocols, and analytical assessment.

Please separate data into:

- Mechanism of Action/s (MOA)

We did not prove MOA. But there were many published materials for MOA of DN and DA as following;

Anti-Cancer :

The extract of Korean *Angelica gigas* Nakai, mainly consisted of DN and DA, significantly inhibited LLC allograft growth (30 mg/kg) and PC-3 and DU145 xenograft growth (100 mg/kg) without affecting the body weight of the host mice. Biomarker analyses revealed decreased cell proliferation (Ki67, PCNA), decreased angiogenesis (VEGF, microvessel density) and increased apoptosis (TUNEL, cPARP) in treated tumors. [The American journal of Chinese medicine, 37(1) : 127-142 (2009)]

DN and DA exerted inhibitory effects on MCF-7 cells (human breast cancer) through G1 arrest and caspase-mediated apoptosis. These compounds decreased ERα in MCF-7 cells at both mRNA and protein levels, and suppressed estrogen-stimulated genes. [Breast cancer research, 9(6) : 77 (2007)]

The structure-activity relationship of DN and its derivatives is as follows: (i) the coumarin structure is required for anti-leukemic activity and (ii) the side chain is a determinant of PKC activation and the cytotoxic mechanism in leukemia cells. [Cancer letters, 223(2) : 191-201 (2005)]

DN and DA inhibited VEGF(Vascular endothelial growth factor)-induced phosphorylation of VEGFR-2, extracellular signal-regulated kinases and c-Jun N-terminal kinase mitogen-activated protein kinases. Taken together, these results demonstrate that DN and DA are novel candidates for inhibition of VEGF-induced angiogenesis. [Carcinogenesis, 30(4) : 655-661 (2009)]

Antiatherogenic activity :

DN and DA inhibited cholesteryl ester (CE) synthesis with IC50 values of 9.7 and 10.1 microM, respectively, whereas they enhanced triacylglycerol (TG) synthesis. Lysosomal metabolism of cholesterol to CE was inhibited by the compounds, indicating that the site of inhibition is one of the steps between the exiting of cholesterol from the lysosomes and CE synthesis in the endoplasmic reticulum. Therefore, acyl-CoA:cholesterol acyltransferase (ACAT) activity in the microsomal fractions prepared from mouse macrophages was studied, and the results showed inhibition of this activity by DN and DA with IC50 values of 43 and 22 microM, respectively. [Biological & pharmaceutical bulletin, 29(5) : 981-984 (2006)]

Anti-inflammatory :

Treatment with compounds DN (1), DA (2), 7-demethylsuberosine (3), marmesin (4), and decursinol (5), purified from Angelica *gigas*, effectively suppressed the expression levels of iNOS, IL-1β, and COX-2, which are responsible for promoting the inflammatory process. [Journal of food science and nutrition, 14(3) : 179-187 (2009)]

Hepatoprotective :

DN and DA selectively and noncompetitively inhibited CYP1A1/2 catalytic activity in canine liver microsomes. [Archives of pharmacal research : a publication of the Pharmaceutical Society of Korea, 31(11) : 1425-1435 (2008)]

- Chemistry/Characterization data
  Very sticky liquid mainly containing DN and DA.
- *In vitro* bioassay data
  No.
- *In vivo* testing (Laboratory, Animal, and Human Clinical Studies)
  No.
- *In vivo* testing
  No.
- Clinically tested
  No.
  - Provide studies done by Company on the ingredient.
  - Total number of clinical studies completed?
  - Study design? (number of subjects, duration of the study/ies, double-blinded, placebo-controlled, case controlled, etc.)
  - Percent response rate?
  - Dose and delivery form used in the study/ies
- Published or not published, and in which journal/s?
  Not yet published.
- Recommended Delivery form/s?
  Not yet determined.
- Recommended dose/s? (mg per day)
  Not yet determined.
- Collaborating Organizations, professors or University Affiliations
  No.
- Conclusions from the studies

2. Intellectual Property / Exclusivity

Provide an IP Portfolio summary to include:

- Provide patent information
  No.
  - Provisional/non-provisional/PCT/
  - How is the patent unique, compared to competition?
  - Number of patents?
  - Patent Type? (Process, Application, Combination, Composition, or other)
  - Patent Number/s, title, abstract, claims and application/issue dates
- Describe exclusivity options (MLM, all markets, global, etc.)
  We don't have exclusive right, but have advanced technologies for extracting it from Korea Cham-Danggui.