SIRTMAX® is a botanical extract dietary supplement ingredient rich in polymethoxyflavonoids that has clinically proven cardiovascular and metabolic health-promoting benefits. It works through a mechanism of action similar to resveratrol’s to enhance the SIRT1 gene pathway, though is 5 times more potent. The SIRT1 gene (Sirtuin 1) has a pivotal role in ameliorating insulin resistance and is considered a “longevity gene” since it influences numerous genes related to aging, early death, and the development of modern degenerative disorders such as heart disease, diabetes, cancer, and hypertension (Liang, 2009; Sharma, 2012). SIRT1 has exhibited a high correlation with life expectancy under specific conditions, and in humans SIRT1 plays an important role in insulin secretion and glucose homeostasis through numerous enzyme and gene transcription pathways, including deacetylation of PGC1α, UCP2, NF-κB, FoxO1, and affects fat accumulation and sugar and lipid metabolism in the liver by modulating the activity of a nuclear receptor, PPAR-gamma (Shimada, 2012). The polymethoxyflavonoid (PMF) compounds KPMF-8 and KPMF-10 in SIRTMAX® are on average 15 times more potent than resveratrol (see Fig. 1) (Nakata, 2014).

**Physiological effects**

Related to turmeric and ginger, SIRTMAX® is derived from the rhizome of black turmeric (also known as black ginger) of the species *Kaempferia parviflora* (KP) Wall. ex Baker of the Zingiberaceae family native to Southeast Asia. It is one of the most popular herbal medicines in Thailand and Laos, used as a revitalizing energy drink and strength tonic. Other noteworthy health benefits of the herb include helping with metabolic syndrome, liver protection, promoting healthy blood glucose levels, and improving blood flow. In vitro studies show it reduces fat-cell differentiation as well as inhibits the production of advanced glycation end products (AGEs), which cause accelerated aging effects (Horikawa, 2012; Shimada, 2012). The anti-glycation activity of *K. parviflora* extract was observed to be 7 times stronger than aminoguanidine, a clinical anti-diabetes drug (Nakata, 2014).

**Reduction of body weight and metabolic syndrome**

In a study of an ethyl acetate extract of *Kaempferia parviflora*, a significant antagonistic effect for increasing body weight and abdominal fat accumulation without affecting food intake was found in special (TSOD) mice that become obese. It was thought that the extract affected leptin levels and neurons directly or indirectly linked to suppressed food intake. In addition, in a different model of mice that don’t become obese, the extract also suppressed body weight increase without affecting food intake. The extract also improved hyperglycemia, hyperinsulinemia, and glucose intolerance for improved insulin resistance, and reduced systolic blood pressure. The PMF compounds inhibited pancreatic lipase, reducing absorption of fats (T Shimada, 2011). In fig. 2, the decline in glucose from 1% and 3% KP extract is shown relative to controls in genetically obese mice (TSOD) and in non obese mice (TSNO) with the effect shown primarily in the genetically obese mice (Akase, 2011).
Human study of metabolic and cardio health

In human subjects, the effect of SIRTMAX® on body weight, blood pressure, glucose and lipid metabolism, AGEs production, and arterial stiffness was evaluated in a double-blind, placebo-controlled, crossover study (N Shimada, submitted). Arterial stiffness, which reflects the degree of arteriosclerosis and damage to the arterial wall and is a known predictor of cardiovascular events and the mortality rate, was evaluated using a cardio-ankle vascular index (CAVI). CAVI is higher in aging, arteriosclerotic diseases such as cerebral infarction, and coronary stenosis, and in metabolic syndrome, hypertension, and diabetes. Twenty-seven healthy volunteers were orally given 100 mg of SIRTMAX® or a placebo for 7 weeks. Body weight declined significantly from 74.3±1.8 kg to 73.4±1.8 kg (p = 0.0033), and fasting blood glucose declined significantly from 106.3±6.5 mg/dL to 101.1±5.8 mg/dL (p = 0.0393) in the SIRTMAX® group.

Improved health indices

Blood glucose dropped from 127.9±17.8 mg/dL to 120.7±14.9 mg/dL after ingestion, and improvement trends in the CAVI arterial stiffness index from 8.0±0.2 to 7.8±0.2 after ingestion were observed in the SIRTMAX® group in those who had HbA1c values greater than 5.4%. The production of advanced glycation end products in the SIRTMAX® group was reduced compared with the placebo group, which had a 6.7±2.2 µg/mL increase compared with only a 1.4±2.8 µg/mL increase in the SIRTMAX® group. No abnormal values were observed in body composition, blood chemistry, and blood pressure as adverse events during the test.

References