

Possible Mode of Action of Kesum in Eurecta (Physta +BioKesum)

1. Antioxidant

Oxidative stress is caused by the imbalance between excessive formation of Reactive Oxygen Species (free radicals) and limited antioxidant defences and is said to be involved in the pathology of degenerative diseases and conditions such as atherosclerosis, cancer, rheumatoid arthritis, neurodegeneration, ageing, immunosenescence and inflammation. The human body deals with the pathological effects of ROS by utilising endogenous antioxidant system (eg. enzymes such as superoxide dismutase and glutathione peroxidase) and by the ingestion of exogenous antioxidants in the diet (eg. flavonoids, vitamins and minerals).

Kesum (*P. minor*) is high in antioxidant. It has been shown to reduce lipid peroxidation thereby protecting cells from damage due to excessive oxidative stress. In clinical studies it is shown to be able to reduce inflammation markers such as malondialdehyde, iNOS and cyclooxygenase which are markers for oxidative stress.

2. Increase acetylcholine

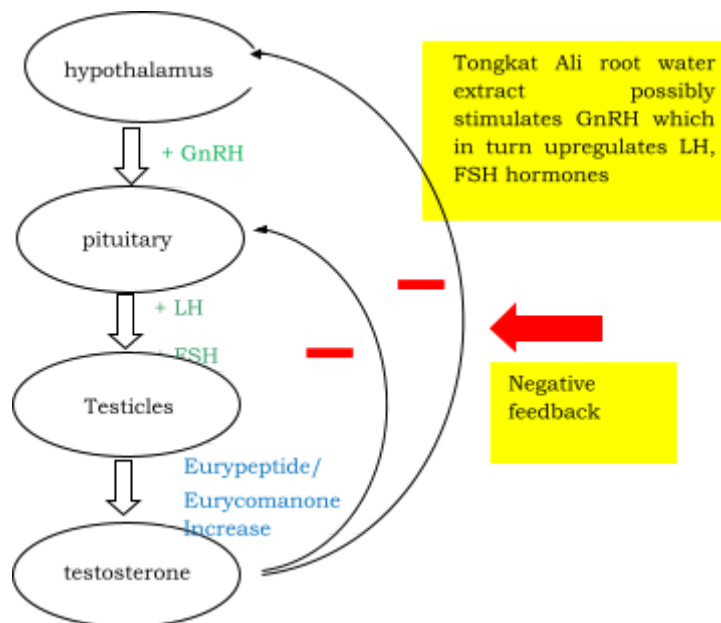
BioKesum has acetylcholinesterase inhibiting activity. Inhibition of acetylcholinesterase (AChE) may be another target for the treatment of ED as it regulates the levels of acetylcholine (ACh), which trigger nitric oxide (NO)-dependent smooth muscle relaxation in erection process. The penile tissue is a reservoir of cholinergic nerves and ACh molecule. But, the increase activity of AChE reduces the concentration of ACh by catalyzing the conversion of acetylcholine to acetate and choline, respectively. Therefore, inhibition of AChE increases the level of ACh, and consequently improves penile erection and rigidity.

3. Increase Serotonin

Kesum also has calming effect as seen in 2 clinical studies in moderately stress women and adults with Mild Cognitive Impairment. It is able to reduce tension by 30% and anger by 50%. In animal studies, it is found to increase serotonin and reduce stress hormone which is probably the reason behind the feeling of calm. The neurotransmitter, serotonin carries messages between nerve cells in the brain (central nervous system) and throughout the body (peripheral nervous system). This neurotransmitter is responsible in boosting mood (happiness), reduces anxiety and depression. BioKesum has been shown to reduce anxiety, stress and improve memory (animal studies).

4. Increase Testosterone

In the production of testosterone, the upregulation of LH and FSH leads to upregulation of testosterone. When the amount is sufficient it triggers a negative feedback to the hypothalamus so lesser LH and FSH is produced thus preventing an overload of testosterone. Oxidatively damaged Leydig cells (prostate) are less sensitive to Lutein Hormone (LH), with fewer LH receptors expressed per cell, leading to reduced activities of several enzymes of the testosterone biosynthetic pathway. The *E. longifolia* on the other hand, has been shown to increase testosterone levels in Leydig cells via the upregulation of CYP17 lyase enzyme in the testosterone biosynthesis pathway, thus increasing testosterone production, hence ameliorating the negative impact of oxidative stress as well. Physta increases the production of testosterone thus increasing libido and sexual performance and reduces the stress hormone cortisol.



5. Increase cGMP

TA has the ability to increase cGMP which increases vasodilation by smooth muscle relaxation thus improving blood flow and circulation and has mild PDE₅ inhibitor effect. PDE₅ inhibitors cause erection. PDE₅ is an enzyme found primarily in the smooth muscle of the corpus cavernosum (erectile tissue) that selectively cleaves and degrades cGMP to 5'-GMP. PDE₅ inhibitors are similar in structure to cGMP; they competitively bind to PDE₅ and inhibit cGMP hydrolysis, thus enhancing the effects of Nitric oxide (NO) involved in smooth muscle relaxation in the erection process. The increase in cGMP in the smooth muscle cells is responsible for prolonging an erection.

6. Increase Dopamine

Physta improves neurotransmitter dopamine levels in brain (animal study). Dopamine is known as the feel-good hormone. It is involved in motivation, memory, mood, attention and more. It provides the feeling of excitement in anticipation of a reward.

Summary

As oxidative stress is influenced by environmental factors, diet and ageing, the older subjects in the study of Eureka may have benefitted from the synergistic effect of both Physta and Biokesum activity. Testosterone increases libido and dopamine provides the feel-good feeling whereas Kesum provides better cell health (Leydig cells) due to the free radical scavenging ability. Kesum also provides good mood. Together Physta and Kesum acts by priming a person to anticipate and perform sexual intercourse.