

The Siddha Drug *Aya birungaraja karpam* (ABK) as Rejuvenative Elixir – A Scientific Review

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Abstract *Kayakarpam* is one of the specific therapeutic formulations in siddha medicine advocated for rejuvenation, which is formulated several thousand years back by our great Siddhars for the wellbeing of the human life by power of health securing the body. Thus it promotes health by preventing grey hair (*Narai*), wrinkling of the skin (*Thirai*) and senility (*Moopu*). This therapy ensures the longevity and elimination of disease causing factor. The aim of this review is to focus the *Aya birungaraja karpam* as rejuvenator. The datas were collected from Traditional siddha texts and from current research findings. Iron used as medicine from Vedic period, the ancient scientist siddha saint Bohar is the father of iatrogenic chemistry and the metallic medicine. The medicinal plants have phytoconstituents like phenolic compound and flavonoids which exert multiple pharmacological activities such as antioxidant and free radical scavenging activity. Thus the traditional medical system chosen as the alternative medical source, the drug from medicinal plant satisfies this need as they have innumerable benefits for the last three decades. The globe turns their eye towards the herbal medicine and its incredible pharmacological activities, pharmacoeconomic viability and less side effect. Reactive oxygen species play an important role in degenerative and pathological process, such as ageing, premature graying, lack of muscular and skin tone, Alzheimer's disease, neurodegenerative disorders, Atherosclerosis, Cardio vascular disease, Diabetes, Inflammatory diseases and cancer. Even though some of synthetic drugs have shown antioxidant and radical scavenging mechanism, the WHO turns their efforts towards the evolution and effectiveness of the medicinal plants and natural products for the condition where there is lack of safe synthetic drugs. Thus, tremendous efforts have been directed toward the discovery and development of natural antioxidant from medicinal plants and its products as protective system. It is concluded that free radical ions and reactive oxygen species causes pathological and degenerative conditions in Human whereas the ingredients of *Aya birungaraja karpam* (ABK) show antioxidant property and radical scavenging ability in a various physiochemical and pharmacological experiments. Thus ABK envisages longevity and elimination of disease causing factor.

Keywords *Kayakarpam*; *Antioxidant*; *Rejuvenation*

1. Introduction

Aya birungaraja karpam is one of the kayakarpa medicine (Rejuvenation Elixir) in siddha medicine. Kaya karpam means to keep the body like firm as stone; the word '*kaya*' means body and '*Karpam*' refer as able or competent, the siddhas have developed the kayakarpam for longevity, to be free from ailments and to make the body to be competent. Kayakarpam is the process of Rejuvenation which is transformable approach to health promotion, consciousness and also possess prophylactic action to safe life via improve health; thus endows human with long life, robust body, glorious health, super human strength, sharpen memory, enhance intellectual power and improves the charring complexion. Therefore the kayakarpam was a gift of the Siddhars' for the human beings for longevity and freedom from ailments.

This drug is used by Traditional practitioner in Sri Lanka and commonly used in government sector and Private practitioner in India. The ABK is included in the essential drug list of siddha medicine by AYUSH Drug Control Cell since 2013. The researchers reported that all kayakarpa plants have anti-radical and scavenging activity. The mechanism of antioxidant activity is describes as, prevention of free radical chain initiation, binding of transition metal iron catalysts, decomposition of peroxides. Prevention of continued hydrogen abstraction, reductive capacity and radical scavenging (Diplock et al., 1997). The reducing properties are generally associated with the presence of reductones, (Duh et al., 1998) thus exert antioxidant actions by breaking the free radical chain, by donating the hydrogen atom and also reductones reputed to react with certain precursors of peroxide, thus preventing peroxide formation (Gordon, 1990).

The modern lifestyle of individuals cause over production of free radicals and reactive oxygen species nowadays. The harmful elements are super oxide anions radicals, hydroxyl radicals and hydrogen peroxide. Our body has a nature defense mechanism to cope up with this oxidative stress, but the immunity power decreased the free radical override the defense mechanism, thereby damaging essential biomolecules such as protein, DNA and lipids which eventually causes premature graying and ageing, inflammatory diseases, Kidney diseases, diabetic mellitus, and several other degenerative diseases in humans (Halliwell, 1997). Now a days people took interest towards the herbal therapy and natural dietary antioxidants. The phenolic compounds rich in natural antioxidants plays role in health care as they provide protection from oxidative stress and associated diseases.

2. Objective

To explore the scientific validation of kayakarpam drug ABK.

3. Methods

The siddha aspects of literatures were collected from classical siddha text such as Siddha vaithiyathirattu, Paandukamalaichikitsai, Sarabenthira vathiyamuraikal, Siddha Materia Medica etc. The Research papers consulted from reputed website like Medline, Pubmed, Medlar etc.

4. Results and Discussion

The search of different siddha classical text reveals the various preparations of Parpam, Chendooram, Karpam etc., formulated with the ingredients of Iron and mandooram are the therapeutically effective drug. Most of the metal and mineral siddha formulations were prepared with adding medicinal plant juices and with the process of pudam (incineration) or Ravi pudam (sunlight). The review of current research findings also supported the ancient kayakarpa concept.

The standard formula of drug ABK contains powder of purified Ayam (Ferric iron) 140gm, Purified Mandooram (Ferrous iron) 210gm, *Wedelia chinensis* juice (Manjal karisalai) 1.3L and *Citrus limon* juice (Elumichai) 1.3L, This drug will not only act as nutritive natural iron supplement for curative care but also beneficial as rejuvenate therapy for Health promotion.

The *Ayam* (Iron)-(Ferrum) found in mountain and in earth in association with certain materials like sulphur; also found in plants and animals. The organoleptic character of ayam-Taste- Astringent, mild sour and bitter, Potency- Hot, Post digestive effect- sweet, Gunam - Ruksham. It acts as tonic, haemopoietic, appetizer, with health promoting properties. The *Wedelia chinensis* and *Citrus limon* plays the major role in this drug combination as they have Laxative and anti-emetic properties because the intake of oral Iron preparation may cause constipation and vomiting.

Iron is extensively used in the various medicinal preparations of siddha, Ayurveda and Unani, system of medicine, mostly utilized as transition metal in human health. Iron plays major role in the organic worlds and stands in very close relation to the fundamental process of the change of the matter and the metabolism because of its great affinity to the oxygen. Iron act as a catalyst for oxygen free radical which induces tissue damage. Hence it is used as the means of life as a protector, the existence of more active and potent iron restrain defense mechanism. The optimum iron level is highly recommended decrease morbidity and increase life span. The total body iron content in normal adult is the result of the balance between irons loses and absorbed from the diet. The normal intake of iron for Men and post-menopausal women is 10mg/day, premenopausal woman 15mg/day and pregnant woman 30mg/day. Increase intake or absorption resulted in Iron toxicity. Ayaparpam (Calx of iron) is the main constituents of iron containing formula, biologically produced nanoparticles proportionate to the type of pudam (incineration) applied on it, and thus elements can easily assimilate and eliminate their harmful effect and enhancing their bio-compatibility.

Mandooram-(Iron rust)-Hydrated Ferric oxide ($\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$) known as Ayakiddam, Ayoomalam, Logamandooram, Kiddam in siddha medicine. It is prepared from iron rust consisting of iron particles of iron or forge scales scattered round the blacksmiths' anvil. It is more potent than iron. This substance is obtained by melting the iron in a furnace and collecting it in waxy consistency. Organoleptic character-Taste-bitter, potency-cold and post digestive effect-pungent. It is abundantly found in nature, during the purification process water portion of the hydrated ferric oxide was evaporated and remaining part get attached with ladle and only ferric oxide remains which are reddish brown in color. During heating of mandooram become brown and black in color and break into coarse particle, and metallic iron part may be exposed after potentiation process. This iron part becomes black Ferrosoferric oxide during heating to red hot. After the process of purification convert the raw mandooram into detoxicated form, then the rational pharmaceutical process convert it into medicinal form.

XRD Pattern of final product of iron oxide majorly present in the form of Fe_2O_3 and Fe_3O_4 (magnetite). During heating of iron oxide forming in its most stable form alpha- Fe_2O_3 . In the Fe_3O_4 is the mixture of FeO & Fe_2O_3 . The FeO is easily converted into its most suitable form Fe_2O_3 . The EDAX analysis of mandoora parpam showed the percentage of the iron in the initial sample decreases after purification and pharmaceutical processing, and also found to be rich in K, Ca, S, Fe, Na, and P. All these elements increase the efficacy of drug which is taken from herbs after the purification process. The observation noticed the concentration of iron decrease in final product whereas high in raw material. The SEM monograph indicated the smooth surface area and reduced particle size. Mandoora parpam prevented the paraffin and CCl_4 mediated changes in the enzyme activities. These results suggest that mandoora parpam have protective activity in CCl_4 induced hepatic injury in albino

rats. Mandoora karpam instead of causing gastric irritation because of its ferrous salts, it act as gastro and hepato protective since it is significant protector against gastric ulcer induced by pyloric ligation.

Wedelia chinensis (osbeck) Merrill, belongs to Asteraceae family commonly known as Manjal karisalai in siddha medicine; is a short perennial herb with, scabrous procumbent stem, and has a gorgeous growth. It contains Wedalolactone, dimethyl wedalolactone (Coumestans derivatives), large amount of phenolic constituents and also contains additive synergistic antioxidant property of phytochemicals such as flavonoids, triterpenoids, steroids etc.

The similar trends were reported that the phenolic and flavonoids constituents of medicinal plants possess antioxidant activity and free radical scavenging ability. Natural products of drugs containing free radical scavengers play a role in preventing and treating several disorders.

The in vitro and in vivo study in experimental mice, the essential oil of *Wedelia chinensis* showed moderate ability to scavenge hydroxyl radicals with standard antioxidant ascorbic acid and reducing power activity of essential oil of *Wedelia chinensis* was found to be high with standard Gallic acid.

Over production of free radicals results in oxidative stress, which leads to damage macromolecules, Gluthione, is a potent inhibitor of the neoplastic process, plays an important role in the endogenous antioxidant system The same study revealed that that the Gluthione level in the treated mice was significantly high in liver, lung and serum, whereas in the cancer induced control mice, it was found to be lower, this reveal that the antioxidant molecule present in the *Wedelia chinensis* have potent antioxidant activity.

Nitric oxide synthesis was high in tissues and plasma responsible for the development of many human cancers. In this study nitric oxide was found to be decreasing in the treated group which shows that the essential oil of *Wedelia chinensis* has the capability of cytotoxic *Wedelia chinensis*, the crude methanol extract exhibited the highest free radical scavenging activity which could be correlated to its phenolic contents. In the brine shrimp lethality bio assay, the hexane soluble fraction of *Wedelia chinensis* displayed the highest cytotoxic potential. The methanolic extract of *Wedelia chinensis* proved that the flavonoids rich fraction possessed Fe^{2+} chelating agent activity and may play a protective role against oxidative damage induced by metal catalyzed decomposition reactions.

The comparative analysis of different solvent, the chloroform extract showed highest number of antioxidant band compared to other extract such as acetone and methanol because the molecules in chloroform extract had antagonistic effect whereas number of antioxidant molecule were less in acetone and methanol extract. Yet they showed more radical scavenging activity could be due its synergistic action of antioxidant molecules present in the two extracts.

The previous researchers were reported that the study of antioxidant mediated defense role of *Wedelia calendulaceae* herbal extract against CCl_4 induced toxic hepatitis, showed reducing lipid peroxidation and significant protective against the hepatic toxicant CCl_4 by antioxidant activity.

Citrus limon L- (lemon) -It is a small glabrous tree with stiff sharp spine, belongs to Rutaceae family, the organoleptic characters are, Taste- sour, potency- hot, post-digestive effect- pungent. Chemical compositions are Citric acid, phosphoric and malic acid, citrates of potassium. Actions- Nutritive, carminative, Refrigerant, Rubefacient, potassium salt ad phosphoric acid act upon the red corpuscles. The *Citrus limon* L, are rich source of various phytochemicals and nutrients, specially Vitamin C and phenolic acid are probably responsible for anti-radical and reducing power activity, both of them are contribute for higher power of antioxidant activity. The lemon contained highest amount of total

soluble protein, total DNA and pentose sugar content, showed good DPPH radical scavenging, thus it has the effect of scavenging free radicals, the involvement of free radicals especially their increased production is the reason for human diseases including cardiovascular diseases and cancer. Also it has been found that cysteine, glutathione, ascorbic acid, tocopherol, flavonoids, tannins and aromatic amines. For the measurement of reductive ability, the transformation from the Fe^{3+} to Fe^{2+} method showed marked antioxidant-reducing power activity in the lemon.

The presence of bioactive compounds such as hydrocinnamic acid, ferulic acid, glucoside, hesperidin and naringin content contribute to good health. Antioxidant capacities can be influenced by the ripening time of citrus fruit; various researchers have studied the relationship between total phenol and different method antioxidant capacity assay. They clearly found excellent linear correlation between total phenolic profiles and antioxidant activity. The major antioxidant components in citrus fruits are tannins, antioxidant vitamins (ascorbic acid, tocopherol and beta-carotene), anthocyanin, hydroxyl cinnamic acid with potential health promoting properties.

Antioxidant property of freshly prepared orange juice higher than commercially available juice. Ascorbic acid is highly bioavailable and is consequently the most important water soluble antioxidant vitamins in cells, effectively scavenging Reactive Oxygen Species (ROS) when relating the antioxidant activities of fruit juices to health and risk diseases, it is important to consider the contribution of ascorbic acid in addition to that of phenolic compounds with antioxidant activity. The citrus fruits have high content of nutrients such as vitamin C, carotenoids and minerals as well as phenolic compounds hydrolysable tannins, flavonoids contributing to the taste of astringency, bitterness, sourness and flavor. In particular the phenolic compounds such as phenolic acids, flavonoids and hydrolysable tannins present in citrus fruits have gained much attention due to their strong antioxidant capacity and free radicals scavenging abilities which potentially have beneficial implications.

Kayakarpam has highly antioxidant activity which helps destroy and neutralize the strong reactive free radical ions and oxygen species to present in the human biological system. Free radicals may oxidize nuclear acids, protein and DNA, that influences degeneration process or disease, thus *kayakarpam* therapy prevent damage of cell membrane and DNA, thus, promote health. Free radical such as peroxide, Hydroperoxide and lipid and peroxy scavenged by antioxidant like phenolic acid, polyphenol and flavonoids which inhibit the oxidative mechanism prevent damage of cells and enhance the healthy biological system. Basically detoxifies all the impurities, the main idea with the growth of newer younger, healthy cells. It is reversal of metabolic activities in the body. The rate of healthy new cells must form faster than the degeneration and death of old cells, in order to the arrest the symptoms of ageing process which is inevitable, irreversible decline in organ function that occurs overtime even in the absence of injury; illness or poor lifestyle choices (unhealthy diet and lack of exercises). Initially, the changes in organ function do not affect base line function; the first manifestations are reduced capacity of each organ to maintain homeostasis under stress. The cardiovascular system, Central nervous system and renal system are most common vulnerable area of affection occur. The immune system has connection with the number of other organs including brain, by activating primarily on the immune system on macrophages, the simple chemical of herbs through the activating cytokine nature could produce all the action that have been attributed to them.

During ageing process the seven elements of body (*sapthathathu*) undergo changes as follows:

- *Sharam* – (Lymph) -Variation of viscosity of lymph and decrease or increase functions of lymph gland.

- *Seneer* – (Blood)– Variation of viscosity of blood, decrease Haemoglobin concentration, Blood vessels thickness, lumen size decreased and peripheral resistance increased.
- *Mamisam* (muscle)– Atrophy, dystrophy, wrinkling and shrinkage of the skin, efficient function of all muscle slowdown, therefore the heart, kidney, liver and other vital functions are retarded.
- *Kozhuppu* (Fat)–Over production or decrease production of fat due to defective lipid metabolism. Decrease fat pad beneath the skin, thus changes in the complexion in the body.
- *Moolai* (Brain)- Poor concentration, disturbance in memory, decrease immunity due to degeneration of brain cells.
- *Enbu* (bone) - Inefficient function of bone marrow leading to defective production of blood cells and thus blood formation will be affected.
- *Sukkila or Arthavam* (Sperm or Ovum) –Potency of sexual power diminish, efficient function of sperm and ovum will be ceased.

The physiology of rejuvenation is reversing the physical degeneration by transforming old cells to new again. Thus, Cell potential plays the major role to keep the cells healthy, this is voltage difference between the interior and exterior surface of the cells. The healthy cell potential should be between 70mV – 90mV. If potential fall below 70mV, the dynamics and kinetics of the body fluid and blood will be affected because enter the nutrients, Oxygen and water retarded as well as depletion of the carbon dioxide and water product also stagnated, thus too much of Na, Hydrogen remain inside the cell which make unhealthy cells.

5. Conclusion

It is concluded that since the *Aya birungaraja karpam* categorized under kayakarpa therapy discipline which is a unique system of Siddha medicine, act on the immune system, it has vital life enhancing effect, delay ageing process, improving mental function and freedom from ailments. The pharmacodynamics of the kayakarpam enlightened the components of medicinal plants such as ascorbic acid, carotene, gallic acid, phenolic compound such as Hydrolysable tannin and Flavonoids etc, seems to be target the ROR –Reactive Oxygen Species, thus modulating the endogenous system of the body and act on the different organs to produce its Myriad action.

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