

## KAYAKALPA HERBS - THE SIDDHA NUTRACEUTICAL FOR THE PREVENTION OF CANCER

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## ABSTRACT

Siddha system is the most ancient medical system originated from the southern India, which is enriched with flora, fauna and mineral resources. *Kayakalpa* a special branch of this medical system is a science of rejuvenation, longevity, and spiritual well being. The process of carcinogenicity is a major challenge to researchers in recent years. India has high incidence rates of oral Cancer and also cancers of pharynx and cervix. Since lifestyle factors and dietary habits are responsible for this disease, it is essential to focus on natural antioxidants which play a vital role in preventing free radical formation and thus preventing cancers. The present study provides a literature review of *kayakalpa* herbs of Siddha and recent researches on their anti cancer potential. The objective of this study is to create awareness of prevention of cancer through Siddha intervention such as *kayakalpa* herbs and to explore the richness of *Kayakalpa* and develop nutraceuticals from these drugs which could be used in preventing the killer disease cancer.

**Keywords:** Cancer, *Kayakalpam*, *Siddha*, Natural Antioxidants.

## INTRODUCTION

*Kayakalpam* is one of the unique therapeutic formulations in Siddha system advocated for rejuvenation, longevity and elimination of disease causing factors. The Siddhars had primarily focussed on their spiritual well being through this *kayakalpam*. In recent years lifestyle modification is one of the main causes for many diseases including cancer. So it necessitates to turn towards *kayakalpa* herbs which are rich in natural source of antioxidants. Production of free radicals results in oxidative stress due to damage of DNA, proteins, lipids and has been suggested to be the cause of most of the serious human diseases [1]. This article is a review of *kayakalpa* herbs with their formulations as mentioned in Siddha literature and scientific exploration of its antioxidant potential in the prevention of cancer.

## Cancer and its biology

Cancer is a disease of uncontrolled cell growth [2]. A cancer cell multiplies in human body producing more and more cancer cells and at the end stage they develop malignant characteristics including metastasis, immune system evasion, and induction of blood vessels in the formation of carcinogenesis. This kind of similar divisions and proliferation lead to the formation of tumours [3].

## Intervention of antioxidants in formation of oxygen free radicals

Exposure to air pollution, tobacco smoke, radiation etc produces oxygen free radicals in humans. These oxygen free radicals are molecules with incomplete electron shells produced as a result of oxidation and start a chain reaction in cell causing damage to DNA leading to diseases like cancer. These are considered to be an important class of carcinogens as they play an important role in the expansion of tumour clones and acquisition of malignant properties [4]. Antioxidants are molecules that interact with free radicals, neutralize the electrical charge and terminate the chain reaction. Antioxidants also fight against ROS (Reactive oxygen species) and protect the cells from their damaging effects. Therefore production of ROS during cellular metabolism is balanced through their removal by antioxidants. Any condition leading to increased levels of ROS results in oxidative stress which promotes a large number of human diseases including cancer. Therefore antioxidants may be regarded as potential anticarcinogens and they are classified according to their mechanism of action as antioxidants which break or interrupt the steps involved in the production of free radicals and also as antioxidants which prevent the formation of oxygen free radicals by several actions. Since Synthetic antioxidants have possibility of promoting carcinogenesis natural antioxidants from herbal sources are considered as superior preferably [5].

*Kayakalpam*

The word *kayakalpa* means (*kayam*-body, *kalpa*-able, competent) to make our body competent and youthful. It is a unique discipline of Siddha system of medicine that addresses the methods and drugs for longevity and enhancement of innate health. They can be divided into kalpa medicines, kalpa practices of life style and kalpa diet. In this science 108 herbs and herbo-mineral combinations are recommended for normal individuals to boost immunity, to promote general health, for prevention of diseases (*pothu karpam*) and also for restoration of health from specific type diseases (*sirappu karpam*). Current science confirms the health benefits of many *kayakalpa* drugs are due to their antioxidant property [6]. This article encloses some of the common *kayakalpa* herbs and their preparations that is reconfirmed by scientific parameters as Siddha nutraceutical for the prevention of cancer. (Table-1).

## DISCUSSION [30]

*Oryza sativa* (*Nell ma*) or the paddy rice is to be ground and mixed with cow's ghee and taken for 40 days, for rejuvenation. Its Phenolic content showed higher antioxidant activity [7] and prevents bowel cancer [8]. *Nelumbo nucifera* (*Thamarai Magarandham*) stamens powder is mixed with sugar and honey and to be taken 1 to 2 gms daily in the early morning for 40 days for which salt and tamarind should be avoided. This is especially given for deafness & male sterility. The stamens contain isorhamnetin glycosides and isorhamnetin rutinoside. The isolated glycosides show antioxidant activity and free radical scavenging activity [9]. *Phyllanthus amarus* (*Kizhikai-nelli*) whole plant is prepared as paste and to be taken with milk/butter milk for 40 days with avoidance of tamarind and salt. This is specific for ophthalmic diseases, liver disorders, giddiness and vomiting. Aqueous extract showed a significant reduction in plasma lipid per oxidation (LPO). It is protective and effective against lymphocyte DNA damage thereby it reduces the oxidative stress [10].

*Eclipta prostrata* (*Karisalai*) the whole plant is dried and prepared as chooranam (powder) and to be taken with tender coconut water for one month followed by one month with honey. Tamarind and salt should be avoided. This gives lustre to the body, brightness to eyes and enhances intelligence. *Karisalalai karpam* has free radical scavenging activity. Further it has enzymatic and non-enzymatic antioxidants such as ascorbic acid and rutin [11]. Dry fleshy leaves of 1-2 g of *Aloe barbadensis* (*Katrachai*) are to be taken for 40 days with avoidance of Salty diet and tamarind for premature greying of hair, chronic piles and anti-ageing therapy. *Aloe barbadensis* contain polysaccharides and flavanoids which are potent antioxidants [12]. Another study says that polysaccharides have chemopreventive effect and oxidative damage was significantly decreased. It also has antitumor and antigenotoxic promoting activity [13]. In *Zingiber officinale* (*Inji*) the rhizome's outer skin is removed, sliced and

soaked in honey of which 3-5 slices are to be taken in the early morning for 40 days to prevent senility, promote good eye sight and to strengthen the body. The rhizome has phytochemicals constituent di-arylheptanoid a potent antioxidant [14] and vanilloid that induces mitochondrial release of cytochrome-C mediated apoptotic pathway [15]. *Ocimum sanctum* (*karunthulasi*) leaf (or) root juice is boiled with oil and applied over head and used as oil bath for a period of 40 days to treat the disorders of Kapha, vatha and delirium. It significantly increases the level of superoxide dismutase, glutathione and total thiols which are antioxidants. [16].

*Semecarpus anacardium* (*Cherangkottai*) nut is prepared as *legium* (powdered and mixed with ghee and honey) as per the method of Siddha literature *Theyran karisal* and to be taken internally 2-5 g twice daily for easy digestion, lustre, good voice and as an appetizer. This serves as an antioxidant because of the presence of flavanoids which scavenge free radicals [17] and increases the antioxidants such as catalase, superoxide dismutase and glutathione transferase [18]. *Withania somnifera* (*Amukara*) root powder of 500 mg is mixed with 2 ml of ghee and to be taken twice a day for 40 days. It provides lustre, reduces nervous debility, strengthens the body and enhances longevity of life. Its extract is effective in preventing DNA damage and in scavenging active radicals generated by mutagens [19, 20]. In *Limonia acidissima* (*Vila*), all parts including leaf, unripe fruit, fruit, bark, root are to be consumed as curry or in a decoction form to prevent ageing and death. The various parts of the plant extract contain antioxidants and free radical scavenging activity [21]. It shows high amount of antioxidants productions such as superoxide dismutase (SOD), catalase (CAT) producing significant decrease in peroxidation [22]. *Azardiracta indica* (*Vembu*) tender leaves are ground and added with *Tachyspermum ammi* (*omam*) and salt. This powder is specially started on rohini nakshathra for 40 days. Tamarind should be avoided. It is said to maintain a good health. Leaves and flowers have strong antioxidant activity, chemopreventive and antitumor activity [23]. Citrus limon (*Elumichai*) fruits are to be used as juice (or) pickles for 6 months

to prevent senility, grey hair and ascites, Both juice and peel demonstrated for its antioxidant properties [24]. Its essential oil significantly reduces the lipid per oxidation levels and nitrate content, glutathione and increases superoxide dismutase [25]. *Centella asiatica* (*Vallarai*) leaf can be used as curry daily. Its leaf juice has inhibitory effect on deoxyribose gradation, hydroxyl scavenging and superoxide scavenging effect. It can also be taken along with common salt for 40 days. It is used in liver disorders, enhances memory, intelligence and strengthens the body. It is an adaptogenic agent used in the treatment for cancer, decreases lipid per oxidation and increases superoxide dismutase [26].

*Basella alba* (*Kodi Pasalai*) leaf can be prepared as curry and to be taken along with diet for 40 days and salty diet to be avoided. This will promote sexual desire and strengthen the body. It has high values of total phenol, flavanoids and ascorbic acid content and has antioxidant activity [27]. *Terminalia Chebula* (*Kadukai*) epicarp is made into powder and 500 to 1000 mg is taken with water, specially in the evening for 40 days to prevent premature greying of hair, senility, pitha diseases and liver disorders. It rejuvenates the body. It has greater triterpenoid content and exhibit good antioxidant activity [28]. Chebulic acid helps in the regulation of glutathione content [29].

### CONCLUSION

Many deadly diseases which are prevalent in current day clinical practice can be effectively bypassed with the simple procedures of preventive and curative methods in Siddha system of discipline *kayakalpa*. Although the pharmacokinetics of *kayakalpa* herbs were not revealed 5000 years ago by the ancient siddhars, Recent researches on herbs has enlightened that the components of *Kayakalpa* herbs seems to target the reactive oxygen species which are significant cancer causing agents. A deeper exploration in the areas of *kayakalpam* can fetch us to a break-through in combating various diseases like cancer and promote healthy living.

Table 1:

S. No.	Kayakalpa herbs	Preparation and indications	Scientific view
1.	 <p><i>Oryza Sativa</i> (<i>Nell ma</i>)</p>	<p><b>Parts Used:</b> Rice.  <b>Method of preparation:</b> To be round and mixed with cows ghee  <b>Duration:</b> 40 days.  <b>Benefaction:</b> Rejuvenation.</p>	<p>High Phenolic content and has antioxidant action. Prevents bowel cancer.</p>
2.	 <p><i>Nelumbo nucifera</i> (<i>Thamarai magharantham</i>)</p>	<p><b>Parts Used:</b> Stamens  <b>Method of Preparation:</b> Stamens powder mixed with honey or ghee and to be taken 1-2 gms.  <b>Duration:</b> 40 days.  <b>Diet Regimen:</b> Avoid tamarind and Salt.  <b>Benefaction:</b> Deafness &amp; Male Sterility.</p>	<p>Isorhamnetin  Glycoside and Isorhamnetin  rutonoside has Antioxidant potential and are  Free radical scavengers.</p>
3.	 <p><i>Phyllanthus amarus</i>: (<i>Kizhkainelli</i>)</p>	<p><b>Parts Used:</b> Whole Plant  <b>Method of Preparation:</b> Ground and prepared as paste mixed with milk/Butter milk.  <b>Duration:</b> 40 days.  <b>Diet regimen:</b> To avoid tamarind and salt.  <b>Benefaction:</b> Eye diseases, liver disorders, giddiness, vomiting.</p>	<p>Has high content of vitamin C. Prevents DNA damage, oxidative stress and Lipid peroxidation.</p>

4.		<p><b>Parts Used:</b> Whole Plant  <b>Method of Preparation</b> - dried and powdered. Taken with tender coconut water 1 month &amp; with Honey 1 month  <b>Diet regimen:</b> Avoid tamarind &amp; Salt.  <b>Benefaction:</b> Body becomes lustre, Eye brightness, to acquire more knowledge.</p>	<p>Has Enzymatic &amp; Non-Enzymatic antioxidants.            Has free radical scavenging activity.</p>
5.		<p><b>Parts Used:</b> Fleshy leaf &amp; Method of Preparation Dried 1-2 gms to be taken.  <b>Duration:</b> 40 days.  <b>Diet regimen:</b> To feel as young,  <b>Benefaction:</b> grey hair, chronic piles, life span will increase.</p>	<p>Contains Polysaccharides and flavanoids. Anti-tumour, Anti-genotoxic and chemopreventive</p>
6.		<p><b>Parts Used:</b> Rhizome  <b>Method of preparation:</b> Remove the outer skin, sliced &amp; soaked in honey 3-5 slice.  <b>Duration:</b> 40 days.  <b>Benefaction;</b> Prevents senility, gives good eye sighted, strengthen the body.</p>	<p>Diarylheptanoid acts as Antioxidant. Vanilloid induces mitochondrial release of cytochrome- c medited apoptotic pathway</p>
7.		<p><b>Parts Used:</b> Leaf Juice or root.  <b>Method of Preparation:</b> To be boiled with oil &amp; take bath.  <b>Duration:</b> 40 days.  <b>Benefaction:</b> Kapha, Vatha diseases, &amp; delirium.</p>	<p>Increases superoxide dismutase, glutathione and thiols that are free radical scavengers.</p>
8.		<p><b>Parts Used:</b> Nut  <b>Method of Preparation:</b> Nut is prepared as leteyam (as per theran karisal) 2-4 gm twice daily.  <b>Duration:</b> 40 days.  <b>Dietary regimen:</b> Avoid tamarind and salt.  <b>Benefaction:</b> It is a good appetizer digestion, lastre, good voice.</p>	<p>Rich in flavanoids. Increases Glutathione, catalase, superoxide dismutase and acts as antioxidants</p>
9.		<p><b>Parts Used:</b> Root  <b>Method of preparation:</b> Powdered and is mixed with 2 ml of ghee.  <b>Duration:</b> 40 days.  <b>Benefaction:</b> Increases life span, lustre, nervous debility, strengthens the body,gives longevity</p>	<p>Prevents DNA damage and scavenges active free radicals generated by mutagens.</p>

10.		<p><b>Parts Used:</b> Juice &amp; Fruit.  <b>Method of Preparation:</b> Prepared in to juice as pickle.  <b>Duration:</b> 6 Months.  <b>Benefiaction:</b> Prevents senility, grey hair, ascitis.</p>	<p>Increases Superoxide dismutase, catalase and prevents peroxidation</p>
11.		<p><b>Parts Used:</b> Tender &amp; Mature leaf.  <b>Method of preparation:</b> leaf is dried &amp; grounded, omam &amp; salt is added.  <b>Duration:</b> 40 days  <b>Diet Regimen:</b> Tamarind  <b>(Note):</b> specially started on rohini nakshathra.</p>	<p>Presence of strong antioxidant activity, antitumour and chemopreventive activity</p>
12.		<p><b>Parts Used:</b> Juice &amp; Fruit.  <b>Method of Preparation:</b> Prepared in to juice as pickle.  <b>Duration:</b> 6 Months.  <b>Benefiaction:</b> Prevents senility, grey hair, ascitis.</p>	<p>Decreases lipid peroxidation &amp; increases superoxide dismutase.</p>
13.		<p><b>Parts Used:</b> leaf.  <b>Method of Preparation:</b> can be used as curry or taken with jathipathiri (Myristica fragrance)  <b>Duration:</b> 40 days.  <b>Benefiaction:</b> Liver disorders, enhances memory and intelligence.</p>	<p>Inhibitory effect on deoxyribose gradation and hydroxyl scavenging activity</p>
14.		<p><b>Parts Used:</b> Leaf.  <b>Method of preparation:</b> Prepare as curry and taken with diet.  <b>Duration:</b> 40 days  <b>Diet Regimen:</b> Salt free diet  <b>Benefiaction:</b> Strengthens body and improves libido.</p>	<p>Phenols, flavanoids and ascorbic acid are high. Inhibitory effect on deoxyribose gradation and hydroxyl scavenging activity.</p>
15.		<p><b>Parts Used:</b> Epicarp.  <b>Method of Preparation:</b> Made into powdered form and taken 500-1000mg in evening.  <b>Duration:</b> 6 Months.  <b>Benefiaction:</b> Prevents senility, grey hair, pitha disorders, liver disorders and as a rejuvenator.</p>	<p>Has rich triterpenoid content and chebolic acid. Regulates glutathione and has antioxidant potential.</p>

*Terminalia Chebula (Kadukkai)*

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## REFERENCES

- Indap MM, Parab SR Evaluation of antioxidant and anticlastogenic properties of sponge *Tetheya lynevirium* [Linn]. Indian drugs No.45 aso:9 Sep:2008.
- Savith Dixit, Huma Ali Anticancer activity of medicinal plant extracts a review. J. Chem and Chem. Sci 2010; vol.1. (1,) 79-85.
- Wamidh Hadi Talib Anticancer and antimicrobial of plant derived natural Products. Department of Clinical Pharmacy and therapeutics, University of Applied Science, Jordan.
- Dreher D, Junod AF Role of oxidative free radical in cancer development. European Journal of cancer 1996; vol 32 (1):30-38.
- Thirunarayann T Introduction to siddha medicine. Centre for traditional medicine and research 2012;189-192.
- T. Thirunarayann,Introduction to siddha medicine, Centre for traditional medicine and research 2012;189-192
- Prasit Sumannalert & sirichet Rattanchithawat High levels of phytophenolics and antioxidant, activities in *oryza sativa* - unpolished thai rice strain of leum phua. Tropical journal of pharmaceutical research 2011; 10(4): 431-436.
- Weisburger JH, Reddy et al., Protective mechanism of dietary fibers in nutritional carcinogenesis. Basic life Sci 1993; 61:45-63.
- Hyan SK, Jung YJ et al Isorhametin glycosides with free radical radical ONOO Scavenging activities, from the stamens of *Nelumbo nucifera*. Archive of pharmcol research 2006; v. 09(H): 287-292.
- Pub Med. Indian J. Pharmacol 2009; 41 (2): 64-7.
- Evaluation of antioxidant potential of *Crotalaria ternate* and *Eclipta Prostrata*. Indian journal of Biochemistry & Biophysics 2009; Vol 46(3).
- Pub Med. Evaluation of antioxidant potential of *Aloevera* extract. Agric food chem. 2003; 17-51(26): 7788-91.
- Hyng Sikkim, Sam kacew et al In vitro chemopreventive effect of plant polysaccharide *Aloe barbadensis*. vol 20 (8):1637-1646.
- Khan MS, Khanam et al Antioxidant activity of a new diarylheptanoid from *Zingiber officinale*. Pharmacognosy Magazine 2006; v. 2(8): 254-257.
- Narah merine et al Medicinal plants with potential anticancer activities:A review. The international journal of pharmacy 2012; 3(6):26-29.
- Sethi J, Sood S et al Evaluation of hypoglycemic and antioxidant effect of *Ocimum sanctum*. Indian Journal of Clinical Biochemistry 2004; vol 19(2); p.152-155.
- Xio A Study on the Antioxidant activity of *Semecarpus anacardium*. MAPA. 2005; Vol 31
- Verma N, Vinayak M *Semecarpus anacardium* nut extracts promotes the antioxidant defence system and inhibits the anaerobic metabolism during development of lymphoma. Biosci rep 2009; 29(3):151-64
- Khanam S, Kshama Devi Antimutagenic activity of *Ashwagandha*. Journal of natural remedies 2005; vol. 5(2):126-131.
- Vijakumar M, Govindarajan R et al, Review of some important plants worth antioxidant and other biological activities, National botanical research Institute, Lucknow 2005; v.1 (4): P12-135.
- Soni Monikaka et al Review of activities of various parts extract of *Limonia acidissima* Linn. International Journal of pharmaceutical Research and development 2012; vol. 41053: 059-063.
- Ilango K, Chitra V, Antidiabetic and antioxidant activity of *Limonia acidissima* Linn in alloxan induced rats. DerPharmacia letter 2009; 1(1):177-125.
- Manal MET, Siddig IA, Lal Fouziah et al In-vivo Antitumour effect of *Azardirecta indica* in rat liver carcinoma.
- Maryam Boshtane, Jamal Moshtaghian et al Antioxidant aurantifolia juice and peel extract on LDL oxidation. Journal of Res Med sci 2011; vol:16(7).
- Campelo LM, Gonclaves FC et al Antioxidant activity of citrus limon essential oil in mouse hippocampus. Pharma boil 2011; 49(7):709-15.
- Raghavendra M, Maiti Ritupura et al International journal of green pharmacy doi:104 103/093-8258 69184.
- Roshan Adhikari, Naveen Kumar HN et al A Review on medicinal importance of *Basella alba*. International Journal of pharmaceutical sciences and drug research 2012; 4(2):110-114.
- Citi A Lin Chang & Che San Lin Evidence based Complementary and alternative medicine 2012.
- Prasad L, Husainkhan T Chemomodulatory effects of *Terminalia chebula* against nickel chloride induced oxidative stress and tumour promotion response in male wistar rats. J Trace ElemMed Biol 2006; 20(4):233-239.
- A Hand book of common siddha *kayakalpa* Herbs for Healthy life. Central Council for research in Ayurvedha and Siddha New Delhi.