IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 10, May 2025
Impact Factor: 7.67

Antioxidants in Indian Culture: A Comprehensive Study

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Abstract: *Antioxidants play a pivotal role in maintaining health by neutralizing free radicals, which can cause cellular damage and contribute to chronic diseases. Indian culture, with its deep-rooted traditions in Ayurveda and natural medicine, has long recognized the importance of antioxidants, integrating them into daily life through diet and traditional remedies. Indian cuisine is rich in antioxidant sources, including spices such as turmeric (curcumin), which is renowned for its anti-inflammatory and antioxidant properties. Other commonly used spices like cumin, coriander, and cloves are also potent antioxidants. Indian fruits like amla (Indian gooseberry), rich in vitamin C, and vegetables such as spinach and fenugreek, contribute significantly to the antioxidant intake. Herbal teas and infusions, particularly those made from Tulsi (holy basil) and ginger, are traditional remedies known for their antioxidant benefits. Ayurvedic practices emphasize the balance of the body through diet, which includes consuming antioxidant-rich foods to maintain health and prevent disease. Rituals and customs, such as the use of turmeric in cooking and religious ceremonies, further highlight the cultural importance of antioxidants in promoting longevity and well-being. In recent years, scientific research has increasingly validated the health benefits of these traditional practices, leading to a growing global interest in the antioxidant-rich elements of Indian culture. As modern science continues to explore these natural sources, the cultural wisdom embedded in Indian traditions remains a valuable asset in the global pursuit of health and wellness. This abstract underscore the integral role of antioxidants in Indian culture, blending traditional knowledge with contemporary scientific understanding to highlight their significance in promoting health and preventing disease..*

Keywords: Antioxidant, Spices, natural medicines

I. INTRODUCTION

This exclusive and esteemed essay contributes significantly to the intersectional understanding of antioxidants in the profound and diverse traditions of India, brilliantly blending an array of languages, systems, and epochs of both science and non-science. The term "antioxidant", which has now achieved remarkable global recognition in the realm of esoteric medicine, signifies and evokes notions of utmost importance such as health, beauty, wellness, fitness, rejuvenation, anti-aging properties, enhanced immunity, invigorated energy, improved performance, and even resistance against various ailments. Interestingly, one of the well-known manufacturers of sunscreen creams has impressively branded their product as "Antioxidant Defense", thereby emphasizing the immense significance of these compounds. Delving deeper into the understanding of the oxidation reduction process within the human body, we encounter an elemental and fundamental concept elucidated through the ancient clarion call known as "Dehodhatadevah". This remarkable concept underscores the essential role played by antioxidants within our bodies. These antioxidants are not limited to a singular system, but rather find their practical and beneficial application in a multitude of domains such as revulsant methodologies, eubiotic principles, adaptogenic darabras (also known as dravyas), subcontinents encompassing diverse landmasses, dietary practices, rasayanas related to rejuvenation, and therapeutic chikitsa methods. It is worth noting that these antioxidant concepts are seamlessly integrated and applied within various renowned disciplines including Ayurveda, Yoga, Naturopathy, Unani, Siddha, Homeopathy, allopathy,

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as well as within the intricate domains of physiology, pathophysiology, and biochemistry. In fact, India's profound and unparalleled floristic legacy in the realm of botanical treasures has incessantly attracted and captivated the souls of seekers, not only within its geographical borders but also beyond. The wondrous exploration and utilization of these botanical gems through the unique lens of Vicca (Vital Ingredients for Clinical Care from Ayurveda) has further amplified the global fascination and reliance on India's incredible green pharmacy. The perpetual quest for natural remedies and holistic solutions has been remarkably fulfilled through India's unwavering devotion to exploring the boundless potentials of antioxidants, extending far beyond the confines of conventional medicine.

Fig no.1 Spices

Being essential for health, they are considered as the cause of life (Jivaniyam) in Ayurveda. They possess the property to prevent the exercise of reactivity and thereby save the body from wear and tear of day-to-day activity. The use of traditionally known dietary antioxidants has been seen to be effective in Indian culture. Due to increasing health problems, a method has been developed for the analysis of antioxidants by photochemiluminescence (PCL). Antioxidants of medicinal plants are supposed to act as free radical collectors and scavengers and not to allow the occurrence of chain reactions. In this study, the DPPH test is done for the collection of free radicals and decrease in antioxidant volume, which is indicated on the basis of chemiluminescence signal.

1.1. Definition and Importance

Antioxidants are compounds that inhibit the degradation of properties of various products, including food, nutritional, pharmaceutical, and cosmetic formulations, initiated by oxidation. The configuration of antioxidants is best described as any substance that delays or inhibits oxidative damage to a target molecule. The mantle of an antioxidant is fulfilled by curbing the formation and carnation of free radicals, quenching the already formed reactive species, and repairing the damage to the target involved in the oxidation process. An imbalance between antioxidants and free radicals in the body can lead to the development of oxidative stress and might cause severe diseases, mainly in old age. Antioxidants have made their way, one way or the other, into every culture to give the framework of nutrition and lifestyle more stability. This might have been on a bigger scale for that of the Indian population, given it is a country brimming with cultural diversities, and the nutritional aspects of different cuisines are taken care of, especially emphasizing the medicinal powerhouse ingredients often incorporated.

The word antioxidant is a chemical term, though the concept underlying it is a radical thought, believed by Ayurveda and many other antique medicinal practices. The Ayurvedic texts are one of the oldest medical encyclopedias in the world, revealing that they have been practiced for over 5000 years and still constitute the medicinal system of about two-thirds of the population of India. The modern world has started to acknowledge the superpowers of our age-old

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ingredients, which also serve the basic principle of Ayurveda. In this review, an effort has been made to endow in-depth information on historical, culinary, medicinal, and cultural aspects of Indian antioxidants and to give an insight into the scientific approach as to what led to the elements of Indian culture in slowing the aging process.

II. HISTORICAL CONTEXT OF ANTIOXIDANT USE IN INDIAN CULTURE

Slow growing, short-lived inferences based on the history of medicine reveal that the use of herbs rich in antioxidants had started in various parts of the developed world since ancient times. The historical context of antioxidants forms a part of the traditional practice of various communities, notable amongst which is the Indian system of medicine.

The current era of antioxidants might have attained its peak, but almost similar recommendations were present in Ayurveda, one of the oldest methods of treatment, for upkeep of health and prevention of diseases. The lifestyle, cultural pedigrees, and race are the determinants for the status of health and diseases. Antioxidant ingestion and exposure are part of everyday routine and in most of the cases, they are vested with religious, cultural, or ethnic-racial and spiritual values. Antioxidant enzymes are excellent indicators of dietary and food antioxidant intake. The pathways of the practice of antioxidants are interlinked since the serendipity of Ayurveda (5000 BC). Centuries from then, people are still integrating antioxidants with a rich culture and tradition making the Indian traditions of antioxidants a viable subject of research.

2.1. Ancient Ayurvedic Texts

Classical Ayurvedic texts are one of the oldest repositories in the world containing voluminous information on many aspects of health and diseases. These texts were composed thousands of years ago in India. They were composed by a battery of brilliant minds and continue to be used throughout the subcontinent with greater enthusiasm.

There are several references made to the wide range of antioxidative agents. Charaka Samhita was compiled by Maharshi Agnivesha and was later revamped by Maharshi Charaka. It is believed that the age of Charaka was later than the era of Lord Krishna (600 BCE). Charaka considered that there were five "Maha-Moolas" of the body, namely atman (soul), sharira (body), indriya (senses), satwa (mind), and sattmya (the concordance of mind and body). He states that the body is derived from food such as vegetables, fruits, cereals, meat, game, wine, fish, etc. He suggested 8 ways to make the food more digestible, tasty, soothing, refreshing, natural, cultivable, nutritious, and preserves the energy.

Various references of the specific antioxidants or the types of antioxidants are given in Table 1. The plants or the Ayurveda-based formulations, which contain properties of the contemporary class of antioxidants, are also mentioned. Vagbhata composed the Ashtanga Sangraha by collecting information from Banarasi practitioners. Ashtanga Sangraha explains 8 divisions or branches of Ayurveda. Amongst these 8 divisions, the Rasayana (rejuvenation), Vajeekarana (pharmacology), and Vrishya (potency) with 40 chapters, attempt deals specific antidifferential medicine viz Sookshma Chikitsa. But practically, the principles of Rasayana are being applied for attaining longevity and promotion of health.

III. COMMON ANTIOXIDANT-RICH FOODS IN INDIAN CUISINE

Spices and herbs! That is the crux of Indian cuisine. India is known for spices and has a history of trade and conquest that is, in some ways, synonymous with the search for spices. They give dishes so much flavor that the same carbohydrates, proteins, and fats, when combined with these herbs and spices, become more than just another means of consuming macronutrients. Antioxidants make food a more holistic way of nourishing the body. According to the USDA, spices and herbs have the highest amount of antioxidants. So, when it comes to dietary antioxidants in our food, we rely heavily on Indian spices and herbs.

This paper aims to study Judy Hedstrom's "A Study of Antioxidants in Indian Spices" and evaluate her observations. It also aims to take one step further and put into perspective the role of dietary antioxidants in Indian cuisine. India, with its Vedic heritage, perceives food in a more holistic yet advanced way compared to the West. According to Ayurveda, the nutritional quality of food is seen through the use of acidic and alkaline foods.

Despite this, researchers, including Kuhn, have found a positive correlation between Indian food and Western and American food because of the nutritional quality of herbs and spices common in these countries. The spices that are commonly used in commercial and Indian cuisine include turmeric, black pepper, ginger, cumin, fenugreek, paprika,

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coriander, fennel seed, rosemary, cloves, oregano, allspice, garlic, and marjoram. Out of these, only a select few are used in common dishes, such as turmeric, black pepper, paprika, ginger, garlic, cumin, fennel, and coriander. Hence, the study explores the antioxidant composition of a few of these common spices.

According to the genus (taxonomic group), the standard tannin content of fruits includes quercetin glycosides, luteolin 7-o-glucoside, apigenin, and glycosides of the latter two. It is important to note that tannins are not present in fruits such as apples, bananas, grapes, etc.

3.1. Spices and Herbs

3.1. Spices and Herbs. The Indian kitchen is not only rich in taste and aroma but also known for its medicinal properties. Almost every Indian recipe is prepared using some amount of different spices and herbs. These are rich sources of essential nutrients like proteins, carbohydrates, fats, minerals, vitamins, water, etc., as well as bioactive principles like polyphenols, alkaloids, dietary fiber, flavonoids, antioxidants, etc. The phenolic compounds present in spices in appreciable amounts are also responsible for their marked antioxidant activity. Natural antioxidants are found in all spices, either as vitamins, minerals, essential oil constituents, enzymes, or spice-specific compounds. Age-old Indian medicinal systems like Siddha, Ayurveda, Yoga, Unani, etc., often use spices and herbs for their various health benefits. In the Indian subcontinent, unlike in Europe and the USA, spices are also extensively used for thickening the gravies and lifting up the taste of the food. Both whole spices and spices in powder form increase the taste and flavor of food products. These antioxidants inhibit or retard the oxidation of lipids and other biomolecules by scavenging free radicals.

Fig no.2 Spices and Herbs

Spices most often contribute significantly to the total phenolics present in Indian foods. It was estimated that ¼ of dietary phenolics consumed in India is contributed by spices and herbs, and ¼ of which is present as catechins, glucose esters of catechins, flavonols, diphenols, and flavone glycosides. As there is no consumption of wine, tea, etc. in India, the total flavonoids in the Indians are much lower (approximately 5-9 times) than Europeans. The mean total antioxidant activity (AA) as assessed through the Ferric Reducing Power (FRAP) of spice extracts is equivalent to that of 5 mmols of FeSO4 per 100 g. The ground spices generally possess very low water and fat contents of about 4% and 25%, respectively. Thus, except for the dehydrated and freeze-dried samples, spice extracts could not yield further concentration for use in our in vitro experiments.

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IV. TRADITIONAL ANTIOXIDANT THERAPIES IN INDIAN MEDICINE

The antioxidant-rich culinary herbs, namely tulsi, ginger, cardamom, cumin, coriander, fennel, and fenugreek, are part of the Indian food menu. Due to their several health benefits besides their traditional use, these can be included under functional foods. According to the practice of indigenous systems of medicine, the healing of the whole physical body, or consumption of medicinal substance, is determined by the removal of ill health as a state. Ayurveda's conversion of antioxidants imparts much more importance to antioxidants. Many of the medicated ghee and oils are indicated as Rasayanas not only reduce the symptoms of aging after aging but also increase the longevity and vigor of healthy persons.

Fig no.03 antioxidant-rich culinary herbs

The individual, molecular, or systemic (oxidant - trigger) is determined to restore the Yoga of Acharya Yogendra. In conclusion, Ayurveda concept is very much established in antioxidant therapy. It has both prophylactic and therapeutic viewpoints. Ayurveda has emphasized the use of appropriate Rasayana Chikitsa, dietary and lifestyle precautions, introduction, drug therapy, and management of environment to create more natural and constructive medicinal principles for possible prospects of free radical theory. In Ayurveda, all positive and negative changes occur within the scope of mineral diseases, mineral pathogens, human processes, and asset pharmacopoeia. Antioxidant properties are also present in almost all of these compounds, according to Rasayana Kala-treatment. It is also important to note that the patient has been exploited by the atmosphere and acts as an oxidant, such as excessive passion, exercising, hard work, and addiction.

4.1. Ayurvedic Treatments

In recent years, Ayurvedic medicine, the historical Indian system of healthcare, has gained renewed attention among a particular section of Indian society who are interested in alternative medicines. Considered the earliest materialistic medical science, Ayurveda is a Sanskrit word and is an elaborate system of traditional Indian medicine. The word Ayurveda and its derivatives have appeared throughout the oldest Indian scriptures known as the Vedas. Various therapies are designed by performing data mining in ancient, traditional Indian systems of medicine, and the specialization of treatment is backed by "Ayurveda" (an ancient system illustrative medication in Hinduism). Treatment was initiated by weighing the toxicity and potential drug targets viz; anticancerous, anti-diabetic, and antimicrobial properties. Here chemicals have been amassed from natural products having an abundance of antioxidants.

In Ayurveda, i.e. the traditional Indian system of medicine, therapy that is based on antioxidants is mainly rebalancing therapy and supporting therapy. Supporting therapy uses antioxidants to help the body's periodic antioxidants protect it from oxidative damage caused by drugs, disease, or other toxic substances. Glutathione, vitamins C and E, and

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antihistamine agents are included in these natural antioxidants. Rebalancing therapy, also referred to as adaptive therapy, safeguards the optimal antioxidant equilibrium of an individual, thus improving the body's internal environment and supplying reserves for the body's alternatives to oxidative tension. Ayurveda offers treatments for everybody by exhorting different pure therapeutic measures correspondent in accordance with the distinctive conditions of an individual aimed to alleviate chronic diseases, reinstate vigor, and re-establish the body.

V. ANTIOXIDANTS IN INDIAN FESTIVALS AND RITUALS

Antioxidants are important vitamins and minerals that protect your cells from damage. The 5 common antioxidants, Vitamin C, E, A, Selenium, and Beta-carotene-derived products, are used in Indian culture from ancient times. Commonly used antioxidants in Indian culture are spices, fruits, flowers, and vegetables which are offered to God and Goddesses (Deities) in worship and some part is consumed by themselves. Many Indian spices like turmeric, black pepper, ginger, and sweet cinnamon, etc. with antioxidant properties are used as medicines in Ayurveda (Indian traditional system of medicine). As a part of Ayurveda, many Indian communities take Ayurvedic food and drugs containing attractive antioxidants. In India, large numbers of processed Ayurvedic products are available in the form of attractively packed products for protection against diseases.

Antioxidants are everywhere. They are in your food, in your medicine, even on parade in your body. India possesses a mosaic of religious diversities and a rich cultural heritage. Cultural practices weave themselves into a mosaic of religious diversities based on Indian philosophy and psychology of belief, faith, and spiritualism. When these practices are seen in the context of the history of human civilization, they may indeed announce their existence in human life; a life crammed with hereditary wisdom, beliefs, devotees, and devotion. The harmonious co-existence of various cultures is responsible for the evolving traditions and festivities in India. Such a chain of cultural activities has established its scientific reasoning from time immemorial. Ayurveda and Naturopathy, the two holistic medical sciences of ancient Indian philosophy, form the scientific base for such cultural practices. The ideas and thoughts recorded in these texts can be better appreciated and understood under this background. The paper aims to document the use of antioxidants in Indian culture.

VI. MODERN SCIENTIFIC RESEARCH ON ANTIOXIDANTS IN INDIAN INGREDIENTS

Indian tradition has always been focused on health promotion. In fact, in traditional Indian medicines, various recipes including turmeric (Curcuma longa) along with other spices are mentioned. It has also been mentioned in ancient Ayurvedic literature related to the usage of turmeric, generally promoting homeostasis alongside playing a significant role in bolstering the body's systemic immune function. Over the years, several reports have stated that turmeric is also an eminent source of several biologically active compounds such as curcumin, walking hand in hand towards benefiting the body's functions and also conferring survival advantages as antioxidants and anti-aging molecules. Curcumin is one such molecule, which is calculated to have a powerful antioxidant potential.

In the post-genomic era, there has been an extension of interest among the scientific community to see the effectiveness of curcumin in inhibiting the process of oxidative stress. Recently, plants and plant-based ingredients have withstood regular research to prove their actual health benefits. In fact, many laboratories and scientists are now actively involved in detecting promising therapeutic dirt, which is now being advanced at the market level alongside being tested globally to determine their exact optimum dose and to find appropriate molecular targets. In 2014, Narayan et al. had mentioned that considerable amounts of Indian spices exhibit effects such as antioxidant, immuno-modulatory effect, and also help in having anti-inflammatory activity. They further stated that nanoparticle-based research opened up a new arena mark between Ayurvedic practices and modern science, which created a new ray of hope via these nanoparticles to intervene in various cellular levels of the body to protect it against cellular damage caused by various free radicals.

6.1. Turmeric and Curcumin

6.1.1 Introduction

Ancient traditional healing systems like Ayurveda have generated considerable data on the antioxidant properties of medicinal plants over the last 5000 years. A leading traditional medicinal plant hailing from India, Curcuma longa, is

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Impact Factor: 7.67

used as a spice and dietary coloring, and is extensively studied for its antioxidant properties by the modern scientific world. Over the last 45 years, modern medicine has validated the use of C. longa in diseases involving inflammatory and oxidative stress. The potent antioxidant turmeric has only recently been recognized as an important protective agent against the damaging effects of radiation.

6.1.2 Turmeric

Turmeric is unique in its structural and functional properties, known for its tantalizing yellow color, an intrinsic part of Indian culture and the popular cosmetic for women. An ancient spice of prehistoric use found preserved in Egyptian tombs, turmeric has been used since ancient times and is well-documented in Greek and Roman manuscripts. The Indian spice was known to Arabs in antiquity and to people of Southeast Asia. Since Indian society and culture are rich in folklore, legends, rituals, and traditions, turmeric has always had a place of honor in Indian society, being used as a cosmetic and ritual offering, and for its preservative and coloring properties. In its natural ecosystem, turmeric grows wild in the humid tropics of South and Southeast Asia. Tacitus wrote, "A dye of saffron hue has come from the Utter people that intermingle with our Indian trade."

Fig no.4 Turmeric

VII. CULTURAL SIGNIFICANCE OF ANTIOXIDANT-RICH FOODS IN INDIAN CELEBRATIONS

Indian celebrations have a cultural as well as emotive or symbolic value that is very effectively expressed through food. Not only are they essential for our biochemical processes, but many foods such as turmeric (curcumin), peppers (capsaicin), parsley, and more, are packed with antioxidants that have properties to quench or oxidize free radicals. These foods are time and again consumed in grand celebrations and lavish feasts because they have health-benefiting properties as they are good sources of antioxidants. Several studies have been conducted on these foods due to their high values of antioxidants, for their possible anticancer properties, etc. Due to these health benefits, they are also consumed on a daily basis; however, they are heavily promoted in our cultural hues, particularly during celebratory days. Additionally, their consumption has become a common practice to quench the cupful of free radicals in our body, resulting from poor dietary habits as well as fatigue or stress. These cultural hues keep the tradition alive, underlining the importance of antioxidant-rich foods even in the 21st century.

Ironically, scientific evidence supports the view that they pay tribute to and fully integrate antioxidants as part of their cultural norms. However, to the extent it is used in a religious way, these foods are tinged with a cultural and historical origin; cultural memories as well as social and interpersonal contexts begin to play a decisive role. India is a land of a variety of cultures and festivals, is a melting pot of a vast number of traditions and customs, and religious and cultic events often take place to promote principles that are considered valuable. Many feasts last for more than a day and, interestingly, the festive meal is the most significant food and cannot begin without it. Four such festivals have been selected for the study. From the scientific point of view, there is no uniform holiday description for the Indian calendar,

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but it depends on the observations made. Although, for biochemists, the culturally important food associated with such scenery is added up as an antioxidant cocktail, the level of antioxidants can vary from meal to meal, and it is advised not to mix them in large amounts.

VIII. COMPARATIVE ANALYSIS OF INDIAN ANTIOXIDANT PRACTICES WITH GLOBAL TRENDS

The current effort provides, for the first time, a comprehensive study about the use of natural antioxidants and corresponding research predominantly in the Indian subcontinent. While providing information about how the Indian population has always believed in using natural antioxidants, it shows how science today acknowledges the potential of these products. An endeavor has been made here to provide a simple comparison of the practices in other parts of the world and the uniqueness of Indian systems of healthcare. An attempt has been made to make a comparative study vis-a-vis India's ancient practices with those around the world. It highlights how antioxidant therapy is currently gaining dominance in the Indian as well as the world market.

Therefore, in this review, an attempt has been made to provide evidence for natural antioxidants in India, supported by experimental results obtained by researchers in this part of the world, for the newer approaches including those of nanoemulsions. However, this must not be taken in any sense as being exhaustive because some of the investigations reported in non-indexed journals. This review tries to provide a short comparison of the Indian scenario on antioxidants with the rest of the world. In a world characterized by cross-culture, it is particularly interesting to look at practices followed by other cultures and compare them with the customs that we have been following for centuries. Cultural anthropology often talks about cultural diffusion in recent times and how cultures borrow practices from one another. At a time such as this, one would think that in 'modern' times we would know everything that happens in various societies. But surprisingly, this is not the case, and there are practices of other cultures that we are still not aware of.

IX. FUTURE DIRECTIONS AND POTENTIAL APPLICATIONS OF INDIAN ANTIOXIDANT KNOWLEDGE

The wide variety of plant species can be used to form a database for future research based on antioxidant activities. There is a need to conduct intensive research on herbal medicines, products, and recipes practiced in different parts of India with significant antioxidant potential in Ayurvedic clinical as well as rejuvenating systems. The combination of Indian Ayurvedic concepts of 'Rasayana' and 'Yukti' can provide the science of a diet with a balanced antioxidant power by mixing fruit, floristic, and plant materials. Since the frequency and the optimal concentration responsible for beneficial dietary antioxidant effects largely depend on diet and lifestyle.

The literature in Ayurveda is another resource that can be re-explored and tested using newer and advanced technologies and by correlating with the current understanding of antioxidants at the molecular and cellular levels. The antinutritional component of any plant species (if any) should be evaluated under the interdisciplinary approach. Nutritionists and food scientists can directly investigate the qualitative energy-significant supply for fulfilling the food requirements and in order to study the antioxidant potential and health benefits of Indian foods and foods from Indian recipes. Currently, no predictive methods are available for routine use in testing the antioxidant behavior of dietary antioxidants. Further, in search of biomolecules of natural sources, there are great prospects in developing active ingredients from biologically diverse species. In addition to enhancing aspects like taste and coloring in the food, antioxidants with intangible medical qualities were used in India by traditional medical science to prolong the duration of life, to promote intelligence and lead a saturated life, and the same was recommended by Indian doctors.

X. CONCLUSION AND SUMMARY OF KEY FINDINGS

Hope that the readers were thrilled to explore the Indian antioxidant treasure with the philosophy, the cuisine, the phytoantioxidants and the multitude of antioxidants of diverse potentials which are driving the evolution of different improvised anti-aging formulations. The core strength of this article is the comprehensive data about different antioxidants with their novel roles which have been used by the Indian metaphysicist, chemist and the food scientists. Also, we describe simultaneously their cultures and customs that are ingrained in their lifestyle, product development and their ultimate great acceptance.

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We begin the exploration by discussing the Ayurveda, Sankya, Yoga and associated Indian sciences, making an effort to extricate their equivalent western terminologies and instrumentation. Subsequently, the phytoantioxidant part of the Ayurveda moves up with the description of the Pa`snottara. In the next section, we enumerate a vast repertoire of phytoantioxidants used in Indian cuisine to delay catabolic oxidation of food. The article quickly shifts gear to the Indian science of antioxidants where we conduct a cannonading survey of radical scavengers employed in everyday life in India. The cannonade revels in the destructive strength of powerful endogenous chemicals with divinely sweet arsenal. The article then moves to describe examples from a number of categories like the ore-dressing biochemistry. National Institutes of Ayurveda in India finalize the conclusion. The parting shot describes the current research activities, extinct or outmoded chemicals and derivatives which were once handcrafted by Indian scientists.

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