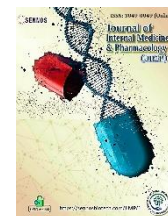




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Review Article

An Analytical Study on the Methodical Scrutiny of Ayurveda's Trajectory Towards Longevity and Youthful Vitality Using Rasayana Therapy

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ABSTRACT

The ancient Indian medical system known as Ayurveda provides valuable insights on attaining longevity and timeless energy. Rasayana therapy, one of its basic principles, is a restorative procedure intended to enhance individuals' physical and mental health while promoting vigor, power, and longevity. In light of contemporary biomedical research, this review examines the scientific scrutiny of Rasayana therapy, assessing its therapeutic effects, mechanisms of action, and potential molecular pathways. This study aims to bridge the gap between traditional Ayurvedic knowledge and modern scientific understanding by critically analyzing the existing literature, including clinical studies, pharmacological evaluations, and contemporary interpretations of Ayurvedic principles. Additionally, the review explores the relevance of Rasayana for modern anti-aging treatments, its role in boosting immune function, enhancing cellular health, and preventing age-related degenerative processes. Emphasizing the need for further clinical research and scientific validation, this review seeks to comprehensively assess Rasayana's therapeutic potential in the pursuit of longevity and vitality.

Keywords: Rasayana therapy, Ayurveda, Health, Anti-aging, Longevity, Immunological function

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1. Introduction

Throughout human history, the pursuit of longevity and timeless vitality has persisted across all cultures and eras. Over the centuries, various societies have endeavoured to comprehend the ageing process and have looked for ways to maintain youth and vigour. Ayurveda, an ancient medical system that dates back more than 5000 years to India, offers a particularly complete and holistic framework for improving health, longevity, and vigour among the many different traditions of health and wellbeing. Ayurveda emphasizes harmony among the physical, mental, and spiritual aspects of the human body, in contrast to contemporary medical methods that frequently divide the body into separate systems. The concept of Rasayana treatment, or the science of renewal and regeneration, is one of the cornerstones of Ayurvedic medicine. In Ayurveda, Rasayana treatment is regarded as the ultimate regeneration technique. By boosting the body's essential energy and offering defence against ageing and degenerative diseases, it seeks to improve not just life expectancy but also quality of life. It encompasses a variety of methods, ranging from food advice and herbal formulations to lifestyle changes and mental health treatments. Restoring and enhancing the body's vital energy, or ojas, which is thought to be the foundation of longevity and vigour, is a key component of Rasayana therapy's effectiveness. Rasayana is described in Ayurvedic writings as a technique that slows down the ageing process, restores youthfulness, and improves mental clarity by promoting rejuvenation at the cellular, tissue, and organ levels. A substantial corpus of research on ageing, its pathophysiology, and interventions meant to improve life expectancy and

quality of life has emerged because of the scientific community's increased interest in the mechanisms underlying ageing and longevity in recent decades. In addition to gerontologists, biologists, molecular biologists, and pharmacologists who study the biochemical and genetic elements that influence ageing processes have taken an interest in the term longevity [1]. Considering this, Rasayana therapy has become widely acknowledged as a promising field for further research. Rasayana compounds, which are frequently polyherbal formulations, have demonstrated encouraging therapeutic effects in improving cellular regeneration, lowering oxidative stress, strengthening the immune system, and fostering general vigour. There is a rare chance to close the gap between traditional Ayurvedic principles and contemporary biomedical sciences through the scientific examination of Rasayana therapy. From the perspective of contemporary science, the name "Rasayana" itself can be interpreted as a multifaceted strategy that may interact with a variety of physiological processes, such as those linked to cell signalling, DNA repair, mitochondrial function, antioxidant activity, and inflammatory control. These pathways have long been linked to the ageing process and the emergence of age-related illnesses like diabetes, dementia, and cardiovascular disorders. The potential of Ayurvedic Rasayana formulations in modifying these biological pathways has been highlighted by recent research, which implies that they may not only postpone ageing but also lessen the effects of chronic age-related illnesses. Furthermore, Rasayana therapy includes the two strategies of rejuvenation and prevention, which are both essential in the contemporary quest for good ageing. According to Ayurveda, rejuvenation involves more

than just reversing the outward manifestations of ageing; it also entails re-establishing harmony and balance in the body, mind, and soul. This multifaceted view of vitality is indicative of a larger medical paradigm shift that prioritizes quality of life improvement and preventive care over merely extending longevity [2]. Therefore, by combining traditional and modern approaches to health, wellness, and illness prevention, scientific research into Rasayana may provide fresh insights into customized therapy. Although Rasayana's medicinal promise for prolonging longevity is widely recognized in Ayurvedic circles, there is still a substantial lack of complete scientific proof. The majority of the Rasayana material that is currently available is anecdotal or based on historical writings and customs. Even though Rasayana formulations have been shown to have beneficial benefits on age-related degenerative disorders on multiple occasions, nothing is known about the molecular and mechanistic basis of these effects. Rasayana therapy's complete integration into contemporary medicine is hampered by the absence of systematic scientific research and controlled clinical trials [3]. Thus, it is still crucial to investigate the scientific basis of Rasayana therapy, clarify its biochemical workings, and confirm its results in current study settings. Numerous investigations on the pharmacological effects of the various components utilized in Rasayana formulations have started in recent years. Numerous research has examined the adaptogenic, antioxidant, and neuroprotective qualities of important Ayurvedic herbs, including ashwagandha (*Withania somnifera*), Amalaki (*Embolia officinalis*), Shatavari (*Asparagus racemosus*), and Brahmi (*Bacopa monnieri*). These herbs have shown incredible promise in reducing

oxidative stress, regulating inflammatory reactions, and enhancing cellular resilience—aspects that are strongly related to ageing processes. Furthermore, certain Rasayana preparations contain a variety of herbs, which may work in concert to provide stronger effects than any one herb alone. This feature is consistent with the growing interest in polypharmacology in contemporary medicinal approaches. Rasayana therapy's multifaceted approach thus presents a viable substitute for the single-targeted treatments that are frequently seen in modern pharmacology. Rasayana's function in neuroprotection and cognitive health is another topic of increasing interest. Globally, neurodegenerative illnesses, age-related cognitive decline, and the general deterioration of brain function are major issues in gerontology and healthcare. Rasayana's restorative benefits on mental faculties have long been highlighted in Ayurvedic scriptures, which imply that it may improve intellect and mental clarity in addition to preventing memory loss and cognitive decline. Recent studies on Ayurvedic neuroprotective agents have demonstrated their capacity to enhance synaptic plasticity, encourage neurogenesis, and lessen the burden of neuroinflammation—all of which have been connected to longer lifespans and the avoidance of cognitive disorders like Parkinson's and Alzheimer's. These results imply that Rasayana therapy has great potential to solve one of the most important health issues like aging population. Furthermore, Rasayana's possible anti-ageing benefits go beyond physical health to include mental and emotional health. The focus that Ayurveda places on mental renewal and spiritual balance in Rasayana therapy aligns with contemporary approaches to mind-body medicine in a world where

the mind-body connection is becoming more widely acknowledged as a critical component of health [4]. Rasayana promotes a state of holistic vitality that extends beyond the physical body to include cerebral clarity, emotional resilience, and spiritual serenity. Its main components include stress reduction, emotional well-being, and spiritual harmony. An intriguing new area for longevity study is the growing convergence of Ayurveda and contemporary scientific studies. Rasayana therapy appears to be a viable option for expanding our knowledge of healthy ageing and vitality as we continue to decipher the intricate biology of ageing and investigate the possibilities of conventional medical systems. To fully reap the benefits of Rasayana in the context of modern healthcare, however, a more thorough scientific investigation of its processes, clinical efficacy, and therapeutic potential is necessary. As we look to the future, where the goal of longevity is not just about prolonging life but also improving its quality through integrated, holistic approaches, this review attempts to examine and summarize the most recent research on Rasayana therapy, illuminating its many facets and its intersection with contemporary biomedical understanding [5].

2. Rasayana Therapy

A key idea in Ayurveda, Rasayana therapy aims to revitalize the body and mind to support longevity, health, and energy. Rasayana, which means "the path of essence" and has its roots in ancient Ayurvedic knowledge, is a collection of techniques meant to restore the body naturally while putting a focus on preserving harmony and balance within the individual. Fundamentally, Rasayana aims to improve the immune system, nourish the body's

tissues and organs, and slow or reverse the ageing process. To maximize the body's innate capacity for regeneration, this holistic approach includes the use of medicinal herbs, dietary adjustments, detoxification procedures, and mental health activities [6]. Several powerful Ayurvedic herbs with revitalizing qualities are used in the treatment, including Amalaki (*Emblica officinalis*), Brahmi (*Bacopa monnieri*), and ashwagandha (*Withania somnifera*). These herbs offer qualities that have been proven by science to enhance general vitality, mental clarity, and physical endurance. For instance, Brahmi is believed to improve memory and mental clarity, while ashwagandha functions as an adaptogen, assisting the body in managing stress and boosting vitality. Amalaki, which is high in antioxidants and vitamin C, promotes cellular repair and fights oxidative stress. In addition, Rasayana therapy promotes a healthy lifestyle that includes meditation, stress reduction, and adequate sleep—all of which are essential for both physical and mental renewal. A balanced diet full of fresh, complete foods that are suited to each person's dosha (body constitution) is frequently advised by Ayurvedic practitioners. To further enhance the rejuvenating effects, detoxification therapies like Panchakarma are frequently included to rid the body of accumulated toxins. Rasayana therapy is essentially a holistic strategy that supports the best possible functioning of the body, mind, and spirit to not only prolong life but also improve its quality [7].

2.1 Components of Rasayana Therapy

One important component of Ayurvedic practice that aims to improve vitality, prolong life, and rejuvenate the body and mind is Rasayana therapy (Table 1). Medicinal herbs, dietary

recommendations, lifestyle choices, cleansing processes, and mental health techniques are just a few of its many elements. Together, these elements

promote the body's natural regenerative processes, postpone the ageing process, and maximize health [8].

Table 1: Rasayana therapy herbs with effects

Herb	Botanical Name	Effects
Ashwagandha	Withania somnifera	Adaptogenic, anti-stress, neuroprotective, immunomodulatory
Shatavari	Asparagus racemosus	Rejuvenating, anti-aging, hormone balancing, antioxidant
Guduchi	Tinospora cordifolia	Immunomodulatory, hepatoprotective
Shilajit	Mineral pitch	Adaptogenic, anti-ageing, reminiscence-augmenting
Guggulu	Commiphora wightii	Hypolipidemic and anti-inflammatory
Licorice	Glycyrrhiza glabra	Anti-ulcer and anti-inflammatory

2.1.1 Herbal Formulations and Medicinal Herbs

The use of strong medicinal plants with revitalizing qualities is central to Rasayana therapy. These herbs were chosen with care because of their capacity to strengthen and nourish the body, heal damaged tissue, and increase longevity. Among the essential herbs utilized in Rasayana therapy are:

- **Ashwagandha** (*Withania somnifera*): This plant is well known for its adaptogenic qualities, which support physical stamina and vigour while assisting the body in adjusting to stress. Ashwagandha is a crucial plant in Rasayana therapy because it is also said to strengthen the immune system, increase vitality, and promote mental clarity [9].
- **Brahmi** (*Bacopa monnieri*): Brahmi is utilized in Rasayana to enhance mental

clarity, memory, and focus because of its well-known cognitive-enhancing qualities. It is the perfect herb for fostering longevity and mental renewal because it also shields the brain against neurodegenerative alterations.

- **Amalaki** (*Embllica officinalis*): Amalaki is a potent plant that helps against oxidative stress, one of the main causes of ageing, and is high in vitamin C and antioxidants. It contributes to general vigour and longevity by boosting the immune system, encouraging detoxification, and revitalizing tissues.
- **Shatavari** (*Asparagus racemosus*): The main purpose of this plant is to promote hormonal balance, particularly in women. Additionally, it is advantageous for

improving immunity, reproductive health, and digestive health—all of which are essential components of Rasayana therapy.

- **Guduchi** (*Tinospora cordifolia*): Guduchi, which is well-known for its anti-inflammatory and immune-boosting qualities, is essential to Rasayana therapy since it aids in the body's detoxification, increases its resistance to infections, and slows down the ageing process [10].

2.1.2 Nutritional Routine

In Rasayana treatment, nutrition is essential for promoting the body's capacity to repair itself and preserve its best possible health. By choosing foods that are suitable for a person's constitution, the Ayurvedic diet philosophy aims to balance the three doshas—Pitta, Kapha, and Vata. The goal of a Rasayana diet is to provide the body with the deep nourishment it needs to regenerate its cells [11].

Among the fundamentals of Rasayana diets are:

- **Fresh foods:** It is stressed to eat seasonal, organic, and fresh meals. This diet is based on whole grains, fruits, vegetables, and legumes.
- **Good fats:** Good fats, including ghee (clarified butter), are utilized because they can boost mental clarity, aid digestion, and nourish tissues.
- **Warm, prepared foods:** To encourage the best possible digestion and nutrient absorption, Ayurvedic principles advise eating warm, readily digested meals.
- **Herbal teas and tonics:** To aid with digestion and cleansing, herbal infusions

including ginger, turmeric, and other revitalizing herbs are frequently suggested.

The Rasayana diet is personalized for each person according to their dosha balance, tastes, and health requirements [12].

2.1.3 Lifestyle Practices

Rasayana treatment incorporates lifestyle changes to improve general well-being in addition to the use of herbs and nutrition. Important lifestyle habits consist of:

- **Sufficient Sleep:** Ayurveda holds that rest and sleep are necessary for lifespan and renewal. Sleep is thought to be essential for the body's capacity to detoxify, renew cells, and repair tissues.
- **Stress management:** Prolonged stress hastens the ageing process and has a role in the development of certain illnesses. Essential elements of Rasayana therapy include techniques like yoga, meditation, and deep breathing. These techniques support mental clarity, emotional equilibrium, stress reduction, and mental calmness.
- **Exercise:** It is advised to engage in regular physical exercise that is adapted to each person's talents and constitution. The best activities for increasing circulation, enhancing flexibility, and preserving general health include yoga, walking, and mild workouts.
- **Daily Routines (Dinacharya):** Ayurveda places a strong emphasis on the value of daily schedules that complement the body's natural cycles. Getting up early, engaging in personal cleanliness practices (such as

oil massage or Abhyanga), and adhering to regular eating, sleeping, and working routines are all examples of this [13].

2.1.4 Detoxification Procedures

Rasayana therapy includes detoxification as a key element since it helps rid the body of accumulated toxins (Ama) that impede its natural healing processes. A specific cleansing technique called panchakarma is frequently suggested in Rasayana treatment. Panchakarma includes several therapies, such as:

- *Therapeutic Vomiting or Vamana*: It is a method of clearing the respiratory system of excess mucus or toxins.
- *Purgation or Virechana*: It is a technique for clearing the body of toxins and cleansing the digestive tract.
- *Enema Therapy or Basti*: It is a method for balancing the Vata dosha and cleaning the intestines.
- *Nasya or Nasal Therapy*: It is the practice of administering therapeutic oils via the nose to cleanse the sinuses and revitalize the mind.

2.1.5 Mental and Spiritual Well-Being

Rasayana therapy prioritizes emotional and spiritual well-being in addition to bodily renewal. Meditation, mindfulness, and spiritual development are among the practices that are thought to be essential for long-term health. Restoring the body's energy and vitality is said to be facilitated by positive emotions, mental clarity, and spiritual equilibrium. Integrating physical and mental health practices promotes a comprehensive approach to lifespan [14].

2.2 Principles of Rasayana

These principles aid in directing Rasayana's application and guaranteeing its efficacy in fostering the best possible health and vigour.

- *Tissue Rejuvenation (Dhatu Rasayana)*: The renewal of the body's tissues, or "Dhatu Rasayana," is one of the main tenets of Rasayana. Plasma, blood, muscle, fat, bone, marrow, and reproductive tissue are the seven main tissues (Dhatu) that make up the body, according to Ayurveda. Age, stress, bad food, and other lifestyle choices cause these tissues to degrade over time. By giving these tissues the crucial nutrients, they require to be strong, flexible, and vibrant, Rasayana helps to nourish and rejuvenate them. Herbal remedies and dietary recommendations based on a person's dosha (body constitution) are used to sustain physiological processes, restore energy stores, and nourish tissues. To ensure lifespan and general well-being, this rejuvenation process promotes the growth of new, healthy cells and inhibits the deterioration of tissues.
- *Immunity (Ojas)*: Enhancing the body's immunity (Ojas), the essential energy or essence in charge of general health, strength, and illness resistance, is the goal of Rasayana. Resilience and health are promoted by strengthening the body's defences against diseases through certain Rasayana activities.
- *Balancing of Doshas*: The three doshas—Pitta, Kapha, and Vata—represent the physiological energy in the body, and Rasayana seeks to balance them. Rasayana assists in keeping the body and mind in a

balanced, healthy state by bringing these energies back into harmony.

- **Digestive Fire (Agni):** Enhancing Agni is seen as essential to health in Ayurveda, and is a major component of Rasayana. Proper nutrition absorption and waste removal are guaranteed by a robust digestive fire. Maintaining life and energy requires doing this [15].

3. Rasayana Therapy Practices

A key component of Ayurvedic rejuvenation techniques, Rasayana treatment balances the body, mind, and spirit to provide a profound approach to longevity, energy, and general health. Rasayana therapy, which has its roots in Ayurvedic ancient knowledge, aims to restore and enhance the vital energy (Ojas) that supports immunity and health to achieve optimal well-being. Rasayana is an integrated lifestyle that includes detoxification procedures, herbal formulations, food, and mental rejuvenation approaches rather than being restricted to a single therapy. Using natural, nourishing elements to help fight the inevitable consequences of ageing and postpone the beginning of age-related disorders, this holistic approach highlights the significance of harmony between the body and the environment [16]. The idea of feeding the body's tissues (Dhatus) to preserve vigour and vitality is fundamental to Rasayana treatment. From plasma to reproductive tissue, the seven main tissues described in Ayurvedic teachings need to be properly nourished and balanced. With an emphasis on revitalizing the heart, brain, and digestive system, Rasayana maximizes the quality of these tissues [17]. This is accomplished using herbal formulae, such as ashwagandha (*Withania somnifera*),

Amalaki (Indian gooseberry), and Brahmi (*Bacopa monnieri*), which are well-known for their strong anti-inflammatory, adaptogenic, and antioxidant qualities. As natural tonics, these herbs improve energy, memory, and cognitive function while revitalizing the body's systems at the cellular level. Rasayana therapy emphasizes dietary changes and lifestyle modifications in addition to herbal remedies. A customized approach is used, considering each person's distinct constitution (Prakriti) and adjusting routines and diet appropriately. For instance, the foundation of Ayurvedic health, Agni (digestive fire), is maintained by eating warm, filling, and nutrient-dense meals. In addition to encouraging cleansing, a robust Agni guarantees appropriate digestion and nutritional absorption. To maintain the body light, energized, and free of accumulated toxins, it is generally advised to have fresh fruits, vegetables, whole grains, and good fats (Ama). Panchakarma, a cleansing and purifying procedure, is one of the main techniques of Rasayana treatment [18]. To maximize the body's ability to absorb Rasayana therapies, Panchakarma rids the body of accumulated toxins. To detoxify the body and revitalize its tissues, this procedure entails several therapeutic procedures such as oil massages, herbal steam baths, and purgation therapies. Rasayana treatments aim to promote bright health, increase lifespan, and restore equilibrium once the body has been detoxified. Additionally, Rasayana rejuvenates the intellect and emotions in addition to the physical body. A key element of this therapy is mental clarity and emotional well-being; pranayama (breathing exercises), yoga, and meditation are crucial for promoting mental sharpness and soothing the mind. These techniques aid in lowering stress and anxiety,

two major factors that contribute to early ageing and health decline. In particular, meditation helps the practitioner develop a strong bond with their inner self, which promotes mental and emotional stability—two things that are critical for general renewal [19].

4. Rasayana Remedies and Conformations

Small quantities of minerals, pearls, corals, jewels, and Shilajit (mineral exudates) are typically incorporated in the complex mixture of medicinal plants that make up Rasayana medications or preparations used to provide the benefits. In Ayurveda, several plants have been widely utilized as "Rasayana drugs" to treat neurodegenerative illnesses as well as nutritional supplements, immunomodulators, rejuvenators, and aphrodisiacs [20]. *Emblica officinalis* (Indian gooseberry, Amla), *Terminalia chebula* (Haritaki), *Asparagus racemosus* (Shatavari), *Withania somnifera* (Ashwagandha), and *Tinospora cordifolia* (Guduchi) are a few of the most often utilized herbs. *Bellirica* (Bibhitaki), *Glycyrrhizaglabra* (Yesthamaddhu), *Aloevera* (Kumari), *Bacopa monnieri* (Mandukaparni), *Picrorhiza kurroa* (Katuki), and *Boerhavia diffusa* (Punarnava). Ayurveda offers several Rasayana recipes that may be used for general or whole-body purposes or organ or tissue-specific purposes (brain, heart, reproductive organs, etc.) based on the plant composition and ratio. Triphala, Chyawanprash, Aamalaki Rasayana, Amrita Rasayana, Brahm Rasayana, Ashwagandha Rasayana, Narasimha Rasayana, Amritaprasham, Anwala Churna, Brahmi Rasayana, and Amalkadi Ghrita are a few of the well-known Rasayana formulations [21].

4.1 Chyawanprash: Chyawanprash is one of the most well-known and traditional Ayurvedic remedies. It is the most popular Rasayana medicine in India and outside and the most potent of all herbal rejuvenating tonics. Due to its many nutritional benefits, this Tridoshic Rasayana is known as "the elixir of life". The Charaka Samhita, an Ayurvedic literature, has the earliest known evidence of this formulation. Chyawanprash is used to treat cough, dyspnea, consumption, voice issues, and heart diseases, per the Charaka Samhita's chikitsasthana section [22].

4.2 Ashwagandha Rasayan: The main component of Rasayana Ashwagandha is Indian ginseng or ashwagandha. The natural remedy has an extremely calming and balancing impact on the body. When taken in the prescribed dosage, ashwagandha the body can revitalize the reproductive organs with the aid of rasayana and support the rejuvenating activity of the bone marrow and nerves. We can take the rasayana as a dietary supplement if an Ayurvedic practitioner suggests it [23].

4.3 Triphala: *Emblica officinalis* (Amla), *Terminalia chebula* (Haritaki), and *Terminalia bellirica* (Bibhitaki) are the three medicinal fruits that make up Triphala, a traditional Ayurvedic formulation that is well-known for its powerful Rasayana (rejuvenating) properties. Packed with flavonoids, polyphenols, and antioxidants, Triphala has anti-ageing, anti-inflammatory, and immunomodulatory qualities. Balancing the three doshas (Pitta, Kapha, and Vata), improves digestive health, detoxifies the body, and increases longevity. Its function in enhancing gut flora, lowering oxidative stress, and averting chronic illnesses is supported by scientific research. Triphala has long

been used in Ayurveda for general well-being, and its adaptogenic qualities make it a useful therapeutic agent in holistic medicine [24].

4.4 Amritaprasham: The main element of Amritaprasham, an Ayurvedic Rasayana treatment, is *Tinospora cordifolia* (Guduchi), which has immunomodulatory and restorative qualities. Packed with glycosides, alkaloids, and flavonoids, it strengthens immunity, fights oxidative stress, and improves vitality. Amritaprasham balances Tridosha (Vata, Pitta, Kapha) to support metabolic processes, enhance cognitive health, and lengthen life. According to scientific research, it has adaptogenic, hepatoprotective, and anti-inflammatory properties that make it useful in the treatment of age-related degeneration and chronic illnesses. Its importance as a potent Rasayana in both conventional and contemporary medical procedures is further supported by its function in bolstering immune responses and fostering overall well-being [25].

4.5 Anwala Churan: A popular Rasayana in Ayurveda, Anwala Churna is a finely ground mixture of *Emblica officinalis* (Amla) that is prized for its anti-aging and restorative qualities. It is a powerful antioxidant that boosts immunity and cellular regeneration. It is high in vitamin C, polyphenols, flavonoids, and tannins. Anwala Churna balances Tridosha (Vata, Pitta, and Kapha), detoxifies the body, and promotes digestive health. According to scientific research, it has neuroprotective, hepatoprotective, and cardioprotective properties that make it useful for controlling chronic illnesses. Frequent use of Anwala Churna supports general well-being, increases energy, and encourages longevity,

confirming its importance as a comprehensive Rasayana therapy in Ayurvedic medicine [26].

4.6 Brahmi Rasayana: A well-known Rasayana in Ayurveda, Brahmi Rasayana is produced from *Bacopa monnieri* and is prized for its neuroprotective and cognitive-enhancing qualities. Packed with flavonoids, alkaloids, and bacosides, it lowers stress and anxiety while enhancing memory, focus, and mental clarity. Brahmi Rasayana promotes the health of the nervous system, fights oxidative stress, and balances Tridosha (Vata, Pitta, Kapha). Its function in neurogenesis, improving synaptic activity, and averting neurodegenerative diseases like Alzheimer's is highlighted by scientific research. It also has immunomodulatory, anti-inflammatory, and adaptogenic properties. Brahmi Rasayana is an essential therapeutic agent in Ayurvedic medicine since it regularly enhances mental acuity, longevity, and general well-being [27].

4.7 Narasimha Rasayana: In Ayurveda, Narasimha Rasayana is a highly esteemed Rasayana formulation that is renowned for its ability to revitalize and strengthen the body. It is made up of powerful herbs that nourish tissues, encourage vitality, and strengthen muscles, such as ashwagandha (*Withania somnifera*), Shatavari (*Asparagus racemosus*), and Amla (*Emblica officinalis*). Packed with bioactive components, adaptogens, and antioxidants, it promotes immunity, maintains hormonal balance, and enhances the health of skin and hair. Research shows that it has immunomodulatory, aphrodisiac, and anti-aging properties. Narasimha Rasayana promotes lifespan, physical stamina, and general well-being by balancing Tridosha (Vata, Pitta, and Kapha),

highlighting its importance as a comprehensive Rasayana treatment [28].

4.8 Brahma Rasayana: Classical Ayurvedic Rasayana formulation Brahma Rasayana is well known for its adaptogenic, neuroprotective, and restorative qualities. It is made up of powerful herbs that improve cognitive function, strengthen immunity, and fight oxidative stress, such as *Emblica officinalis* (Amla), *Bacopa monnieri* (Brahmi), and *Withania somnifera* (Ashwagandha). Brahma Rasayana, which is abundant in alkaloids, flavonoids, and antioxidants, promotes mental clarity, fortifies the nervous system, and reduces weariness. It is good for mental and physical health since it helps control stress and balances Tridosha (Vata, Pitta, and Kapha). Its relevance as a potent Ayurvedic Rasayana therapy is further supported by scientific researches that emphasize its function in neuroprotection, lifespan, and illness prevention [29].

5. Rasayana in Contemporary Anti-Aging Therapy

Rasayana, a fundamental idea in Ayurveda, has drawn a lot of interest in current anti-aging research due to its potential for cellular renewal and longevity increase. In line with contemporary biological approaches to aging, Rasayana treatment, which has its roots in ancient writings, emphasizes immunomodulation, neuroprotection, and systemic rejuvenation. Rasayana formulations, including Amalaki (*Emblica officinalis*), Brahmi (*Bacopa monnieri*), Guduchi (*Tinospora cordifolia*), and Ashwagandha (*Withania somnifera*), have been shown in recent pharmacological studies to have strong antioxidative, anti-inflammatory, and adaptogenic effects that counteract cellular

senescence and mitochondrial dysfunction—two major causes of ageing. According to scientific studies, these herbal substances control important molecular pathways that are essential for metabolic balance and longevity, such as AMPK (AMP-activated protein kinase), mTOR (mechanistic target of rapamycin), and SIRT1 (sirtuins). Rasayana herbs reduce age-related cognitive decline, neurodegeneration, and metabolic diseases by increasing telomerase activity, regulating autophagy, and reducing oxidative stress. Additionally, new research indicates that Rasayana treatment enhances the makeup of the gut flora, supporting immunological resilience and systemic health. A possible approach to comprehensive longevity therapies is the incorporation of Rasayana into modern anti-ageing paradigms through the use of nutraceuticals, functional foods, and bioactive phytochemicals. Future studies can clarify the complementary roles of Rasayana in tissue regeneration and cellular ageing by utilizing systems biology, metabolomics, and AI-driven drug development. Rasayana bridges ancient knowledge with contemporary biological developments in anti-ageing therapy, providing a scientifically sound and therapeutically deep approach to alleviating ageing-related illnesses as interest in integrative medicine develops globally [30].

6. Rasayana and Age-Related Degenerative Processes

Numerous age-related degenerative illnesses, including dementia, cardiovascular problems, and metabolic syndromes, are brought on by the complicated biological process of ageing, which is marked by gradual cellular degradation, oxidative stress, mitochondrial malfunction, and chronic

inflammation. Targeting the molecular processes that underlie tissue deterioration and cellular senescence, Rasayana, a subspecialty of Ayurveda, provides a comprehensive, regenerative approach to ageing. The effectiveness of Rasayana formulations in modifying important biochemical processes linked to ageing, specifically oxidative stress reduction, immunological enhancement, and neuroprotection, has been progressively confirmed by scientific research. Oxidative stress, which is fueled by an excess of reactive oxygen species (ROS) and weakened antioxidant defences, is one of the main causes of age-related degenerative processes. Rich in flavonoids, polyphenols, and alkaloids, rasayana herbs such as *Emblica officinalis* (Amalaki), *Withania somnifera* (Ashwagandha), and *Tinospora cordifolia* (Guduchi) increase the activity of endogenous antioxidant enzymes such as glutathione peroxidase, catalase, and superoxide dismutase (SOD), thereby lowering oxidative damage at the cellular and mitochondrial levels. Aging-related neurodegeneration is intimately associated with decreased autophagy, misfolded protein accumulation, and synaptic dysfunction, as shown in Parkinson's and Alzheimer's disorders. By modifying BDNF (brain-derived neurotrophic factor), Nrf2 (nuclear factor erythroid 2-related factor 2), and acetylcholine regulation, Rasayana formulations like *Bacopa monnieri* (Brahmi) and *Centella Asiatica* (Mandukaparni) demonstrate neuroprotective qualities, improving neurogenesis, neuronal plasticity, and cognitive resilience. It has also been demonstrated that Rasayana treatment lowers neuroinflammation by suppressing pro-inflammatory cytokines such as TNF- α , IL-6, and NF- κ B, which are essential for preventing age-related cognitive decline. Another important feature

of ageing is mitochondrial failure, which alters cellular bioenergetics and fuels metabolic diseases. By activating AMPK (AMP-activated protein kinase) and PGC-1 α (peroxisome proliferator-activated receptor gamma coactivator 1-alpha), rasayana herbs control mitochondrial biogenesis, increasing ATP synthesis, lowering metabolic stress, and avoiding insulin resistance. Clinical research shows that Rasayana is effective in enhancing metabolic flexibility, lowering glycation end products, and promoting cardiovascular health by regulating vascular integrity and lipid metabolism [31].

Conclusion

The current research highlights the significant influence of Rasayana treatment in Ayurveda as a comprehensive, scientifically supported strategy for longevity and young vigour. With its roots in ancient knowledge, Rasayana has developed into a multidisciplinary field that complements modern biological studies, especially those studying ageing. Targeting immunological regulation, oxidative stress, neuroprotection, and cellular senescence, Rasayana provides a thorough foundation for age-management techniques. The bioactive ingredients in Rasayana formulations, including Guduchi (*Tinospora cordifolia*), Amalaki (*Emblica officinalis*), Brahmi (*Bacopa monnieri*), and Ashwagandha (*Withania somnifera*), have strong adaptogenic, antioxidant, and regenerative qualities that support their function in reducing age-related deterioration. Even with its encouraging uses, issues including clinical validation, pharmacokinetic profiling, and standardization need more research. Systems biology, AI-driven drug development, and metabolomics are examples of advanced research

approaches that might help close the gap between conventional wisdom and contemporary scientific confirmation. A sustainable and comprehensive strategy for extending the human lifespan and health span is provided by the incorporation of Rasayana into international healthcare systems as an adjunctive anti-ageing intervention. Rasayana treatment therefore embodies the confluence between Ayurveda and contemporary longevity sciences, representing a timeless but advanced approach.

Conflict of Interest

The authors declare no competing interests.

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Data Availability

The authors confirm that the data supporting the findings of this study are available in the article.

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