

Formulation and Evaluation of Multivitamin Biscuit

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ABSTRACT

Modern lifestyle changes have greatly affected human health, leading to greater awareness and a stronger need for foods that are healthy, functional, and packed with nutrients. Among the various kinds of baked goods, biscuits and cookies are very popular because they are easy to eat, last a long time, and people enjoy them. Adding nutraceuticals to these products is a smart way to boost their nutritional value without making them less tasty. The term "nutraceuticals" was first used by Stephen De Felice. It refers to parts of food that offer health and medical benefits beyond just basic nutrition, such as helping to prevent diseases and improve overall health. These bioactive compounds, like antioxidants, phytochemicals, vitamins, minerals, fatty acids, and probiotics, are important for managing health issues caused by lifestyle and for addressing deficiencies in essential nutrients. India has a high rate of nutrient deficiencies, especially in vitamins A, B12, folate, calcium, and vitamin D, which can lead to major health problems. Using bakery products as a way to fortify food is a practical method to tackle these deficiencies. Adding encapsulated multivitamins and herbal powders to biscuits helps keep nutrients stable, improves how well they are absorbed by the body, and preserves sensitive compounds from being damaged during baking. Techniques like microencapsulation and lipid-based delivery systems further enhance nutrient absorption and help the biscuits stay fresh longer. This study looks at making biscuits enriched with nutraceuticals using certain herbal powders and encapsulated multivitamins. The main goals are to check how well the biscuits taste, their functional qualities like antioxidant activity and total phenolic content, their physical and chemical properties, how well they resist microbes, and how long they stay fresh. These nutraceutical-enriched biscuits are compared to regular biscuits to see how well they are accepted by consumers and what health benefits they offer. Overall, nutraceutical biscuits are a promising type of functional food that can help improve public health, meet the growing global demand for healthier options, and support disease prevention through better diet choices.

Keywords: Multivitamin Biscuit

INTRODUCTION

Change in lifestyle is affecting the quality of human health. Today, people are more focused on eating healthy and nutritious food to stay fit. In India, the baking industry has been a major part of the food processing sector. Baked goods became popular because they are easy to prepare, readily available, and have a long shelf life. Cookies are a type of nutritious snack that is different from other baked items. They contain less moisture and are made using a hot air oven. The term "nutraceutical" comes from combining the words "nutrition" and "pharmaceutical," and was first used by Stephen de Felice in 1989. He described nutraceuticals as "a food (or part of a food) that provides medical or health benefits, including the prevention and/or treatment of a disease." There is a slight difference between

functional foods and nutraceuticals. When food is made or prepared with "scientific intelligence," either with or without understanding the reasons behind it, it is called a functional food. Functional foods give the body the necessary vitamins, fats, proteins, carbohydrates, etc., needed for maintaining good health. Nutraceuticals are bioactive chemicals found in everyday foods or from botanical sources. They can be eaten as part of functional foods or taken as dietary supplements, offering extra health benefits beyond basic nutrition. Examples of such compounds include antioxidants, phytochemicals, fatty acids, amino acids, and probiotics, which are found in various food sources and are used in nutritional supplements. Nutraceuticals are known for their role in treating and preventing diseases, slowing aging, and fighting cancer, whether their effects are already proven or still being explored. Nutraceuticals are oral dietary

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components that are naturally found in food and are believed to offer medical or health benefits. The term was coined by dr. Stephen de felice by combining "nutrition" and "pharmaceutical." here, the theoretical actions and clinical benefits of some dermatologic nutraceuticals are discussed. Nutraceuticals are products that are extracted, purified, or made from plant, animal, or marine sources, such as antioxidants from blueberries, elk velvet, and fish oils. They can also be made from dried, powdered, or pressed plant materials. These products have been shown to provide physiological benefits or protect against chronic diseases.

Concept of nutraceuticals

In the pharmaceutical industry, it is necessary to have results from animal tests and studies to confirm that a product works as intended. However, in the case of nutrition, there was no clear way to prove that certain foods could prevent diseases in the past. In recent years, as scientific research has shown how food components can influence lifestyle-related diseases, nutrition has become a bigger topic of concern. Nutraceutical products are now recognized for their health benefits, such as reducing the risk of cancer and heart disease, helping to manage or treat high blood pressure, high cholesterol, excess weight, osteoporosis, diabetes, arthritis, macular degeneration (which can lead to permanent blindness), cataracts, menopausal symptoms, insomnia, memory loss and difficulty concentrating, digestive issues, and constipation. Some products are even claimed to help with thinning hair, low self-esteem, poor skin condition, varicose veins, alcoholism, depression, and tiredness.

OBJECTIVES

1. To create a biscuit that includes different amounts of selected herbal powders.
2. To check the sensory qualities of the biscuits, such as how they look, taste, feel, smell, and how acceptable they are to consumers.
3. To test the functional properties of the biscuits, like their antioxidant activity and the amount of total phenolic content.

4. To find out how long the biscuits stay fresh and how stable they are against microbial growth over a specific storage time.

5. To study the physical and chemical properties of the biscuits, including texture (hardness, brittleness), color, how much they spread when baked, and their pH level.

6. To compare the developed herbal biscuit with a standard non-herbal biscuit in terms of health benefits and how well consumers like them.

Why Nutraceuticals?

1. For many of us, it's really hard to get all the nutrients we need from regular food.
2. Also, we live in a very polluted environment with lots of toxins and pesticides that can mess up how our body works.
3. Plus, there are a lot of new health issues that are becoming more common, like chronic fatigue, Epstein Barr, and lupus.
4. It makes more sense to focus on strengthening our body's natural defenses instead of relying on antibiotics that are no longer as effective.
5. Medicines often have side effects because they aren't made from natural sources, but high-quality supplements that the body can actually use can help improve our health in a natural way.

Growth of Nutraceuticals

In the global market, nutraceuticals and functional foods have become a huge industry worth billions of dollars. However, growth in this area is limited because there's a need for proper labeling and understanding of the health benefits of these products. Choosing plants that consistently produce high levels of active compounds in specific regions can help create better and more reliable nutraceuticals and functional foods. The United States has the largest and fastest-growing nutraceutical and functional food market in the world. India is known for a wide range of medicinal herbs, spices, and trees, and these are in high demand in the domestic market. In India, functional foods and nutraceuticals are often available as traditional Ayurvedic medicines and are sold under different brand names. However, there aren't strict regulations for these products in India, and they are

available over the counter without a doctor's prescription. India has a big share in the international nutraceutical and functional food market and exports these products to many countries, especially the USA and Japan. The global food market for nutraceuticals is growing rapidly.

Global Demand for Nutraceuticals

The global demand for nutraceutical ingredients rose by 5.8% each year, reaching \$15.5 billion in 2010, supporting a \$197 billion global nutritional product industry. China and India are expected to be the fastest-growing nutraceutical markets as their economies grow and they expand their food, beverage, and drug production. Herbal and non-herbal extracts are gaining more acceptance from both consumers and medical professionals, leading to a 6.5% annual increase in demand for these products, reaching \$1.85 billion in 2010. The demand for nutrients, minerals, and vitamins reached \$9.5 billion in 2010, growing by 6.3% annually since 2005. The global demand for nutraceutical vitamin ingredients increased by 4.6% each year, reaching \$4.2 billion in 2010. Natural vitamin E and beta carotene (vitamin A) are also expected to perform well in the global market due to their effectiveness compared to synthetic alternatives for both adults and children.

FUTURE SCOPE

Changing your lifestyle can help prevent diseases like metabolic syndromes. One way to change your lifestyle is by adjusting your diet. The main challenges for nutraceuticals are:

- Creating scientific standards to assess how they can help prevent diseases
 - Setting up a system to evaluate disease prevention using human trials
 - Building a smooth process to move from basic research to making products for the market
- Nutraceuticals aren't just one thing; they often include several components. This means the way they work to prevent diseases might be due to the combined effects of these components. It's also important to compare how different types of food can prevent diseases. Therefore, it's necessary to study biomarkers that show if prevention is working. That's why it's

important to define how to measure these biomarkers and set standard indicators.

Multivitamin Biscuit

More than 80% of the Indian population suffers from micronutrient deficiencies, mostly in vitamin A, B12, folate, and calcium (Ritchie et al., 2018). Lack of calcium is often connected with low vitamin D, which can happen due to diet or not getting enough sunlight. This can lead to poor bone health, rickets in children, and osteomalacia in adults (Sizar et al., 2021). Anemia is also common in pregnant women and women of reproductive age (Ministry of Health and Family Welfare (MoHFW), Government of India, UNICEF and Population Council, 2019). These deficiencies can cause serious health problems, including mental and physical issues and even death. One major reason for these deficiencies is eating the wrong foods and poor absorption of vitamins in the body (Das et al., 2013). To fix this, food fortification is used at various stages of processing. This means adding or increasing the amount of several vitamins in food products. Edible oils are often used to help with this process. To keep vitamins stable during fortification and not affect the taste, smell, or appearance of food, they need to be properly protected (Das et al., 2013). Microcapsules are highly recommended as a good way to deliver nutrients in food because they protect active ingredients, release them at the right time, are stable under heat, and can mask taste, color, and smell (Yang et al., 2020; Pattnaik et al., 2021). Using a lipid-based emulsion as a template helps create a layer of polymer around vitamins, protecting them from bad conditions (Pattnaik & Mishra, 2021a, 2021b). Lipid-based nanoparticles (liposomes) are made from phospholipids that can enclose both water and fat-soluble components, which helps improve how well nutrients are absorbed (Sercombe et al., 2015). Biscuits and cookies are enjoyed by people of all ages. They are made by mixing starch and/or protein and then kneading the dough. They have a long shelf life, making them great for large-scale production and wide distribution (Rebellato et al., 2015). With more people focusing on healthy lifestyles, there's a growing interest in low-fat biscuits. Many studies have looked into fortifying flour with nutrients (Rebellato et al., 2015; Bajaj & Singhal, 2021). Using encapsulated vitamins in biscuits helps protect heat-

sensitive nutrients from breaking down and keeps them stable even under high temperatures or changing pH levels (Canizales et al., 2018). This also improves the food's function (Tripathy et al., 2021). In this study, the dough was fortified with encapsulated multivitamin nanoparticles. The effects of baking on the dough and biscuit were then studied. Vitamins can be affected by different pH levels, leading to poor absorption in the stomach. To test if these biscuits could help with vitamin absorption, a simulated in vitro model was used to check how the vitamins were released.

Methods of preparations

1. Liposomes

Liposomes are tiny, spherical particles that form naturally when certain lipids are mixed with water. They range in size from 0.05 to 5.0 micrometers and have a unique structure where they can trap some of the surrounding liquid inside their outer layer. These particles can have a single layer or multiple layers, making them flexible for different uses. The main components of liposomes are polar lipids, which have both water-loving and oil-loving parts. When these lipids come into contact with water, they arrange themselves into small, organized structures. Using liposomes for delivering drugs can help improve the effectiveness of cancer treatments. This is because liposomes can concentrate more of the drug in the tumor while reducing its presence in healthy tissues, either through the enhanced permeability and retention effect or by targeting specific areas. The benefits of using liposomes include their compatibility with the body, ease of making them, their ability to carry various types of substances, and the ability to adjust their behavior in the body by altering their composition. There are several methods used to make liposomes, including mechanical dispersion, solvent dispersion, and detergent removal, which helps in getting rid of unwanted materials not enclosed within the liposomes.

2. Phytosomes

Introduction: Many drugs used in medicine come from natural sources. To make these compounds more soluble in fats, water-loving ingredients can be mixed with helpful nutrients like phospholipids. Phytosomes

are structures similar to liposomes, created by combining these ingredients. Unlike liposomes, where no chemical bond forms and phosphatidylcholine just surrounds water-soluble substances, phytosomes significantly improve the absorption of active ingredients that are not easily soluble in fats. This increased absorption helps plant-based medicines that are hard to dissolve in lipids to be more effectively absorbed in the digestive system.

Method of preparation:

In a round bottom flask, phosphatidylcholine and cholesterol were measured precisely and dissolved in 10 ml of chloroform. The mixture was then sonicated for 10 minutes using a bath sonicator. Organic solvents were removed using a rotary evaporator set at 45°C to 50°C. Once the solvent was fully gone, a thin layer of the phospholipid mixture formed. This layer was then hydrated in a rotary evaporator at 37°C to 40°C for an hour using a plant methanolic extract. After hydration, the mixture of lipids and plant extract was sonicated for 20 minutes in an ice bath to cool it down. Finally, the prepared phytosomes were stored in amber bottles and kept in the freezer at 2°C to 8°C until they were needed.

3. Microsphere

Introduction: Systems that deliver drugs to specific parts of the body have a big impact on healthcare. Because of this, carrier-mediated technology has become an intelligent way to deliver drugs more effectively. This method involves attaching the drug to carrier particles such as microspheres, nanoparticles, and liposomes. The best drug delivery system releases the drug at a rate that matches the body's needs during treatment. The most common way to take medicine is through the oral route. Microspheres are small, spherical particles with a diameter ranging from 1 to 100 micrometers. These are biodegradable particles made from natural or synthetic materials and are free-flowing. There are two main types of microspheres.

- Microcapsules are substances that are completely enclosed by a distinct capsule wall.
- In micromatrices, the substance is spread throughout the matrix.

It's important to deliver the drug properly to get the full therapeutic Benefit, as controlled drug delivery systems solve many problems with traditional treatment and improve the effectiveness of a drug. Developing a new system for controlled drug release often involves using microspheres.

Method of Preparation:

- Solvent evaporation
- Double emulsion technique
- Spray drying and spray congealing
- Solvent extraction
- Single emulsion technique
- Quasi emulsion solvent diffusion
- Spray drying
- Phase separation coacervation technique

Spray Drying

In the spray drying process, the polymer is first dissolved in a volatile organic solvent like acetone or dichloromethane. The drug is then mixed thoroughly and dispersed in the polymer solution. A high-speed stream of hot air is used to break this mixture into tiny droplets. As the droplets form, the solvent quickly evaporates, creating microspheres that range in size from 1 to 100 micrometers. A cyclone separator is used to collect the microspheres from the hot air, while vacuum drying removes any remaining solvent. One of the main advantages of this process is its ability to work in aseptic conditions.

Ingredients in biscuit making

1. Flour: This is a powder made by grinding a cereal grain. Wheat flour is the most common type. All flours are mostly made up of starch and protein, but wheat flour has a high level of a group of proteins called gluten. When you mix wheat flour with water to make dough, the gluten forms into a thick, stretchy mass. When you bake it, the dough puffs up a lot and becomes light and airy. The quality of flour depends on a few things. The type of wheat and how it was grown. This affects how much gluten is in the grain.

- The milling process. This determines how much of the bran and endosperm are separated, and how fine the flour is.
- Any additives or special treatments the miller uses to create flour with special properties.

2. Fat: Fat plays five main roles in baking.

The way it works depends on its slip point, which is the temperature at which it starts to melt. In general, the slip point should be at least 5°C higher than the proving temperature of the dough. The roles of fat are as follows:

- Shortening: Fat weakens the gluten in the dough, making the final product softer, easier to break, and with a tender texture.
- Creaming: When fat is beaten, it can trap air, creating a batter full of tiny air pockets.
- Layering: In puff pastry, fats that are soft across a wide temperature range are used. These fats separate layers of pastry during cooking, creating a flaky texture.
- Flavour: Fats should be neutral in taste so they don't change the flavour of the final product.

3. Sugar: Sugar is mainly used for sweetness, but it also affects several other processes in baking.

At high temperatures, sugar undergoes complex browning reactions, which create the golden crust on many baked goods. These reactions are called Maillard reactions. In non-fermented items like biscuits, a lot of sugar can be used to improve shelf life and add sweetness. The sugar used is usually pure sucrose such as castor sugar. Sometimes, less pure forms like golden syrup, honey, or brown sugar are added for special flavours.

4. Baking Powder: Baking powder is a mix of sodium bicarbonate (NaHCO_3) and a weak acid or acid salt. When it dissolves in water and heat is applied, it releases carbon dioxide gas. When baking powder is used instead of baking soda, it makes less alkaline by-products, which don't affect the taste of the final product.

5. Salt: Salt is used to improve the taste of baked goods and to firm up the soft mixture of fat and sugar, making the dough more elastic.

Nutraceuticals and Disease: It has been suggested that nutraceuticals offer health benefits or can help protect against several conditions, including cancer, allergies, osteoarthritis, heart disease, diabetes, obesity, Parkinson's disease, eye problems, immune system issues, and inflammation.

CONCLUSION

Changes in how people live and what they eat have had a big impact on their health. This has led to a greater need for foods that not only give the basic nutrients the body needs but also provide extra health benefits. Nutraceuticals and functional foods have become important tools to tackle nutrient shortages, lifestyle-related health problems, and long-term diseases. Biscuits and cookies are especially good for adding these health-boosting ingredients because they are widely accepted, last a long time, and are easy to make. Creating biscuits and cookies that include nutraceuticals or multivitamins along with herbal powders and encapsulated vitamins is a promising way to improve nutrition, especially for people who lack certain micronutrients. Using techniques like microencapsulation and lipid-based delivery systems helps keep sensitive nutrients stable and improves how well they are absorbed during baking and digestion. These methods also help maintain the taste, texture, and appearance of the biscuits. Testing the sensory qualities, physical and chemical properties, antioxidant activity, phenolic content, microbial safety, and how well consumers like the product is essential for making a high-quality functional food. Compared to regular biscuits, these nutraceutical versions offer better health benefits without losing their appeal to consumers. The growing interest in nutraceuticals worldwide and in India shows that people are becoming more aware and open to health-focused food choices. In general, nutraceutical biscuits have a big potential as functional foods that can help prevent nutrient deficiencies, support disease prevention, and enhance overall well-being. With proper scientific support, quality standards, and regulatory guidelines, these products can play a key role in improving public health and addressing future nutritional needs.

REFERENCE

- Dumoulin M, Gaudout D, Lemaire B. Clinical effects of an oral supplement rich in antioxidants on skin radiance in women. *Clin Cosmet Investig Dermatol*. 2016; 9:315–324.
- Bolognia JL, Jorizzo JL, Schaffer JV. *Evaluation of beauty and the aging face*. London: Elsevier; 2012. p. 2473–2478.
- Sekhar RV, Patel SG, Guthikonda AP, Reid M, Balasubramanyam A, Taffet GE, Jahoor F. Deficient synthesis of glutathione underlies oxidative stress in aging and can be corrected by dietary cysteine and glycine supplementation. *Am J Clin Nutr*. 2011; 94:847–853.
- Yoshida S, Yasutomo K, Watanabe T. Treatment with DHA/EPA ameliorates atopic dermatitis-like skin disease by blocking LTB₄ production. *J Med Invest*. 2016; 63:187–191.
- Berger MM, Spertin F, Shenkin A. Clinical, immune and metabolic effects of trace element supplements in burns: a double-blind placebo-controlled trial. *Clin Nutr*. 1996; 15:94–96.
- Bagchi D, Preuss HG, Kehrer JP. Nutraceutical and functional food industries: aspects on safety and regulatory requirements. *Toxicol Lett*. 2004; 150:1–2.
- Zhao J. Nutraceuticals, nutritional therapy, phytonutrients and phytotherapy for improvement of human health: a perspective on plant biotechnology application. *Recent Pat Biotechnol*. 2007; 1:75–97.
- Bland JS. Phytonutrition, phytotherapy and phytopharmacology. *Altern Ther Health Med*. 1996; 2:73–76.
- Berger MM, Shenkin A. Vitamins and trace elements: practical aspects of supplementation. *Nutrition*. 2006; 22:952–955.
- Bagchi D. Nutraceuticals and functional foods regulations in the United States and around the world. *Toxicology*. 2006; 221:1–3.
- Ramaa CS, Shirode AR, Mundada AS, Kadam VJ. Nutraceuticals—an emerging era in the treatment and prevention of cardiovascular diseases. *Curr Pharm Biotechnol*. 2006; 7:15–23.
- Biesalski HK. Nutraceuticals: the link between nutrition and medicine. In: Kramer K, Hoppe PP, Packer L, editors. *Nutraceuticals in Health and Disease Prevention*. New York: Marcel Dekker Inc.; 2001. p. 1–26.
- Klein C, Sato T, Meguid MM, Miyata G. From food to nutritional support to specific nutraceuticals: a journey across time in the treatment of disease. *J Gastroenterol*. 2000; 35:1–6.
- World Nutraceuticals. *Industry Study with Forecasts to 2010 and 2015*. Cleveland (OH): The Freedomia Group; 2006.

15. Patwardhan B, Warude D, Pushpangadan P, Bhatt N. Ayurveda and Traditional Chinese Medicine: a comparative overview. *Evid Based Complement Alternat Med.* 2005;2(4):465–473.
16. Bajaj SR, Marathe SJ, Singhal RS. Co-encapsulation of vitamins B12 and D3 using spray drying: wall material optimization, product characterization, and release kinetics. *Food Chem.* 2021; 335:127642.
17. Jacob J, Leelavathi K. Effect of fat-type on cookie dough and cookie quality. *J Food Eng.* 2007; 79:299–305.
18. Kucukkolbasi S, Bilber O, Ayyildiz HF, Kara H. Simultaneous and accurate determination of water- and fat-soluble vitamins in multivitamin tablets using RP-HPLC. *Quim Nova.* 2013; 36:1044–1051.
19. Ministry of Health and Family Welfare (MoHFW), Government of India; UNICEF; Population Council. Comprehensive National Nutrition Survey (CNNS) National Report. New Delhi; 2019.
20. Ramalho MJ, Loureiro JA, Pereira MC. Poly (lactic-co-glycolic acid) nanoparticles for the encapsulation and gastrointestinal release of vitamin B9 and vitamin B12. *ACS Appl Nano Mater.* 2021; 4:6881–6892.
21. Sowmya RS, Sugriv G, Annapure US. Effect of basil herb on cookies development and its impact on nutritive, elemental, phytochemical, textural and sensory quality. *J Food Sci Technol.* 2022;59(9):3482–3491.
22. Kalra EK. Nutraceutical—definition and introduction. *AAPS PharmSci.* 2003; 5:27–28.
23. Pandey M, Verma RK, Saraf SA. Nutraceuticals: new era of medicine and health. *Asian J Pharm Clin Res.* 2010;3(1):11–15.
24. Ramakrishna S, Dhanush SR, Lavanya MB, Vindyashree L. Formulation and evaluation of nutraceutical tablet using radish leaves powder. *World J Biol Pharm Health Sci.* 2022;12(3):107–118.
25. Chauhan B, Kumar G, Kalam N, Ansari SH. Current concepts and prospects of herbal nutraceuticals: a review. *Adv Pharm Technol Res.* 2013;4(1):4–8.
26. Dhage VR, Singh AM, Kurhe VE, Dhage SS, Pokale SS. Formulation and evaluation of nutraceutical tablet. *Int J Pharm Sci.* 2024;2(9):217–222.
27. Thliza BA, Kolo MT, Dawi HA, Kanadi AA. Production and storage properties of biscuit from orange peels and pulps. *J Sci Eng Res.* 2021;8(8):98–109.
28. Pathan SA, Panchal AB, Dhakane RP, Chaudhary MB. Role of nutraceuticals in various diseases: a comprehensive review. *Int J Creat Res Thoughts.* 2024;12(3).
29. Rani V, Sangwan V, Rani V, Malik P. Orange peel powder: a potent source of fiber and antioxidants for functional biscuits. *Int J Curr Microbiol App Sci.* 2020;9(9):1319–1325.
30. Burungale A, Sune R. Therapeutic uses of Tulsi. *Int J Life Sci Pharma Res.* 2023;13(5):1–5.
31. Jokhi Y, Vasava P, Yogi L, Vorapatel S, Weldingwala M, Tajkhan B, Thakor H. Nutritive evaluation of composite flour biscuit assimilated with herbal constituents. *JETIR.* 2023;10(5):475–484.
32. Chaudhari SP, Patil PS. Pharmaceutical excipients: a review. *Int J Adv Pharm Biol Chem.* 2012;1(1):21–34.
33. Wadher KJ. Ideal characteristics of pharmaceutical excipients. Slideshare. Available from: <https://www.slideshare.net/kamleshwadher/pharmaceutical-excipients-108218044>
34. Sopyan I, Santi NMW, Berlian AV, Meilina NE, Fauza Q, Apriyandi RA. Pharmaceutical excipients of solid dosage forms and characterizations: a review. *Int J Res Pharm Sci.* 2020;11(2):1472–1480.
35. Himanshu, Sameeksha, Kumar M. A comprehensive review on pharmaceutical liquid dosage forms. *Acta Sci Pharm Sci.* 2022:12–24.

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