

**FORMULATION OF HEARBAL ADDITIVE TREATED FOR
MARASMUS DISEASE****Aadarsh Nagdoi*, Agraja Chaure(UG Students), Sonali Patidar**

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ABSTRACT

The objective of this page is to enlighten students and health educators about Marasmus. It illustrates how people suffer from this illness as a result of inadequate nutrition in the food they eat. Due to malnutrition and poor diet, starvation poses a serious danger to the world's efforts to eradicate Marasmus, which primarily affects children in underdeveloped and emerging nations. The child's muscles and fat are drastically reduced due to a lack of energy and protein, which causes severe wasting and just skin and bone are visible. A youngster with marasmic symptoms may experience marasmic-kwashiorkor oedema. Marasmic children are susceptible to a number of problems, such as diarrhoea, hypoglycemia, hypothermia, viral diseases, and deficiencies in micronutrients

(such as iron, zinc, copper, and vitamin A). Anti-fungal, anti-septic, anti-microbial, anti-cancer, anti-diabetic, anti-allergic, anti-fertility, anti-filarial, wound healing, and anti-dermatophytic are just a few of the many benefits of betel leaf. Abrus precatorius is recommended by Ayurveda for conditions such as alopecia, oedema, helminths, skin conditions, itching, urinary problems, and infertility. Solanum nigrum Linn. (Sn), commonly referred to as Black Nightshade, belongs to the Solanaceae family. This plant is used for addressing various pediatric conditions that can lead to infant mortality, particularly seizures caused by fever, eye diseases, water-related phobias, and serious skin disorders. The heartwood of this plant is transformed into a medicinally effective product known as Katha, which boasts a broad spectrum of therapeutic benefits.

KEYWORDS: Marasmus, Catechu, Solanum nigrum linn, Abrus precatorius, Clinical features.

INTRODUCTION

The phrase "protein-energy malnutrition" describes acute malnutrition, which is defined as an inadequate weight in relation to vertical height and is caused by an inadequate intake of protein. There are two primary types of severe acute malnutrition: kwashiorkor and marasmus. A person with marasmus will experience weight loss and facial fat. In a similar vein, their skin develops creases due to the decrease of bodily mass, and their bones show up beneath their skin. Their eyes may appear sunken. A child with marasmus can also be very hungry and suck on their clothes or hands as if trying to find something to eat but some people with marasmus have anorexia nervosa and they are not wanting or be able to have food. Both adults and youngsters can have marasmus, but it most frequently affects young children in developing countries. It happens when the intake of nutrients and energy is just too low for an individual's needs. It appears in wasting, or the loss of fat and muscle. A child with marasmus might not grow as children usually do. The World Health Organization recognizes the elderly as another population that's susceptible to poor nutrition. Because their nutritional requirement isn't well defined, attempts to supply them with the required nutrition become difficult.^[1]

Adequate nutrition is defined as the intake and use of enough energy and nutrients to maintain nutritional and health well-being. Adequate nutrition is essential in early childhood to ensure normal growth, neurological and cognitive development, and healthy life. Adequate feeding and access to appropriate quality and quantity of foods are essential components of optimal nutrition for children.^[2]

Optimal infant and young child feeding can be achieved easily by encouraging mothers to breastfeed exclusively for the first 6 months and to introduce nutritionally adequate, safe, age-appropriate, and responsive complementary feeding starting at 6 months.^[3] Evidence has shown that health in old age is associated with adequate nutrition and good health in earlier years of life. Therefore, there is a need to introduce qualitative and quantitative foods at earlier ages for children.^[4] of the 7.6 million annual deaths among children younger than 5 years, ~35% are because of nutrition-related factors.^[5]

Marasmus is one form of severe protein energy malnutrition (PEM). It is an important cause of under 5 deaths in developing countries. In 2009, over 9 million children died of disease and malnutrition globally and most child death occurs in developing countries. Sub-Saharan African accounts for around 4.8 million of all child death, where around 3.1 million are in south Asia.^[6] Despite different development program and priority in several health's' and other program malnutrition remains a perennial problem in many developing countries. Infection, diarrhoea, low birth weight (LBW) associated with intrauterine growth restriction (IUGR) are associated with marasmus. Although incidence and mortality of severe malnutrition which include marasmus is declining slowly still, it is a threat to child health and child survival. Most of the child mortality occurs in severe acute malnutrition (SAM) which includes marasmus if it is not address properly. Faulty case management and weak health system inappropriate treatment strategies inadequately trained staffs, lack of support lead to high case fatality of severe malnutrition (marasmus) associated with complication. The article will provide awareness and information about the characteristics features of marasmus, its aetiology, pathogenesis and complications and its appropriate management at facility and community level. Marasmus is the most common form of introduction severe malnutrition in nutritional emergencies.

The word marasmus is derived from the Greek word marasmus, which means wasting. It is characterized by severe wasting of fat and muscle which the body breaks down to make energy. Affected children exhibit extreme wasting and have the appearance of old man appearance with just skin and bones visible. The body of wasted child tries to conserve energy by poor activity and reducing metabolic process.^[7]

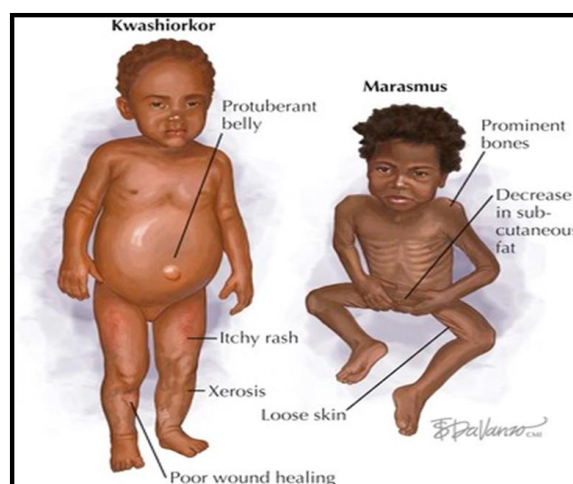


Fig No: 1 Malnutrition.

Marasmus is a severe form of malnutrition — specifically, protein-energy undernutrition. It results from an overall lack of calories. Marasmus is a deficiency of all macronutrients: carbohydrates, fats, and protein. If you have marasmus, you lack the fuel necessary to maintain normal body functions. People with marasmus are visibly depleted, severely underweight and emaciated. Children may be stunted in size and development. Prolonged marasmus leads to starvation. Marasmus can affect anyone who lacks overall nutrition, but it particularly affects children, especially infants, who require more calories to support their growing bodies. It is more common in developing countries with widespread poverty and food scarcity, and where parasites and infectious diseases may contribute to calorie depletion. In the developed world, elderly people in nursing homes and hospitals or who live alone with few resources are more at risk.^[8]

The external signs of marasmus

- ❖ Visible wasting of fat and muscle.
- ❖ Prominent skeleton.
- ❖ Head appears large for the body.
- ❖ Face may appear old and wizened.
- ❖ Not suitable form for drug inactivated in the stomach or cause damage to stomach these should be presented as enteric-coated tablets.
- ❖ Dry, loose skin (skin atrophy).
- ❖ Dry, brittle hair or hair loss.
- ❖ Sunken fontanelles in infants.
- ❖ Lethargy, apathy and weakness.
- ❖ Weight loss of more than 40%.
- ❖ BMI below 16.^[9]

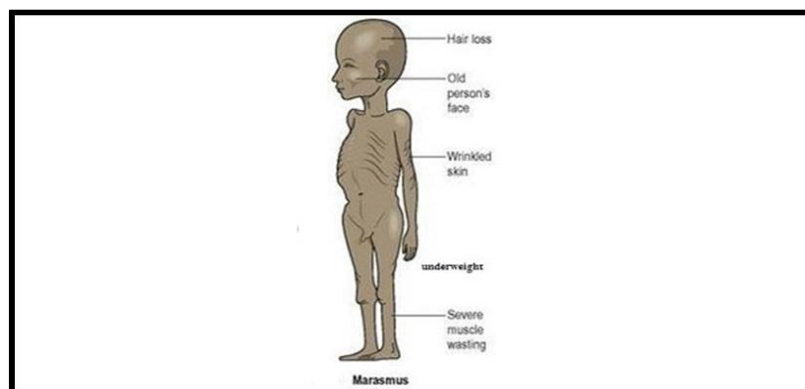


Fig No: 2 Marasmus.

Causes

Marasmus is caused by the following factors: Maternal malnutrition, Maternal anaemia, Parental ignorance, Poverty, Pneumonia, Cyanotic heart diseases, Malaria, Necrotizing enterocolitis Pyloric stenosis, Lactose intolerance Intussusception Meningitis, Anorexia Nervosa, Diarrhoea, measles, or a respiratory tract infection are serious complications during a child with marasmus.^[10]

Clinical Features

Marasmus is an acute loss of body fat and muscle tissues, resulting in a strangely low body mass index.^[11]

- Weight loss
- Dehydration
- Chronic diarrhoea
- Stomach shrinkage
- Fatigue
- Difficulty staying warm
- A lower body temperature
- Diarrhoea
- Reduced appetite
- A lack of emotion
- Irritability
- Weakness
- Slower breathing
- Dry skin
- Hair loss

Risk Factors

- ❖ Risk factors for marasmus include: Chronic starvation.
- ❖ Contaminated water, inadequate foods components.
- ❖ Other diet deficiencies (vitamin A, E or K).
- ❖ Unbalanced food format lacking in grains, fruits and vegetables, and protein.
- ❖ Growth troubles in kids.
- ❖ Joint deformity and destruction.
- ❖ Loss of strength, blindness.

- ❖ Organ failure or dysfunction.
- ❖ Unconsciousness and coma.^[12]

POWDER

Powder is a mixture of finely divided drug and / or chemicals in a dry form that may be intended for internal use (oral powders) or external use (topical or dusting powder).^[13]

Classification of powders according to the manner of their dispensing

Divided powders. Simple and compound powders for internal use. Powders for reconstitution. Bulk powders for internal use: Oral bulk powders for internal use. Antacid Oral bulk powders for reconstitution for internal use. Injectable bulk powders for reconstitution for internal use. Bulk powders for external use. Dust. Douches. Dental Insufflations In snuff Effervescent granules.^[14]

Divided powders

These are powders used for potent drugs (drugs that are effective in low concentrations), it was used before in old days but after development of other dosage forms it became obsolete. They are diluted with lactose and dispensed in form of divided doses and are wrapped separately. They have now been replaced by tablets and capsules. They are intended for internal use only. Packaging of divided powders: Volatile or hygroscopic drugs are wrapped in aluminum foil or plastic bags.^[15]

Bulk powders Definition

These are powders used for less potent drugs. These are powders supplied in bulk or large quantities. They are intended for internal or external use. Bulk powder for internal use They are non-potent substances such as antacid. They are dispensed in a wide mouth container so that the teaspoon can easily remove the powder.^[16]

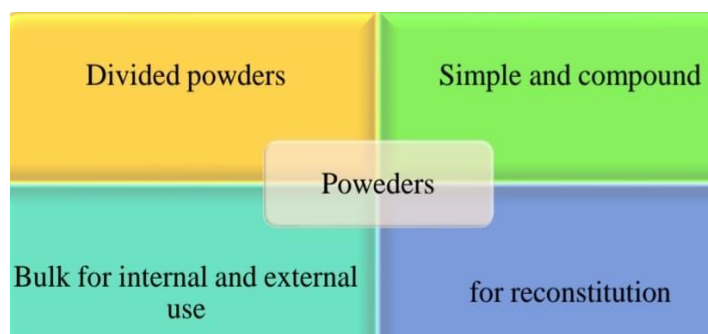
Simple and compound powders for internal use

They are packed into properly folded papers and dispensed in envelopes, metal foil, small heat-sealed plastic bags or other containers. The modern packaging has replaced the foil and plastic laminates by paper wrapping, due to the protective qualities and are able to be used on high speed packing machine. The preparation of simple powder involving weighing of the ingredients correctly and blending them. The mixture is either divided into blocks of equal

size or each dose is weighed separately and placed into a powder paper, the paper is then folded and placed in an envelope or powder box.

Powder for reconstitution

These powders are intended to be reconstituted just before use. They are used to protect drugs against hydrolysis and enhance stability of the active constituents.^[17]



Advantages of powder

- Powders being the solid preparation are more stable than liquid and semi-solid preparations.
- Convenient forms, to dispense large dose of drugs. They can be best administered in powder form by mixing them with food or drinks.
- Since powders are in the form of small particles, they offer a large surface area and are rapidly dissolved in the gastrointestinal tract minimizing the problems of local irritation.
- More convenient to swallow, faster dissolution and absorption than tablets or capsules.

Disadvantages of powder

- Less convenient to carry
- Bulk powders are not suitable for administering potent drugs with a low dose.
- Difficult to mask the unpleasant taste of the drugs.
- Light fluffy powders may be inhaled by infants leading to breathing difficulties.
- Variable dose accuracy.

PLANT PROFILE

ABRUS PRECATORIUS

Abrus Praetorius (L.) is a famous plant to the family (Leguminosae) the chickpea family.^[18]

- ❖ It is native to tropical and subtropical India. tropical area, outside eat an altitude of 1200 m Indian Himalayas. It is beautiful, multi branched, slender, perennial, deciduous, woody,

and deciduous or climbs a mountain. Stem cylindrical, purple, bark soft, brown. The leaves are pinnate and oblong, many leaflets (12 or more) arranged pair of oval leaves, 2.5 cm long and a width of 1.5 centimetres.^[19]

- ❖ Flowers are abundant and visible in it leaf blades along the petioles, shorter than the leaves; This happens in groups 1 to 1, admiring the point of swelling 3 inches long, usually reddish purple or sometimes red white The plant produces short and short brown retracts when opened to reveal the pendant red and black seeds, 4-6 peas per pot.^[20]
- ❖ Medicinal plants can be an important resource previously unknown chemicals with potential therapeutic effects. The medicinal use of plants is an ancient tradition, older than modern times. Medicine, pharmacology and chemistry. Global health organization estimated that more than 75% of the world's population is still dependent in herbs usually obtained from traditional healers basic health needs.^[21]
- ❖ Herbal medicines are in great demand for development. It is chosen with developing countries for primary health care because of its breadth biological and pharmaceutical agents, higher safety margins and lower costs.^[22]
- ❖ The current effort is to review compile various updated data aspect of *Abrus precatorius* Linn. It is a plant that is used all over the world. This is a plant commonly known as 'Gunja' or 'Jequirity' and available everywhere- In the plains of India. In the absence of modern medicine, people rely on herbal medicines derived from herbs and to reduce swelling in wounds and other skin injuries, and to treat indigestion and stomach pain. A lot Molecules have emerged from the medical field, for example, rauwolfia alkaloids in amoeba. Goulston's as a hypolipidemic agent, *Mucuna pruriens* for Parkinson's disease. India is one of the largest It is known as the botanical garden of the world because it produces medicinal plants and sits on top of gold Documented and traditional herbal medicinal practices. About 17,000 species About 7,500 Indian plants have been reported to have high medicinal value and in other countries estimated between 7% and 13%.^[23]



Fig. No. 3 *Abrus precatorius* leaf.

TAXONOMICAL CLASSIFICATION

- **Kingdom Plantae Division:** Magnoliophyte
- **Family:** Fagaceae
- **Subfamily:** Facoideae
- **Tribe:** Abera
- **Genus:** Abrus
- **Species:** Abrus predator jus.^[24]

THREE TYPES OF GUNJA

- ❖ Red
- ❖ Black
- ❖ White



Fig. No: 4 Abrus seeds.

Solanum nigrum

- The plant *Solanum nigrum* Linn (Solanaceae) commonly called as black night shade in English, Makoi in Hindi, Kachchi Pandu in Telugu, Munatakali in Tamil, Piludi in Gujarati & Kamuni in Marathi.
- It is an erect, divaricately branched, unarmed, suffrutescent annual herb. Leaves ovate or oblong, sinuate-toothed or lobed, glabrous; flowers 3-8 in extra-axillary drooping subumbellate cymes; fruits purplish black or reddish berries; seeds many, discoid, yellow, minutely.^[25]
- *Solanum nigrum* belongs to the family Solanaceae is not an effectively used food crop that is known for its medicinal and nutritional bio-components. The plant is commonly known as Black nightshade (in English), Makoya or Kakamachi (in Hindi), Vanbhutka (in Bihar, India) is an herbaceous and dicotyledon plant. It is widely distributed across the world and mostly found in wild and exists as a famine Superdivision: food crop.^[26]

Taxonomical Classification

- **Kingdom:** Plantae
- **Subkingdom:** Tracheobionta Spermatophyta
- **Division Class:** Magnoliophyta
- **Class:** Asteridae
- **Order:** Solanaceae
- **Genus:** Solanum
- **Species:** Solanum Nigrum^[27]



Fig. No: 5 Solanum Nigrum.

Betel leaves

Betel leaf (*Piper betel*) is a well-known medicinal plant found in Asia. It belongs to the family Piperocaines. Plant leaves are used for the preparation of traditional medicine to treat various diseases. It is highly abundant and inexpensive; therefore, it may promote further research in food companies and the pharmaceutical industry. Betel leaf is commonly known as betel vine. It is widely used for chewing practices in most countries, like India, for avoiding bad breath, strengthening the gums and stimulating the digestive fire. In Indonesia, betel leaves are used for the treatment of vaginal douching and used as gargle mouth wash in India. In Sri Lanka, juice extracted from betel leaf is used to treat skin ailments. Betel leaves are also boiled and used as cough medicine due to their astringent taste.^[28]

In India, as a traditional practice, betel leaf is consumed after the commencement of a meal in order to improve digestion due to its astringent taste. Ancient classical Ayurvedic texts like Bhojankuthalami state that consumption of betel leaf is wholesome after commencement of a

meal to improve digestion, reduces excessive cough accumulated in the mouth and maintains weight, cleanses the throat. In Ayurveda, a betel leaf with the addition of medicinal herbs is known as Timbal or Paan. Ayurveda describes the properties of betel leaf as it is pungent, sweet and bitter in taste, alkaline, astringent and hot. It kills the worms and kindles the fire of love as it is an aphrodisiac in nature, and also increases digestive fire.^[29]

In research carried out in (2017), betel leaf contains phytochemicals which show antioxidant, anti-inflammatory, anti-platelet, antithrombotic, antibacterial and antifungal properties. Phytochemicals found in the analysis of betel leaf are hydroxyl chavicol (69.46%), 4-Chromanol (24%) and Eugenol (4.86%), which has wide applications including as agents.^[30]

History The piper betel plant, which God created and gave the shape of his own heart to, is blessed because it is both perennial and evergreen. Even before regular and organized agriculture began to be practiced, anthropologists have discovered betel traces in the spirit caves of Northwest Thailand dating as far back as 5500-7000 BC. Similar discoveries dating back to 3000 BC have been made in Timor, Indonesia, and in the blackened teeth of a human skeleton discovered in Palawan, the Philippines, back to 2600 BC.

It had been included in the oldest historical work on Sri Lanka, the Pali-written "Mahawamsa." In Thailand, Myanmar, and Indonesia, some seasoned betel chewers have been discovered with blackened teeth as a result of many years of chewing. It is unknown when these two various stimulant ingredients were initially combined, however there is archeological evidence that betel leaves and areca nuts have been chewed together since very ancient times. It may therefore be challenging to pinpoint the exact time when the custom of chewing paan first began.

Ayurvedic Significance

Piper betel is a Vedic plant in the Vedic name Saptasira and the Sanskrit labels Tambool, Nagvelleri, and Nagani. It was used as therapy for a number of ailments. From Vatsyayana's Kamasutra and Panchatantra all the way to Kalhan's Rajatarngini (perhaps the last documented old Sanskrit writing of historical relevance), mentions to Tambool can be discovered. Tambool has thus roughly referred across a period of about 2000 years. In Ayurveda medicine system, the properties of betel leaf described as given below.

Guna (Quality): Laghu, Ruksha, Tikshan

Rasa (Taste): Tikta

Vipak (Metabolism): Katu

Virya (Potency): Ushan

Prabhav (Impact): Hridya

Additionally, to its solitary usage as medicine, betel leaf extract is widely employed in Ayurveda as an adjuvant and blended with pharmaceuticals, possibly for better benefits. Tambola leaves have been defined in the Sushruta Samhita as aromatic, sharp, hot, acrid, great for the voice, a laxative, and an appetizer, in addition to the fact that they comfort Vata and promote pitta.^[31]



Fig. No: 6 Betel leaf.

Taxonomical Classification

- **Colour:** Deep green colour
- **Shape:** Heart shaped
- **Length:** 15-18 cm long width: 10cm
- **Odour:** Aromatic
- **Margin:** Entire margin
- **Apex:** Acute
- **Base:** Symmetric base.
- **Kingdom:** Plantae
- **Clade:** Tracheophytes
- **Order:** Piperales
- **Family:** Piperaceae
- **Genus:** Piper

- **Species:** P. Betle^[32]

Acacia Catechu

The body immediately responds to damaged tissues and cells which are caused by pathogens, certain stimuli such as chemicals or even by physical injury by inflammation.^[33] Lately, inflammation has been described as "the succession of changes which occurs in a living tissue when it is injured provided that the injury is not of such a degree as to at once destroy its structure and vitality" or "the reaction to injury of the living microcirculation and related tissues".^[34] The Acacia Catechu is also known by the names like Cutch tree, Terra Japonica as well as Black Catechu. It is also called Khair in Hindi and Khadira in Sanskrit. This herb was previously known as Kat or Cacho. Especially in the early 16th century, this tree was widely exported from India to China, Persia and Arabia. The main application of this plant was in dyeing and tanning. In the 17th Century, Japan introduced this plant to countries in Europe. The tree of Acacia catechu is widespread all around the Indian country. The main areas for its habitat in the country are the eastern slopes of the Western Ghats and the Himalayan tracts. This tree is deciduous having short hooked spines that grow to the height of 9 to 12 meters.^[35]



Fig. No: 7 wood and powder of acacia catechu.

MATERIALS AND METHOD

Materials

- Abrus precatorius leaves
- Solanum nigrum leaves
- Betel leaves (Piper betle)
- Acacia catechu Bark.

METHODOLOGY

Collection and Drying of Plant Material

Fresh leaves of *Abrus precatorius*, *Solanum nigrum*, Betel (*Piper betle*), and *Acacia catechu* were collected and thoroughly washed to remove impurities. The leaves were then shade-dried at room temperature until complete removal of moisture was achieved.

Powder Preparation

- The dried leaves were separately ground into a fine powder using a mechanical grinder. Each powder was stored in airtight containers for further use.
- Preparation of Semi-Solid Formulation
- At the time of application, 5 grams of each powdered material was accurately weighed and mixed thoroughly.
- A sufficient quantity of water was added to prepare a homogeneous semi-solid paste.

Application Procedure

- The prepared paste was applied externally over the spinal bone marrow region (affected area). The paste was allowed to dry completely on the skin surface.
- Post-Application Treatment
After complete drying, lukewarm water was gently sprinkled over the applied area. And swipe up with the help of cotton cloth.

OBSERVATION

The treatment was observed for its effect, where the condition (described as parasitic infestation) was reported to be eliminated as the organisms emerged from the affected area. And it is not seen by the naked eyes.

SUMMARY

The formulation and evaluation of a herbal additive for the treatment of marasmus focuses on developing a nutrient-rich, plant-based supplement to address severe protein-energy malnutrition. The formulation typically includes herbs and natural ingredients rich in proteins, vitamins, minerals, and antioxidants, aimed at improving nutritional status and boosting immunity. Evaluation parameters involve physicochemical properties, nutritional content, microbial safety, and stability studies to ensure quality and effectiveness. The herbal additive is assessed for its ability to promote weight gain, enhance appetite, and restore metabolic balance in affected individuals. Results from such studies often indicate that herbal

formulations can serve as supportive therapy alongside conventional nutritional rehabilitation. Overall, the study highlights the potential of cost-effective, natural remedies in managing marasmus, especially in resource-limited settings, while emphasizing the need for clinical validation to confirm safety and efficacy.

CONCLUSION

Herbal additive for the treatment of marasmus concludes that such preparations can serve as an effective supportive nutritional therapy. The developed formulation, enriched with natural plant-based ingredients, provides essential nutrients, improves appetite, and helps in gradual weight gain among malnourished individuals. Evaluation results indicate that the formulation meets acceptable standards for quality, safety, and stability. Additionally, the herbal additive shows potential in enhancing overall health and immunity without causing significant side effects. However, while the preliminary findings are promising, further clinical trials and long-term studies are necessary to validate its therapeutic efficacy and safety. Thus, herbal additives may offer a cost-effective and accessible approach to managing marasmus, particularly in low-resource settings, when used alongside proper dietary and medical care.

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