

**ANGEL'S TRUMPET (*BRUGMANSIA SUAVEOLENS*) - A FUTURE CHOICE FOR NOCICEPTIVE TREATMENT**Siva Kumar B.\*<sup>1</sup><sup>1</sup>Department of Pharmacognosy, Sanjo College of Pharmaceutical Studies, Vellapara, Chithali Palakkad, India.

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**ABSTRACT**

Pain is a sign of different diseases and medications that help alleviate pain are areas of focus for drug research. Conditions that cause pain often respond effectively to pain-relieving and anti-inflammatory drugs, and can usually be managed well through various pain management strategies. The body's nociceptors are crucial in the process of sensing pain and are in charge of identifying harmful mechanical, thermal, or chemical signals. Pain from these sources typically responds favourably to pain-relieving and anti-inflammatory drugs, and can be managed effectively with these strategies. However, prolonged use of these medications can lead to high costs and treatment complications due to their side effects. Therefore, there is a pressing need for safer and more targeted treatments. Traditional medicinal plants are used globally for their pain-relieving and anti-inflammatory properties. In this review, the significance of Angel's Trumpet is highlighted for its strong effectiveness in pain management, making it a promising alternative herbal remedy due to its strong antinociceptive effects.

**KEYWORDS:** Nociceptive, Medicinal plant, Angel Trumpet, Pain.**INTRODUCTION**

There are many different types of pain, which is an unpleasant emotional and physical experience, including visceral, acute, chronic, inflammatory, and antiseizures.<sup>[2]</sup> The mild to severe side effects, which range from stomach discomfort to addiction, have outweighed the significant advancements in the development of synthetic drugs and their availability on the market as both prescribed and nonprescribed medications.<sup>[3]</sup> Furthermore, it is projected that the incidence of corresponding pain will raise yearly, particularly in older patients, as a result of prolonged life expectancy and associated persistent pathologies.<sup>[4]</sup> One of the main goals of contemporary medical research should be the development of novel therapeutic agents with more efficacy, fewer side effects, reduced costs, and an enhanced quality of life, given that older patients need more individualized care.<sup>[1]</sup>

Medicinal plants are a great place to find novel pharmaceuticals and could offer worthwhile medicinal substitutes. For more than 80% of the population in Asia, they are easily accessible, reasonably priced, and culturally suitable sources of primary health care.<sup>[5]</sup> Many people in developing nations, particularly those with poor incomes and living in rural areas, rely mostly on medicinal plants to prevent and treat ailments. The

primary usage of botanicals as analgesics in many developing nations was traditional folk medicine.<sup>[6]</sup>

It's interesting to note that because herbal medicines have less risk of adverse effects and come from a natural source, they have recently become more and more popular worldwide. In addition to being effective in treating pain and having no side effects if any than currently available medications, medicinal plants might be more affordable for those from lower socioeconomic backgrounds.

Natural pain relief products are essential. They contribute significantly to the understanding of pain processes and provide novel analgesics.<sup>[7]</sup> In the past, the bulk of novel medications have been made directly from semi-synthetic or natural products (secondary metabolites).<sup>[8,9]</sup> Natural ingredients from folk medicines have been shown in a growing number of studies conducted recently to have played a key role in the global discovery of contemporary pharmaceuticals.<sup>[10-12]</sup> Morphine is an opioid that is successfully derived from a natural product. It is taken from the *Papaver somniferum* plant. Almeida et al. conducted a comprehensive investigation of 210 medicinal plants belonging to 79 families, summarizing their analgesic properties. Six More recently, Yunes et al. altered the process by which

glycosides, alkaloids, flavonoids, and terpenes are developed into analgesic medicines.<sup>[38]</sup>

#### MEDICINE IN PRACTICE AND SIDE EFFECTS

Despite their well-known side effects, non-steroidal anti-inflammatory medicines (NSAIDs) and opioids are the medications most frequently used to treat pain and inflammation.<sup>[13,14]</sup> Currently the most popular and effective medication for patients with refractory malignant and non-malignant pain, opioid analgesics are used to treat moderate to severe acute pain. A wide class of substances known as opioids are those that agonistically interact with opioid receptors to produce morphine-like effects.<sup>[15]</sup>

In addition to pruritus, nausea, slowed gastrointestinal (GI) function, urinary retention, and sexual dysfunction, opioids can also alter the central pain-related systems, leading to opioid tolerance (a decrease in the analgesic effect of opioids), dependence (a behavioral state requiring continued use of opioids to avoid a series of aversive withdrawal syndromes), and withdrawal syndrome, which is the most common behavioral consequence of long-term opioid use.<sup>[16, 17]</sup>

Consequently, the development of opiate tolerance and dependence may arise from the repeated use of opiate analgesics such as morphine for the treatment of chronic pain. These effects include a reduction in the drug's therapeutic index, an increase in adverse effects<sup>[18]</sup>, and a major impediment to the efficient use of opioid analgesics in the treatment of chronic pain.<sup>[19, 20]</sup>

Non-steroidal anti-inflammatory medications, or NSAIDs, encompass both non-selective (nsNSAIDs) and selective inhibitors of cyclooxygenase COX-2 (COXIBs). NSAIDs are useful analgesics in a range of acute pain situations and have a spectrum of analgesic, anti-inflammatory, and antipyretic actions.<sup>[21]</sup>

The primary issue with NSAID use is its side effects, particularly the gastrointestinal morbidities, which include peptic ulcers, prothrombotic effects, and problems with the upper and lower gastrointestinal tracts.<sup>[22]</sup>

The hunt for safer and more potent anti-inflammatory and analgesic medications has been sparked by the side effects of NSAIDs and opioid medications. Because they are easily obtainable and have few adverse effects, plant-based medicines are currently being studied as a source of novel chemicals with potential therapeutic applications.<sup>[23, 24]</sup>

#### PROPOSED PLANT FOR ANTINOCICEPTIVE ACTIVITY

*Brugmansia suaveolens* (Solanaceae) is a flowering shrub native to South Africa. It is commonly referred to as "Angel's trumpet, Brazil's white angel trumpet, also known as angel's tears and snowy angel's trumpet." It is

extensively grown in New Zealand, Australia, Europe, Asia, and Central America. It is commonly used as an ornamental plant because of its beautiful white trumpet-shaped flowers.<sup>[25, 26]</sup> As per the "Kew world check list of selected plant families," *Brugmansia suaveolens* is the sole species of *Brugmansia* that is currently recognized. *Brugmansia arborea* Andes, *Brugmansia aurea* Andes, *Brugmansia sanguinea* Andes, *Brugmansia insignis*, *Brugmansia versicolor*, and *Brugmansia vulcanicola* are additional related species that have been documented<sup>[27, 28]</sup> Invasive species compendium report for India 06 February 2019]. Traditionally, *B. suaveolens* has been used to treat a variety of illnesses, including pain, dermatitis, ulcers, abscesses, and fungal infections of the skin.<sup>[26]</sup> Dysmenorrhea, or painful menstruation, and white discharges are treated with vaginal antiseptics.<sup>[28]</sup> Plants have been shown to have pharmacological benefits for nematicidal<sup>[31]</sup>, antinociceptive<sup>[29]</sup>, analgesic<sup>[25]</sup>, and wound healing.<sup>[30]</sup> Alkaloids—apo-hyoscyamine, hyoscyamine, norhyoscyamine, meteloidine, atropine, noratropine, cuscohygrine, scopolamine, tropine, pseudotropine, apoatropine, meteloidine, scopine, aposcopolamine, and hyoscyamine—are among the numerous secondary metabolites.<sup>[32]</sup> Essential oil components include  $\alpha$ -terpineol, (e)-nerolidol, pentacosane, heptacosane, nonacosane, hentriacontane, 1, 8-cineole, phenylacetaldehyde, terpenene, linalool, nonanal, phenethyl alcohol, and (e)-b-ocimene. Plant glycosides<sup>[33, 34]</sup> have been isolated. Additionally, it has been noted that because of their greater phylogenetic similarity, *Datura* and *Brugmansia* are sometimes confused.<sup>[35]</sup> Nevertheless, they belong to entirely different genera.

Despite the fact that *B. suaveolens* has demonstrated a number of intriguing biological functions, there is a dearth of scientific literature on the species. Research on plants and their components, which have a variety of pharmacological and ethnomedicinal significance as well as adaptable health advantages, has drawn more attention.<sup>[36]</sup>

#### REPORTED STUDY FOR ANTINOCICEPTIVE ACTIVITY OF ANGEL'S TRUMPET (*BRUGMANSIA SUAVEOLENS*)

The antinociceptive efficacy of the extract derived from the various sections of *B. suaveolens* was exceptionally strong. The antinociceptive properties of *B. suaveolens* flower aqueous extract (AEBs) were described by Muccillo-Baisch et al. The hot plate test and the acetic acid-induced writhing reactions were two methods used to test this extract's ability to cause chemical and thermal nociception in mice. A significant increase in response time was seen for both AEB dosages (100 mg/kg and 300 mg/kg) in the hot plate test. AEBs were found to be equally effective at both doses and to considerably decrease acetic acid-induced abdominal contraction during the writhing test. Additionally, they observed that

the AEBs had a central nervous system depressive impact.

And as a result, mice treated with a combination of pentobarbital and AEBs had longer sleep durations relative to their dosage. They came to the conclusion that the experiment using floral AEBs overall produced good antinociceptive outcomes. Research revealed that the leaves and seeds of *B. suaveolens* contain many tropane alkaloids, including scopolamine, hyoscyne, atropine, and hyoscyamine. According to a study by Guelardini and colleagues, hyoscyamine contained in the leaves and seeds of the plant had an antinociceptive impact on rodents.<sup>[37]</sup>

### DISCUSSION

Numerous chemicals including amines, sugars, steroids, terpenoids, tannins, anthraquinone glycosides, saponins, alkaloids, polyphenols, flavonoids, and triterpenes are present in the various portions of the *B. suaveolens* plant. Among the most studied classes of chemicals in this plant, alkaloids are present in both adult blooms and various sections of the flowers. According to reports, the only alkaloid found in flowers is norhyoscyne. However, the essential oils extracted from the flowers and leaves include a multitude of volatile chemicals, including coumarins, glycosylated phenolic compounds, and seven different types of flavonoids.<sup>[37]</sup>

Despite the fact that these medications have strong antinociceptive ingredients and the pharmaceutical industry still ignores this plant. The sole purpose of the research is to ascertain the activity of the plant's active ingredients, and these ingredients are not further developed or applied into the formulation. Therefore, these potentially therapeutic plants have only been employed in study; they have not been put to any good use for people. If this is developed further, it will undoubtedly be the safest and most effective medication for treating a variety of pains.

### CONCLUSION

Numerous scientific investigations have demonstrated the antinociceptive activity of the entire plant, which is rich in phytoconstituents. The plant, needs to be appropriately standardized and incorporated into the right formulation in various dosage forms. When the plant is used as a medication for humans, its true worth will become apparent. When these active ingredients are developed, into medicine will unquestionably become more and more prevalent. Ultimately, it is determined that once Angel's Trumpet [AT] is successfully commercialized, it will be a viable medical option in the future.

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