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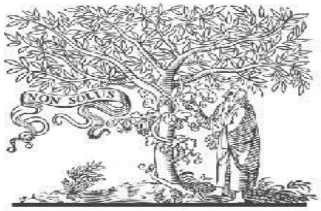

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A STUDY OF PHYSICOCHEMICAL PARAMETERS OF THE PLANT LEAF

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ABSTRACT
The lack of quality control and the lack of supporting scientific data for the safety of such items have been more pressing issues in recent years. Herbal medications must pass safety testing mandated by the World Health Organization (WHO), the National Cancer Institute (NCI), and the International Conference on Harmonization (ICH). several traditional remedies may have genotoxic potential, according to reports, and previous research has shown that several chemicals found in medicinal plants may be toxic and carcinogenic. The results of randomized clinical trials showed that many of the chemicals may have hazardous qualities and that the products themselves may have unwanted side effects. Chromosome abnormalities, cancer, degenerative illnesses, and even cell death may result from interference with essential processes such DNA replication, gene transcription, and cell division. Damage to the genetic material may result in important mutations, which in turn can raise the risk of cancer and other illnesses, making it imperative to evaluate the potential genotoxicity of conventional treatments.

KEYWORDS: Physicochemical Parameters, Plant Leaf, World Health Organization, Herbal medications, DNA replication

INTRODUCTION

The Ammania bacifera plant is known as Pashanbhed in Kerala and Aagiyo in Gujarat. In sum, in South India, three of the aforementioned plants are recognized as Pashanbhed. Coleus aromaticus, named locally as 'Pathharchur' or 'zakhm-e-hayat,' is also thought to be Pashanbhed by Bengali poets, along with Bryophyttum calycinum.

Therefore, in Bengal, the term 'Pashanbhed' refers to a combination of two different plants. Bergenia ligulata, a plant that may grow to be 10–12 feet tall and is native to Kashmir, is the sole acceptable source for Pashanbhed, claims shree bapalal vaidya. In light of these divergent assessments, it's clear that Kalanchoe pinnata is a contentious plant. That's why we're inspecting the facility from a safety standpoint.

Pharmacological review

The many healing effects of Kalanchoe pinnata revealed in modern science and ancient texts have made it a staple in alternative medicine.

Antihistaminic

The guinea pigs were safeguarded from suffocation for at least an hour after receiving the juice (4 ml/kg), as reported by Nassis et al. (1992). Juice failed to prevent gastrointestinal mucosal damage caused by histamine, leading researchers to infer that the juice's antihistamine action

resulted from blocking H1 receptors, rather than H2 receptors.

Immunosuppressive

Rossi-Bergmann et al. (1994) observed that mice with compromised immune systems had their cell-mediated and humoral immune responses significantly suppressed by an aqueous extract of K. pinnata leaves. Pretreatment with K. pinnata inhibited the proliferation of spleen cells in response to mitogen and antigen in vitro.

Antimutagenic

No antimutagenic action was found in the juice when tested against 4NQO and 2-NF in a research by Umbuzeiro-Valent (1999), which may indicate a mechanism unique to aromatic amines and/or other families of compounds.

Anticancer

Inhibitory action was seen for all bufadienolides in the research by Supratman et al. (2001), which provided significant support for the idea that bufadienolides might be used as cancer chemopreventive drugs. The first study to show that K. pinnata can function as an anti-HPV molecule with apoptosis-inducing activity was conducted by Mahata et al. (2012). As a result, it offers a promising new direction for research into treatments for cervical cancer.

Antihypertensive

Laboratory animals employed in the research by Ojewole (2002) showed that the leaf extracts' inhibitory effects on the cardiovascular system were resistant to physiological dosages and concentrations of conventional antagonist medications. They showed that K. pinnata had hypotensive action, providing support for the traditional usage of the plant by certain Yoruba people in Western Nigeria for the treatment of hypertension.

Hepatoprotective

The data and histological tests, as stated by Yadav (2003), support the use of K. pinnata Pers. juice as a folk remedy for jaundice due to the plant's hepatoprotective effect.

Wound healing activity

Khan (2004) found that the granulation tissue's breaking strength and hydroxyproline content both increased after oral administration of all three extracts, corroborating their use in folk medicine. The topical application of water extract also accelerated the healing process in an excision wound model.

Uterine contractility

The frequency of contractions generated by oxytocin was marginally reduced whereas the intensity of contractions caused by K. pinnata was significantly raised. Fenoterol caused a 50% reduction in contraction frequency. Further clinical research may be warranted when in vitro results confirmed the tocolytic action of K. pinnata, as reported by alternative medicine clinics.

Antidiabetic

Animal research indicates that an aqueous extract of K. pinnata leaves has hypoglycemic, anti-inflammatory, and anti-nociceptive effects. Ojewole (2005) suggests that the herb's flavonoids, polyphenols, triterpenoids, and other chemical elements may be responsible for the plant's antidiabetic effects. According to the findings of another investigation, the antidiabetic efficacy of K. pinnata ethanolic extract is affected by the plant's environment.

Antinociceptive and anti-inflammatory

Ojewole (2005) found that an aqueous extract of K. pinnata leaves had hypoglycemic, anti-inflammatory, and anti-nociceptive effects. Another source (Tanko et al., 2012) notes the plant's historic usage in treating pain and inflammation, implying the existence of biologically active components.

Analgesic

Strong analgesic efficacy may be shown by the aqueous extract of K. pinnata, which is equivalent to a nonsteroidal antiinflammatory medication in terms of duration and dosage (Igwe, 2005).

Insecticidal, fungitoxic and phytotoxic

This study's findings showed that cowpea seedlings may be protected and yield increased using extracts from the leaves of four different plants: V. amygdalina, K. pinnata, E. globules, and O. gratissimum. In Nigeria, cowpea seedlings are susceptible to an organism called Sclerotium rolfusii during the rainy season. The fact that the four plant extracts were able to prevent further damage to the cowpea seedlings suggests that they were fungicidal.

Antileishmanial

Separate experiments with quercitrin, quercetin, and afzelin against Leishmania amazonensis amastigotes suggested that the quercetin aglycone -type structure was crucial to the flavonoids' antileishmanial action.

Neuropharmacological

According to Salahdeen's (2006) research, a crude extract of K. pinnata leaf significantly altered general behavior pattern, decreased spontaneous death, and enhanced pentobarbitone-induced sleepiness.

Nephroprotective

The kidneys of rats were shown to be considerably protected against Gentamicin-induced histopathological alteration by administering an aqueous extract of K. pinnata leaves.

Antiulcer

The use of K. pinnata as an antiulcer drug in traditional medicine is supported by research showing a dose-dependent decrease in ulceration and in mean basal and histamine induced stomach acid production.

Antimicrobial

Traditional uses for K. pinnata in the treatment of infectious diseases have been confirmed by studies showing that the plant and certain of its isolated components have intriguing antibacterial potential.

Tracheal antispasmodic

The guinea pig tracheal rings were shown to be less spastic after being exposed to an aqueous K. pinnata leaf extract. The findings support the extract's application in Ethnomedicine for the prevention of asthma.

Antiallergic

New information on the immunomodulatory effects of this plant is provided by the success of treating allergic airway illness with K. pinnata or Quercetin.

Antioxidant

Tatsimo et al. (2012) found that K. pinnata and several of its isolated components had intriguing antioxidant potential, lending credence to the plant's traditional usage in the treatment of free radical damages. Antioxidant activity was highest in the chloroform-soluble fraction. These findings suggest the excellent medicinal

bioactivity of K. pinnata and explain the popularity of this plant in the folk medicine as a remedy for various illnesses. Another study found that K. pinnata possesses antioxidant properties and could serve as free radical inhibitors or scavenger or, acting possibly as primary antioxidants.

Antidepressant

The central nervous system (CNS) depressive activity of the alcoholic extract of K. pinnata is greater than that of the aqueous extract, although it is comparable to that of the standard medication.

Antiurolithiatic

Preliminary findings from a research provide credence to the use of K. pinnata extract in the treatment of urolithiasis, lending scientific backing to traditional methods. Results from a preclinical model of urolithiasis supported the use of an aqueous extract of K. pinnata for treatment and prevention.

Gastro protective

The stomach mucosa may be considerably protected by K. pinnata extract against ethanol-induced damage. Gastric ulcer area decrease, edema suppression, and leucocyte infiltration into submucosal layers were all dose-dependent indicators of this protection (Sharma, 2014b).

Anthelmintic

K. pinnata Linn. (Crassulaceae) dried leaf extracts were tested for their activity against the Indian earthworm Pheretima posthuma, and the results suggested that the whole plant could be useful as an anthelmintic at specific doses.

Traditional/ folkloric use of *K. pinnata* in Gujarat for Urolithiasis

According to our research among ayurvedic hospitals and the local population of Gujarat, India, the leaves are consumed in a number of different ways, including as a hot decoction of whole or crushed fresh leaves in water, as a hot decoction of dried leaf powder in water, and by chewing fresh leaves or eating dried leaf powder followed by drinking water (Bhavsar et al., 2018). This kind of preparation procedures for usage of the plant historically have been documented on several social networks and also in ancient ayurvedic literatures. Unfortunately, there has not been any recorded scientific evidence of the most effective and safe way to consume this plant leaf or its extract formulations.

Therefore, the current research aimed to compare the physicochemical and phytochemical features of four different Kalanchoe pinnata leaf extracts made using conventional procedures. The antioxidant and free radical scavenging characteristics of the leaf extracts were also established, and there in vitro cytotoxicological and genotoxicological activities were studied to determine an appropriate consumption dosage.

CONCLUSION

The Pharmacognostical and Phytochemical assessment processes were the most straightforward and rapid approach to determining the identification and purity of the plant material utilized in this investigation. All of the metrics investigated revealed insignificant results for the LD (50l) and HD (70l) of extract, with the exception of MI, SCEs/Cell, and SCEs/Chromosome (all of which were considerably lower than the positive control). These moderate alterations suggested that the extract, when administered in larger dosages than those

utilized here, had the potential to have genotoxic and cytotoxic effects. This plant's cytotoxic capability was shown by a dose-dependent reduction in cell proliferation in an MTT experiment. Unrepaired DNA damage created by the extract may have slowed the cell cycle or swiftly led human lymphocytes to cytotoxic pathways, both of which might account for the observed drop in MI. The DNA damage and/or alterations in cell cycle checkpoints may account for the extract-induced elongation of the AGT and delay of the PDT, as well as the concomitant elevation of CCPI and CBPI. The inability of pre-replicative repair processes to restore the damaged site leads to a rise in genotoxic endpoints such as single-copy-elements (SCEs) per cell or chromosome, micronuclei (MNs), and nuclear abnormalities.

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