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Antianxiety Activity of Pumpkin Seed in Mice

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Abstract

This study used the elevated plus-maze model (EPM) and light dark model to examine the anxiolytic effects of aqueous extract of *Cucurbita maxima* seeds (AECM) in mice (LDM). The extract was given orally in two doses of 100 mg/kg (low dose) and 200 mg/kg (high dose) and it was evaluated for the quantity of participants and the length of time spent in the open and closed arms of the EPM. the quantity of entries and the amount of time spent in light and dark. The impact of this was contrasted with that of the common medication diazepam (1.0 mg/kg i.p.). In this study, mice administered with AECM (100 mg/kg and 200 mg/kg) spent more time and made more arm entries in the elevated plus-open maze's arms than control mice did. Mice also spent more time in the lighted side of the light and dark test than control mice did. The results of the current investigation showed that both models of anxiety may be treated with *Cucurbita maxima* seeds. In our investigation, it was immediately evident that tryptophan is present in *Cucurbita maxima* seeds and that it reduces anxiety. The results of the current investigation suggest that giving AECM to mice had anxiolytic effects.

Keywords: Anxiety • Anxiolytics • *Cucurbita maxima* • Elevated plus maze

Introduction

One of the most prevalent mental conditions linked to the central nervous system is anxiety. About 1/8th of the world's population is impacted by it. The age at which a sickness first manifests itself varies across individuals and between illnesses. Disease has been increasingly prevalent in recent years and a poll found that women are more likely than males to receive a diagnosis (1.5 to 2 times). Anxiety disorders are frequently acknowledged as a more common, persistent disorder that usually first manifests in adolescence. According to epidemiological research [1-3], the prevalence of anxiety has been shown to significantly decline after the age of 50.

Anxiety may occur from moments of fear that are brought on by upsetting circumstances or an acute sickness, such losing a loved one. These episodes of anxiety are typically self-limiting and might last for only a short time. Benzodiazepines (BZD), azapirones, antidepressants and other medications are just a few examples of the many types of pharmacotherapy and psychotherapy used today [4]. The idea behind drug therapy for anxiety disorder is to modulate the brain's serotonergic and adrenergic pathways, which are thought to be overactive. As an alternative, medications that lessen the overactive levels of these neurotransmitters are used to treat anxiety. Norepinephrine overproduction is inhibited by -2 receptor agonists like clonidine, while overactive norepinephrine produced biologically is blocked by -receptor antagonists [5].

In general, numerous medications were used to treat anxiety pharmacologically. The first-line treatments, including barbiturates, were created and are very effective. Clinically, the use of medications in the barbiturate class to treat anxiety has certain drawbacks because they have a limited therapeutic range and can result in respiratory arrest. As a substitute medication for anxiety brought on by barbiturates, benzodiazepines were created. However, their beneficial benefits rely on a person's physical and psychological state as well as withdrawal symptoms. Other medications used to treat anxiety, such as buspirone, antidepressants and beta-blockers, have negative side effects.

The family Cucurbitacea includes seeds from the *Cucurbita maxima* plant. This fruit is filled with seeds in large quantities. The vast majority of the seeds are oblong, brown, or soft white. Testa surrounds seeds and acts as a barrier to protect them. Fruit is a good source of nutrients since it contains minerals including Mn, Mg, Zn, Fe and Cu as well as proteins, polysaccharides, essential amino acids, carotenoids and essential amino acids. Tryptophan and vital fatty acids are also present in the fruit. In India and the majority of the world's warm regions, pumpkin is grown. Because seeds have strong antioxidant properties, fruits have been linked to a number of health advantages, including the prevention of gastric, breast, lung and colorectal cancer as well as the growth and size reduction of prostate, the alleviation of diabetes by promoting hypoglycaemic activity and the improvement of bladder compliance.

The investigation's goal is to determine whether *Cucurbita maxima* seeds have any anti-anxiety properties. Typically, herbal plant and fruit products have no side effects or negative effects and are inexpensive treatments that are good for individuals. The current investigation of pumpkin seed aqueous extract will provide a more effective and affordable anxiety treatment.

Methods

Cucurbita maxima seeds from the Cucurbitacea family were gathered near Mangalore, Karnataka, in November 2018. Mrs. Mary K M, HSST (Botany) senior grade CHSS, Chattanchal, Kasaragod, Kerala, validated it.

Seeds of *Cucurbita maxima* are gathered from reliable sources. In a conical flask, 200 ml of distilled water was combined with about 100g of dried and powdered pumpkin seeds. After being agitated several times and left at room temperature overnight under cover, the mixture was filtered using No. 1 Whatman filter paper. The obtained filtrate was then dried to a desired level using a drying oven (50%) and kept at 4°C. The doses were chosen in accordance with the ongoing prior study. 100 mg/kg (low dose) and 200 mg/kg (high dose) of two doses were chosen and supplied post orally at a constant volume for each animal.

Using the elevated plus maze (EPM) and light and dark model assessment, the anxiolytic activity was investigated. A total of 24 male mice were chosen at random, divided into 4 groups with 6 mice each and given the following

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treatments:

Group 1: received vehicle (normal saline)

Group 2: received diazepam (1 mg/kg, i.p.)

Groups 3: received 100mg/kg aqueous extract of *Cucurbita maxima* seeds (low dose)

Groups 4: received 200mg/kg aqueous extract of *Cucurbita maxima* seeds (high dose).

Animals' antianxiety behaviour was evaluated using the elevated plus-maze test after receiving oral doses of vehicle, diazepam and an aqueous extract of *Cucurbita maxima* seeds for 60 minutes. The elevated plus-maze (EPM) device has a 30 cm high wall and two opposed open arms that are crossed by two enclosed arms that are the same size (20 cm 7 cm). Central Square (7 cm) connects all 4 arms. The gear was housed in a soundproof room with a 200 lux light-illuminated floor and walls painted in a matte black colour. The animal (mice) was given the test and the standard medication before 30 minutes in order to estimate plus maze test. Then, each mouse is kept on a separate platform in the centre, facing the open arm. For a period of five minutes, the length of time spent in the open arms and the frequency of open arm entries were noted. It is important to take every effort to make sure that the animals won't become anxious from anything other than the height of the maze. All four paws of the animal have to cross the border separating an arm from the central region in order for an arm to be entered.

Discussion

The body's neurohumoral transmission, neuronal function and overall brain activity are altered by oxidative stress, which in turn causes changes in the brain's sensitivity to it. These changes eventually lead to the progression of neurological diseases and neuropsychological disorders like anxiety, stress and depression. Some plants that are biologically derived have a lot of antioxidant properties. As a result, they are protective of anxiety disorders. Diets high in antioxidants, flavonoids, polyphenols and other phytoconstituents have also been found to have anxiolytic and improved antioxidant effects.

Since they have anti-inflammatory properties, pumpkin seeds are used to cure arthritis and reduce inflammation. They also have anti-diabetic, kidney stone-preventing, insomnia-treating and prostate-health-improving properties. The purpose of the current study was to use animal models to assess the anti-anxiety properties of an aqueous extract of *Cucurbita maxima* seeds. Using reliable animal models like EPM and LDM, we examine the anxiolytic impact of AECM in the current work. This concept makes use of mice's innate fear of elevated places and their tendency to stay away from open spaces. The percentage of entries into open and closed areas shows a definite impact of fear.

Anti-anxiety medications enhance the ratio of entries and duration spent in the open arm of the elevated plus maze, which is already well-known in EPM. According to the current study, animals given AECM at doses of 100 and 200 mg/kg exhibit significant outcomes, including a noticeable increase in the amount of time spent exploring the open arm as compared to the control group and a decrease in the amount of time spent in the closed arm. In a light-dark paradigm that produced anxiolytic effects, AECM at doses of 100 and 200 mg/kg often increased entrances toward the too-dark chamber and concurrently decreased the amount of time spent in the light chamber in comparison to controls. Similar to this, animals given diazepam (1 mg/kg) spend less time in the light chamber while spending significantly more time in the dark chamber.

Conclusion

The results of this study show that *Cucurbita maxima* seed aqueous extract significantly reduces anxiety in animal models. Therefore, additional thorough research is required to pinpoint and isolate the seed extract's active ingredients. In the future, it might aid in the creation of secure medications for the management of many CNS-related neurological disorders.

Acknowledgement

None.

Conflict of Interest

None.

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