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Eat tomato a day to keep depression at bay

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Lycopersicon esculentum Mill (Solanaceae) popularly known as tomato, is a native of the western side of South America. Today, the United States of America, Russia, Italy, Spain, China, Egypt, Turkey and India are among the top selling commercial producers of tomatoes. Tomato leaves are used traditionally as antimicrobial agents. There are no reports in literature pertaining to CNS actions of *Lycopersicon esculentum* fruit. In the light of above, the present study was undertaken to test the antidepressant potential of *Lycopersicon esculentum* fruit juice. *Lycopersicon esculentum* juice (LEJ) was administered at various concentrations ranging from 5% to 20% v/v to Swiss mice, once daily for 15 successive days. The antidepressant activity was measured using forced swim test (FST) and tail suspension test (TST). The results showed that the LEJ significantly reduced the immobility time of mice in both FST and TST. Prazosin (62.5 mg/kg, i.p.) and p-CPA (100 mg/kg, i.p) significantly antagonized this reduction in immobility time. Furthermore, *Lycopersicon esculentum* juice inhibited the monoamine oxidase (MAO) enzyme and reduced significantly malondialdehyde (MDA) levels. These findings reveal the anti-depressant potential of tomato.

Key words : *Lycopersicon esculentum*, Anti-depressant, Forced swim test, Tail suspension test

INTRODUCTION

Mental depression is a chronic illness that affects a person's mood, thoughts, behaviour and physical health. Depression is a complex disorder of unknown aetiology, which is manifested by low mood, anhedonia, low energy levels, pessimism, guilty feeling and suicidal tendencies. It may range from a very mild condition, bordering on normality, to severe depression–sometimes called ''psychotic depression'' accompanied by hallucinations and delusions. Patients with major depression have symptoms that reflect changes in brain monoamine neurotransmitters, specifically norepinephrine, serotonin and dopamine (Gold *et al.*, 1998). However, most of the marketed anti-depressant drugs exhibit serious side-effects. Therefore, the use of alternative medicines is increasing worldwide. Various herbal drugs (e.g. St. John's wort) have shown promising results in treating experimental as well as clinical depression and many of these herbal drugs appear to be quite safe (Behnke *et al.*, 2002).

Lycopersicon esculentum Mill (Solanaceae) is commonly known as tomato. *Lycopersicon esculentum* is reported to possess several medicinal properties such as anti-diabetic (Soumya *et al.*, 2009), anti-allergic (Makoto *et al.*, 2004), anti-tumor (Canene *et al.*, 2007), anti-fungal (Baissac *et al.*, 2006), anti-oxidant (Ramandeep and Geoffrey, 2005), anti-hypertensive (Paran *et al.*, 2009), anti-clastogenic (Chandra Mohan *et al.*, 2003), anti-cytotoxic (Emmanuel *et al.*, 2009), anti-viral (Konowalchuk and Speirs, 1978), anti-coagulant (Kone-Bamba *et al.*, 1987), anti-edema (Yasukawa *et al.*, 1993) and anti-mutagenic (Eustolia *et al.*, 2009). Tomato contains several pharmacologically active phytochemicals such as chlorogenic acid, rutin, naringenin (Makoto *et al.*, 2004), lycopene (Canene *et al.*, 2007), tomatoside-A (Baissac *et al.*, 2006), flavonoids, lycopene, ascorbic acid (Ramandeep and Geoffrey, 2005), bergapten and tomatin (Soumya *et al.*, 2009). Furthermore, tomato also contains high amounts of flavonoids (Gwénaëlle *et al.*, 2003) and neurotransmitters such as serotonin (Feldman and Lee, 1985), dopamine, adrenaline and noradrenaline (Mariela and Christina, 1997). However, there is no scientific evidence for the therapeutic potential of tomato in neuropsychiatric disorders. Since serotonin and noradrenaline levels fall considerably in depression, we were interested to investigate the usefulness of tomato in depression, since tomato is reported to contain high amounts of serotonin and fair amounts of adrenaline and noradrenaline.

The present study was undertaken to explore the anti-depressant potential of *Lycopersicon esculentum* juice (LEJ) using forced swim test and tail suspension test. An attempt has also been made to determine the underlying mechanism of action of LEJ by co-administration of agents modulating noradrenaline, serotonin and malonaldialdehyde activities.