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ZANJABEEL (*ZINGIBER OFFICINALE*) IN THE PREVENTION AND TREATMENT OF NAUSEA AND VOMITING: A REVIEW

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ABSTRACT

Herbal medicines are of great significance not only in developing countries but also in developed countries for primary health care because of their efficacy, safety and minimal adverse effects. *Zanjabeel* (Ginger) is one of the most common spices and is used as an important drug in Unani system of medicine as well as in other non-conventional systems of medicine. The Unani classical literature has ample evidence which confirms that *Zanjabeel* is very potent in inhibiting the conditions of nausea and vomiting caused by various factors. In the light of recent scientific studies it has also been found that *Zanjabeel* is very effective in treating nausea and vomiting caused by motion sickness, morning sickness, chemotherapy as well as surgeries and operations. Therefore, an effort has been made to recollect the important scientific data to give an insight on the invaluable pharmacological property of *Zanjabeel* as an antinauseant and antiemetic medicine.

KEYWORDS: *Zanjabeel*, ginger, antiemetic, Unani system of medicine.

INTRODUCTION

Herbal medicines are of great significance not only in developing countries but also in developed countries for primary health care because of their efficacy, safety and minimal adverse effects. More than three quarters of the world population rely on plants and plant products for health care (Sasidharan et al, 2010).

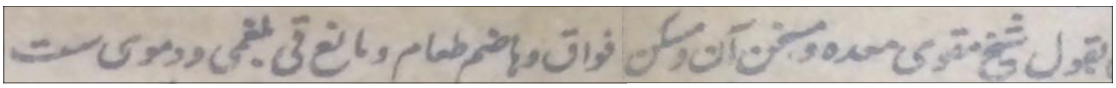
Zanjabeel (Ginger), the rhizome of *Zingiber officinale* is a member of Zingiberaceae family. It is one of the most common spices and used as an important drug in Unani system of medicine as well as in other non-conventional systems of medicine. An English botanist William Roscoe (1753-1831 CE) gave this plant the name Zingiber officinale in an 1807 publication (Banerjee et al, 2011). Etymologically, *Zanjabeel* in Arabic is derived from Sanskrit root *Srangavera*, meaning horn headed, owing to rhizome's appearance. This is a classical example of exchange of language between India and Arabian Peninsula. It consists of pale yellowish and thick lobed dried rhizomes which are highly aromatic and differ in shape and size (Anonymous, 2007; Anonymous, 2003; Kokate et al, 2009). India is the largest producer of ginger, accounting approximately 50% of the total production in the world. *Zanjabeel* produced in Kochi / Cochin is considered next best to Jamaica (Purohit & Vyas, 2008). It is widely used as a spice for flavouring foods, due to its characteristic odour and pungent taste (Anonymous, 2006). *Zanjabeel* is on the U.S. Food and Drug Administration's GRAS (generally recognized as safe) list and the British Herbal Compendium documents no adverse effects of *Zanjabeel* (Bradley, 1990).

It has been found that *Zanjabeel* is very effective in treating nausea and vomiting caused by motion sickness, morning sickness, chemotherapy as well as surgeries and operations (Evans, 2008; Cupp, 2001; Ross, 2005; Khare, 2007).

The main aim to write this review is to give an insight on the invaluable pharmacological property of *Zanjabeel* as an antinauseant and antiemetic medicine.

UNANI PERSPECTIVE

It is a famous Unani herb used as a single drug and as an ingredient in the various Unani compound formulations. It is a root of a plant that remains inside the ground. Dioscorides (circa 1st century CE), described that the root is whitish in colour, strong in odour and has a very pungent taste (Baitar, ynm; Hubal, 2005; Ibn Sina, 2007; Kabiruddin, 2007). It doesn't bear fruits or flowers (Hakim, ynm; Momin, 1850). According to Ghani, fresh root is called *adrak* and the dried root is known as *sonth* (Ghani, ynm). It is being medicinally used from pre-historic period. Its diverse medicinal actions have been described in a number of Unani pharmacopoeias. The Unani classical literature has ample evidence which confirms that *Zanjabeel* is very potent in inhibiting the conditions of nausea and vomiting caused by various factors (Attar, 1888; Ghani, ynm; Kareem, 1880; Khan, 1892; Momin, 1850).



"According to Sheikh (Ibn Sina), it is stomachic, calorific, anti-hiccup, digestive and checks the condition of damvi as well as phlegmatic emesis."

Muheet-e-Azam (1892) Vol. III, Part II: P 109

Figure 1. Quote from an ancient Unani manuscript written in Persian language.

MECHANISM OF ACTION

The mechanism of action behind antiemetic activity of *Zanjabeel* is not clearly understood, but it is perhaps due to the aromatic, spasmolytic, carminative and absorbent properties, which suggest that it has direct effect on the gastro intestinal tract. Though it has not been clearly demonstrated, but the several components of *Zanjabeel* antagonize serotonin type-3 receptors to exert antiemetic effects at the level of the gastrointestinal system and in the central nervous system (Anonymous, 2003; White, 2007).

SCIENTIFIC STUDIES

- **Nausea and vomiting in pregnancy**

Zanjabeel is very often used to overcome the symptoms of nausea and vomiting in pregnancy. A number of studies have been conducted in this regard. In a recent double-blind, randomized controlled trial, the effect of *Zanjabeel* on nausea and vomiting caused by pregnancy was assessed and was compared with metoclopramide drug. Though, *Zanjabeel* was found to be less effective than metoclopramide, but it significantly reduced the episodes of nausea and vomiting and could be a safe and effective alternative (Mohammadbeigi et al, 2011). In a double-blind, randomized clinical trial, 120 women were selected and the effect of *Zanjabeel* in pregnancy-induced nausea and vomiting was compared with vitamin B6 and placebo. The results showed significant difference between groups in severity of nausea and frequency of vomiting (Omidvar et al, 2014). In another similar double-blind, randomized controlled trial the effectiveness of *Zanjabeel* and vitamin B6 for treatment of nausea and vomiting in early pregnancy was compared. For a period of 3 months, 70 women received *Zanjabeel* 1 gm/ day or vitamin B6 40 mg/ day. *Zanjabeel* was found to be more effective than vitamin B6 for relieving the severity of nausea and vomiting in early pregnancy (Ensiyeh et al, 2009). In another similar randomized, controlled trial 291 subjects were given 350 mg of *Zanjabeel* or 25 mg of vitamin-B6, three times a day for three weeks and *Zanjabeel* was found to be effective in reducing nausea and vomiting related to pregnancy

(Smith et al, 2004). In another double-blind, randomized, placebo-controlled trial, 125 mg *Zanjabeel* extract was given four times a day for 4 days and its effectiveness was investigated on the symptoms of morning sickness. The results showed a significant decrease in nausea as well as in retching, concluding that *Zanjabeel* can be considered as a useful treatment option for morning sickness (Willetts et al, 2003). In another double-blind, randomized, placebo-controlled clinical trial, the effect of *Zanjabeel* syrup was evaluated on 26 women in first trimester of pregnancy. One tablespoon of syrup or 4-8 ounces of placebo was given four times daily for a period of two weeks. At the end, 77% of women reported a significant decrease in nausea and about 67% of women reported cessation of vomiting (Blumenthal, 2003). Other trials and studies have also been performed evaluating the significance of *Zanjabeel* in pregnancy induced nausea and vomiting (Vutyavanich, 2001; Keating & Chez, 2002; Fischer-Rasmussen et al, 1991).

- **Chemotherapy-induced nausea and vomiting**

Cancer chemotherapy usually causes severe nausea, vomiting and other abdominal discomforts which is the biggest limitation of this therapy. Despite of use of widespread antiemetic medication, chemotherapy-induced nausea and vomiting is a common side effect. Therefore, the effectiveness of *Zanjabeel* as a prophylactic or treatment for this condition has been evaluated various times. In a randomized, cross-over, clinical trial the efficacy of *Zanjabeel* was evaluated among cancer patients experiencing nausea and vomiting. Patients received 250 mg of *Zanjabeel* and placebo and were crossed over for another regime. The results indicated that *Zanjabeel* showed significant reduction in frequency and intensity of chemotherapy induced nausea and vomiting as compared to placebo (Montazeri et al, 2013). In another double blind, multicenter trial, 744 cancer patients were randomly assigned to four arms: 1) placebo, 2) 0.5gm *Zanjabeel*, 3) 1.0gm *Zanjabeel* & 4)1.5gm *Zanjabeel*. A total of 576 patients were included in the final analysis, which demonstrated that all doses of *Zanjabeel* significantly reduced the severity of acute nausea as compared to placebo. The largest reduction in nausea intensity occurred with 0.5gm and 1.0gm of *Zanjabeel*. Hence *Zanjabeel* supplementation at daily dose of 0.5gm – 1.0gm significantly aids in reduction of the severity of acute chemotherapy-induced nausea in adult cancer patients (Ryan et al, 2012). In another double-blind, randomized prospective cross-over study, effect of *Zanjabeel* powder was compared with two other antiemetics in controlling the frequency of nausea and vomiting induced by chemotherapy. Sixty subjects already taking chemotherapeutic drug, were given in addition 1gm *Zanjabeel* powder or 10 mg metoclopramide or 4mg of

ondansetron. The results showed that *Zanjabeel* was more effective in controlling chemotherapy-induced nausea and vomiting as compared to metoclopramide but showed less significant result when compared with ondansetron (Sontakke et al, 2003). Some other studies also showed that *Zanjabeel* preparations were efficacious against chemotherapy-induced nausea and vomiting (Sharma et al, 1998; Sharma et al, 1997; Pace, 1987).

- **Post- operational/ surgical nausea and vomiting**

The most common side effect after any major or minor surgery is the occurrence of nausea and vomiting. Use of *Zanjabeel* in this condition as an antiemetic can be worthwhile. The efficacy of dry powdered *Zanjabeel* on nausea and vomiting during and after an elective cesarean section was evaluated. In this double-blind and randomized study, 239 women were orally given 1 gm each of either dry powdered *Zanjabeel* or placebo, before and after surgery. The number of episodes of intra-operative nausea and vomiting in *Zanjabeel* group was less as compared to placebo group. The number of episodes of vomiting during surgery was also less in this group (Kalava et al, 2013). In another similar double-blind, randomized controlled trial, 120 patients who underwent major gynecologic surgery were randomized into group A and group B. Group A received 1gm of ginger powder one hour before the procedure and group B received the placebo. The frequency of vomiting was evaluated at 0, 2, 6, 12 & 24 hours after the operation. The incidence and frequency of vomiting in group A were lower than group B and most statistically significant differences occurred at 2 and 6 hour (Nanthakomon et al, 2006). In a couple of similar studies also, *Zanjabeel* significantly reduced the occurrence of post-surgical nausea and vomiting (Bone et al, 1990; Phillips et al, 1993).

- **Motion sickness**

Motion sickness or travelling sickness is a common condition which can occur in any age group. Several studies have been conducted to evaluate the efficacy of *Zanjabeel* in motion sickness. For instance, in a double-blind, randomized placebo-controlled study, thirteen volunteers with a history of motion sickness were selected to assess the effects of *Zanjabeel* extracts on motion sickness and gastric slow-wave dysrhythmias induced by circular vection. Volunteers were pre-treated with the extract (1000 mg and 2000 mg). The individuals then underwent circular vection during which nausea, tachygastria and vasopressin were assessed. *Zanjabeel* significantly improved each of these parameters by prolonging the latency period before nausea onset and shortened the recovery time after cessation of vection (Lien et al,

2003). Some other related studies have also been performed that demonstrated a positive effect of *Zanjabeel* on motion sickness (Riebenfeld et al, 1999; Careddu, 1999; Schmid et al, 1994; Stewart et al, 1991; Wood et al, 1988; Grontved et al, 1988; Mowrey et al, 1982). These studies showed that *Zanjabeel* can be used as an effective alternative medicine for motion sickness.

DISCUSSION

All the studies reviewed and reported above were experimental prospective trials. *Zanjabeel* was shown to be very effective in reducing the frequency of pregnancy-induced nausea and vomiting. The reduction in frequency of nausea and vomiting was reported in post surgical or post operational subjects, and also in cases of chemotherapy-induced nausea and vomiting. Though, it was found to be least effective in reducing the frequency of nausea and vomiting in cases of motion sickness.

CONCLUSION

Zanjabeel appeared to be an interesting, safe and effective natural alternative in the prevention and treatment of nausea and vomiting related to various conditions. There is need to explore further and perform more trials on *Zanjabeel* as an antiemetic.

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