

ANTI-PROSTAGLANDIN AND ANTI-INFLAMMATORY ACTIVITIES OF PLANTS USED IN DYSMENORRHOEA (*USR-I-TAMTH*): A REVIEW

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ABSTRACT

Dysmenorrhoea (*Ushr-i-Tamth*) is defined as painful menstruation. Unani scholars have described *Ushr-i-Tamth* with other terms such as *Waja'al-Rahim* or *Auja al-Rahim*, which occur due to obstruction in menstrual blood flow resulting in uterine contraction and pain. This pain usually occurs in the uterus and spread to the surrounding areas. It is one of the commonest problems encountered by women during their life time. Most of the women suffer from severe incapacitating pain which restrict them from day to day activity. This situation not only has a significant effect on quality of life and personal health but also has global economic impact. The root cause lies with the excessive secretion of prostaglandins which are attributed to myometrial

contraction, uterine ischemia and pain. Women with dysmenorrhea have high levels prostaglandin which increases the sensitivity of the nerve endings to pain. This pain can be alleviated with herbs having anti-inflammatory and anti-prostaglandin activities. In Unani system of medicine, various herbs such as *Zingiber officinale*, *Ruta graveolens* Linn, *Cassia fistula* Linn, *Myristica fragrans* Houtt, *Cinnamomum zeylanaceum*, *Rheum emodi*, *Rosa damascena*, *Trigonella foenum graceum* and *Ferula* are in use for painful menstruation as these plants possess anti-spasmodic (*Dafa-i-Tashannuj*), analgesic (*Musakkin*) and anti-inflammatory (*Muhallil-i-Waram*), and emmenagogue (*muddir-i-hayd*) properties. Recent scientific studies also support use of these herbs in dysmenorrhoea as they possess anti-prostaglandin and anti-inflammatory activities. Hence, this evidenced based review high

lights the plants having anti-prostaglandin and anti-inflammatory effects in relieving menstrual pain.

KEYWORDS: Anti-prostaglandins; Anti-inflammatory; Dysmenorrhoea; Herbal plants.

INTRODUCTION

Dysmenorrhoea is a common gynecological condition that can affect as many as 50% of women, 10% of these women suffer severely enough to render them incapacitated for one to three days each menstrual cycle. This situation not only has a significant effect on quality of life and personal health but also has global economic impact.^[1] In conventional system of medicine, the aetiology of primary or spasmodic dysmenorrhea is associated with an excess of prostaglandins in the uterus, there is Increased abnormal uterine activity, which is secondary to increased levels of prostaglandins produced and released by the endometrial tissue at the time of menstruation.^[2] The cause of this increased prostaglandin production and release in 81 present is unknown. Because of the hyper contractility of the uterus at menstruation in women with primary dysmenorrhea, blood flow to the uterus is compromised and uterine ischaemia occurs. Thus, the pain in primary dysmenorrhea is thought to be due to 3 factors: a) increased abnormal uterine activity, b) uterine ischaemia and c) sensitization of the nerve terminals to prostaglandins and their intermediates by lowering the threshold of these nerve terminals to the action of chemical and physical stimuli.^[3] Herbal remedies are widely gaining acceptance for the treatment and prevention of various diseases as they often contain highly active repertoire of chemical compounds.^[4] In Unani system of medicine several herbs are used to treat dysmenorrhoea which has the anti inflammatory and antiprostaglandin activity and can be used in dysmenorrhoea in anticipation with NSAIDS and other drugs which has their own limitations (Table1).

Prostaglandins and dysmenorrhoea: In primary dysmenorrhoea there is increased abnormal uterine activity, which is secondary to increased levels of prostaglandins produced and released by the endometrial tissue at the time of menstruation which cause o the hypercontractility of the uterus at menstruation. Arachidonic acid is the main precursor in the biosynthesis of prostaglandin which is responsible for promoting inflammatory response. Prostaglandins synthesized from arachidonic acid through COX pathways through the action of several enzymes which are collectively termed *prostaglandin synthetase*. In the initial step, arachidonic acid is converted to cyclic endoperoxides through the action of the enzyme cyclooxygenase. Subsequently the cyclic endoperoxides are converted in the prostaglandins

E2 and F2 C1 through the action of isomerase and reductase, which is occurring at the onset of menstruation together with the increased availability of arachidonic acid. Prostaglandin synthetase inhibitors act by inhibiting the prostaglandins synthetase enzymes and therefore blocking the production of prostaglandins.^[3,5] Hence certain herbs acts on these pathways and decreases the level of prostaglandins in dysmenorrhoeic women.

Scientific Studies

***Zingiber officinale* (Zanjabeel):** It has a long history in medicine and it has been shown that ginger acts as an inhibitor on cyclooxygenase (COX) and lipooxygenase, resulting in an inhibition of prostaglandin synthesis.^[11, 12]

***Cassia fistula* Linn (Amaltas):** The methanolic extract of its fruit inhibits the 5-Lipoxygenase mediated peroxidation of arachidonic acid; free radical induced lipid peroxidation and hence inhibited leukotrienes biosynthesis which inhibits prostaglandin synthesis by inhibiting inflammatory mediators.^[13]

***Myristica fragrans* Houtt (Bisbasah):** It potentially inhibits biosynthesis of PGs.^[14, 15]

***Trigonella foenum graceum* (Hulba):** It has potential analgesic and anti-inflammatory activity due to aqueous solubility, it inhibits production of inflammatory cytokines TNF-ALPHA.^[16]

***Ruta graveolens* Linn (Sudab):** The ethanolic extract of *sudab* inhibits the mediators of inflammation such as prostaglandins there by reducing dysmenorrhoea. Its methanol extract also has anti-inflammatory property. Significantly high anti inflammatory activity of methanolic extract and ethanolic extract of *R. graveolens* may be due to inhibition of mediators of the inflammation such as histamine, serotonin, and prostaglandin. *Sudab* leaves can be given orally in the form of syrup in amenorrhoea or dysmenorrhoea since it contains coumarin which has a spasmolytic activity. Moreover it has anti prostaglandin activity. Hence it can be used in spasmodic dysmenorrhoea.^[17,18,19]

***Rheum emodi* (Rewand chini):** Chauhan *et al.* studied the anti-inflammatory activity of the methanol extract of the rhizome (500 mg/kg) of *rewand chini*. The anti-inflammatory activity was evaluated by using carragenan-induced paw oedema. It was found that the degree of inhibition of oedema increased with time, reaching maximum inhibition after 5 h. This inhibitory activity was comparable to the control drug Ibuprofen (50 mg/kg body weight).^[20]

Cinnamomum zeylanaceum (Darchini): The main component of the essential oil of *darchini* bar is cinnamaldehyde (55-18%) and eugenol(5-18%) cinnamaldehyde has been reported to have an antispasmodic effect. In addition eugenol can prevent the biosynthesis of prostaglandins there by reducing dysmenorrhoea.^[21]

Ferula assafoetida (Hilteet): It has a potent antiprostaglandin activity, due to inhibition of production/reduction of prostaglandins. The herb is considered useful in the treatment of several problems concerning women such as unusually painful, difficult and excessive menstruation.^[22] A randomized standard controlled study proved that asafetida is useful in dysmenorrhoea.^[23]

Rosa damascena (Gule surkh): The hydroalcoholic extract of showed significant anti inflammatory and analgesic effect in the carrageenan induced rat paw oedema.

Table 1: Herbs containing anti-prostaglandins and anti-inflammatory activity

Name	Afaal	Recent Studies	Pharmacological actions	Phyto-constituents	Active Molecule
Zanjabeel (<i>Zingiber officinale</i>)	Muhallil	RCT	Anti-inflammatory,	Gingerol, Shagaol, Paradol, Amaldehyde	Gingerol
Sudab (<i>Ruta graveolens</i> Linn)	Dafa-e-tashannuj Muhallil-i-waram	Animal studies	Anti-inflammatory Anti-spasmodic	Coumarin, Flavonoids Rutin, Quercitin	Quercitin, rutin
Amaltas (<i>Cassia fistula</i> Linn)	Muhallil – i-waram Muddir-al-hayd	Animal study	Anti-inflammatory Anti-diabetic Anti oxidant	Athraquinones, Flavonoids, Flavon-3 ols, Rutin Quercitin.	Rutin, quercitin
Bisbasah (<i>Myristica fragrans</i> Houtt)	Muqawwi-i-rahim	Animal study	Anti-inflammatory Anti-oxidant Hepatoprotective	Myriticin, Sabinene, Alpha pinene, Myrcene, sesquiterpene	Mysisticin
Darchini(<i>Cinnamomum zeylanaceum</i>)	Mufatteh sudad Muhallil-i-waram	RCT	Anti-diabetic Anti-inflammatory	Cinnamaldehyde, Flavonoids, Coumarin, eugenol	Cinnamaldehyde, coumarin
Rewand chini(<i>Rheum emodi</i>)	Mufattehe sudad Muhallil-i-waram	Animal study	Anti-cancerous Anti-fungal Hepatoprotective	Tannins, Rutin, Naphthoquinones, Catechin	Rutin
Gule surkh (<i>Rosa damascena</i>)	Muhalil Muqawwi-	RCT	Anti-inflammatory	Tepenes, Flavonoids,	Querticin

	<i>i-rahim</i>			<i>Quercetin, Galic acid</i>	
<i>Hulba</i> (<i>Trigonella foenum graceum</i>)	<i>Muddir-al-hayd</i> <i>Muhallil-i-waram</i>	Animal study	Anti-inflammatory	<i>Flavonoids, Coumarins, Quercetin, Saponins</i>	<i>Gentiamin, querticin.</i>
<i>Hilteet</i> (<i>Ferula asafoetida</i> L.)	<i>Dafae-tashannuj</i>	Animal study RCT	Emmenagogue, Sedative, Anti-epileptic	<i>Coumarin-foetidin, Galbanic acid</i>	<i>Coumarin</i>

CONCLUSION

This evidenced based review highlighted the plants such as *Zingiber officinale*, *Ruta graveolens* Linn, *Cassia fistula* Linn, *Myristica fragrans* Houtt, *Cinnamomum zeylanaceum*, *Rheum emodi*, *Rosa damascena*, *Trigonella foenum graceum* and *Ferula asafoetida* Linn mentioned in classical Unani texts are recently proven to have anti-prostaglandin and anti-inflammatory effects on molecular level in relieving pain. Hence they are useful in *Usr-i-Tamth*. Further, randomized clinical trials are required in phase III and IV studies as these plants are safe, and cost effective.

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