



# FENNEL OIL

A NOVEL TOPICAL APPLICATION FOR THE  
GENITOURINARY SYNDROME OF MENOPAUSE

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## WHAT IS FENNEL: FOENICULUM VULGARE?

Foeniculum vulgare (fennel), is an annual plant that belongs to the Umbelliferae (Apiaceae) family. Fennel is characterised by palmitic acid, beta-sitosterol, and the phenol methyl ester anethole, which displays estrogenic properties.

As an ingested remedy, it has a history of use in hot flashes post-menopause in addition to nervous system relaxant effects. It shows anti-androgenic and anti-inflammatory effects. Topically, fennel extract cream applied vaginally positively impacts vaginal atrophy and sexual dysfunction in the Genitourinary Syndrome of Menopause attributed to local estrogenic and moisturising effects (1).

## WHAT IS THE GENITOURINARY SYNDROME OF MENOPAUSE (GSM)?

Overlooked in the perimenopausal and menopausal transition is the high incidence of urogenital tract atrophy (50% reported symptoms)(2).

The Genitourinary Syndrome of Menopause (GSM) is an inclusive term that describes changes occurring in the external genitalia, pelvic floor tissues, bladder urethra, and the sexual sequelae occurring in response to reduced oestrogen levels and ageing, which do not settle with time (See Table 1).

These changes significantly affect quality of life and self-esteem in individuals and are more physically and psychologically impactful than previously reported (3).

The tissue changes and subsequent symptom presentation can present at any age and from causes that present with low estrogen status in addition to menopause (See Table 2).

## ANATOMICAL AND FUNCTIONAL CHANGES IN GENITOURINARY TISSUES IN GSM

- Loss of labial and vulval fullness
- Contraction of labia majora and clitoral hood
- Narrowing and stenosis of the introitus
- Loss of hymenal remnants and reduced elasticity
- Vaginal Shortening and narrowing
- Prolapse
- Pelvic floor weakening
- Vaginal epithelium dry and thin with petechiae
- Loss of superficial cells and increase in parabasal cells
- Loss of vaginal rugae
- Inflamed vaginal tissues
- Alkaline pH changes the vaginal microbiome with loss of Lactobacilli (vaginal pH>4.5)
- Persistent and recurrent discharge with odour (not Candida in post menopause)
- Urethral meatal prominence and prolapse with thinning of the urethral epithelium
- Touch perception altered either hypersensitive or decreased feeling
- Loss of clitoral stimulation



## RISK FACTORS FOR GSM

- Menopause
- Bilateral oophorectomy
- Premature Ovarian Failure
- Smoking
- Alcohol abuse
- Decreased sexual frequency or abstinence
- Lack of vaginal birth
- Other causes of low estrogens (post partum, breastfeeding, hypothalamic amenorrhoea)
- Cancer treatments, including pelvic irradiation, chemotherapy and endocrine therapy
- Past history of vaginal dysbiosis and low Lactobacilli levels (infections, STI, UTI, antibiotic use)

Table 2: Risk factors associated with the onset of the Genitourinary Syndrome of Menopause. Adapted from Farrell, 2017 (4)

## FENNEL OIL MECHANISM OF ACTION

### Fennel and vaginal cell maturation and stability

Fennel oil and isoflavone containing products applied intra-vaginally were found to decrease vaginal atrophic changes, dyspareunia, and overall improved the amounts of intermediate and superficial epithelial cells, indicative of improved vaginal mucosal health (5-7).

### Vaginal moisturisers and lubricants in GSM

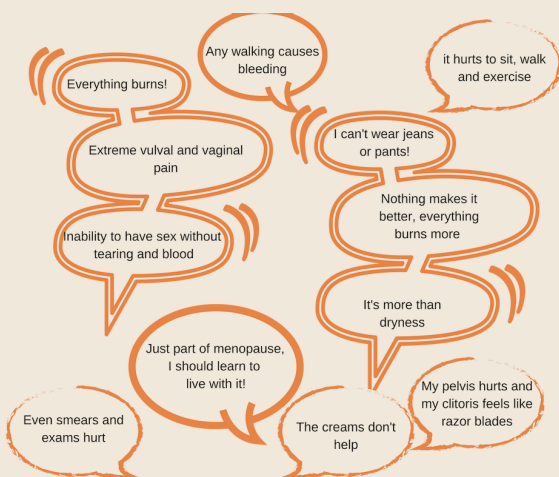
First-line therapy for symptomatic GSM is non-hormonal lubricants and long-acting moisturisers applied externally and intravaginally. A systematic review on non hormonal alternative vaginal therapies for GSM found that moisturisers and lubricants positively impacted vaginal dryness and dyspareunia. Both fennel and olive oil have been shown to be beneficial moisturisers and can be applied as lubricants in GSM (5,8,9).

### Topical isoflavones for skin health

The topical application of fennel has been linked with anti-ageing and skin health markers. The application of a fennel cream showed improvements in skin moisture and changes in trans-epidermal water loss (10). Skin texture after 12 weeks also improved. The moisturising activity of fennel is attributed to its linoleic acid content (54.9% average in fennel extracts) (11).

### Vaginal pH regulation

Vaginal pH is a marker of vaginal microbiome health. With healthy vaginal pH and its associated high Lactobacillus level falling between 3.8 and 4.5. In GSM, pH typically increases with the decline in environmental health and the loss of estrogen stimulus. The hormonal change initiates a shift away from a Lactobacillus dominated environment. When applied intra-vaginally for eight weeks, fennel positively impacted the pH of the vagina by decreasing it (Table 3) (5). Treatments that improve and regulate pH in the vagina do this by affecting vaginal microbial colonies such as Lactobacillus that produce pH regulatory metabolites lactic acid and hydrogen peroxide.



Client reported symptomatic cues that could indicate GSM. Image courtesy of Intimate Ecology

## VAGINAL PH CHANGES WITH THE APPLICATION OF FENNEL INTRA-VAGINALLY

pH	FENNEL (N+33)		CONTROL (N+27)	
	Before	After	Before	After
<5	0	33 (100%)	0	2(7.4%)
5 - 5.49	3 (9.1%)	0	3 (11.1%)	5 (18.5%)
5.5 - 6.49	21 (63.6%)	0	11 (40.7%)	14 (51.9%)
>6.50	9 (27.3%)	0	13 (48.1%)	6 (22.2%)

Table 3: Vaginal pH in two groups of fennel and placebo at baseline and after eight weeks of intra-vaginal intervention. Adapted from Yaralizadeh et al. 2016 (5)

### CLINICAL APPLICATION DOSAGE, SAFETY AND CLINICAL TIPS

The suitability of topical application of fennel oil should be made on a case by case basis. Individual allergies to fennel and olive oil should be considered prior to use. In GSM, levels of tissue inflammation can vary. Patch testing is recommended for suitability. In the clinical trial setting, fennel oil extracts used vaginally were well tolerated and without negative impacts. Typically, vaginal absorption of inserted drugs and compounds to the systemic circulation is low. The estrogenic effects of fennel associated isoflavones are considered to be local only.

### FENNEL PESSARY MANUFACTURE

Fennel oil concentrate can be used to manufacture 5% fennel pessaries for vaginal application by adding to a simple cocoa butter base.

### FENNEL CREAM MANUFACTURE

Fennel oil concentrate can be mixed with a neutral base cream to a concentration of 5% and inserted vaginally.



# CLINICAL APPLICATIONS

## **Fennel vaginal insertion**

5% fennel oil in extra virgin olive oil can be applied directly by syringing 1ml into the vaginal canal daily.

## **Fennel vulval application**

5% fennel oil in extra virgin olive oil can be applied directly to inflamed external vulval tissues.

## **Fennel as a moisturiser**

5% fennel in extra virgin olive oil can be used as a daily moisturiser for whole-body application.

## **Fennel as a lubrica**

5% fennel oil in extra virgin olive oil can be used as a personal lubricant for daily comfort and sexual interaction. Apply liberally as needed. Note: oil-based lubricants are not compatible with barrier methods of contraception.

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