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PREPARATION AND EVALUATION OF HERBAL CHURNA FOR DYSMENORRHEA

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ABSTRACT

Background: In recent years, herbal remedies have become increasingly popular. In Ayurvedic medicine, fundamental elements consist of Avleha or paka, a semi-solid substance; phanta, a hot infusion; swarasa, the expressed juice; him, a cold infusion; kwatha, a decoction; kalka, a formed mass; and churna, a powdered form. However, it's important to develop new standards for production, quality control, and research to ensure the safety and effectiveness of these traditional treatments. This way, age-old knowledge can contribute to finding new medications. **Purpose**: The current study aims to standardise herbal churna for the treatment of dysmenorrhea. This formulation is more cost-effective and can be easily prepared in comparison to the modern medications accessible in the market. **Methods**: This herbal churna is an Ayurvedic formulation which comprises of a number of different ingredients, like ginger, fennel, fenugreek, cinnamon bark, and dill seeds. The standardisation of this formulation included organoleptic properties, physical properties such as moisture content (LOD), ash value, extractive values, and crude fibre content. The quality, purity, and safety of this herbal formulation was also determined through the phytochemical study. **Results & Conclusion**: The pain and discomfort associated with menstruation can be effectively reduced by combining a various herb with anti-inflammatory and analgesic characteristics. This study's finding has produced promising outcomes. This herbal churna is a reliable substitute for prescription painkillers in the treatment of dysmenorrhea. However, further studies are needed to establish the safety and efficacy of this herbal formulation and to determine its active constituents.

Keywords: Churna, Dysmenorrhea, Standardization, Physiochemical, Phytochemical

INTRODUCTION

Ayurveda is an ancient Indian medical system that is still used to treat a variety of ailments. Ayu, in Sanskrit, refers to life, while Veda signifies knowledge or science **[1]**. Body, mind, and spirit integration and balance are goals of ayurvedic therapy. There are five fundamental kalpanas, which are listed in the Brihattray as swarasa, kalka, shrit (kwath), sheet (hima), and phanta. Many upkalpanas, including churna, ghan, vati, avleha, Sneha, and satwa, were designed to fully satisfy the need and necessity for shelf life, low dose, quick effect, etc. [2]. For the welfare of the family, society, and country, women's health is the most important issue to take into account. The term yonivyapats refers to all gynaecological issues that have been discussed in the past **[3]**.

Dysmenorrhoea is a gynaecological illness when a woman cannot perform her everyday tasks due to the acute cramping discomfort associated with menstruation. Primary and secondary dysmenorrhea are the two different types of dysmenorrhea. Menstrual pain without any pelvic disease is referred to as primary dysmenorrhea. The term "secondary dysmenorrhoea" refers to unpleasant menstruation caused by a pelvic disease **[4]**. Although dysmenorrhea frequently indicates other gynaecological issues, it also presents as a primary disease in the majority of women. The two main causes of dysmenorrheal pain are prostaglandin hypersecretion and increased uterine contractility. Adenomyosis and endometriosis, both contribute to the primary symptom of secondary dysmenorrhea **[5]**.

Menstrual pain is referred to as dysmenorrhea, a medical condition. Throughout their reproductive years, many women experience this typical menstrual issue. The lower abdomen, back, or thighs may experience mild to severe pain. Along with these, nausea, vomiting, diarrhoea, headaches, fatigue, and vertigo are possible side effects of dysmenorrhea **[4]**. Primary and secondary dysmenorrhea are the two different types. The most frequent type of dysmenorrhea is primary dysmenorrhea, which can be painful when the uterus contracts excessively during menstruation. Secondary dysmenorrhea is less frequent and is typically brought on by an underlying illness like endometriosis, pelvic inflammatory disease, or uterine fibroids **[5]**. The right treatment for dysmenorrhea depends on how bad the pain is and what's causing it. Ibuprofen or naproxen, both available over-the-counter, can be used to treat mild to moderate pain **[4]**. A warm bath or a heating pad are examples of heat therapy that can be beneficial. Prescription painkillers or hormonal birth control may be suggested in extreme cases. Surgery might

be required in some circumstances to treat the underlying condition causing the dysmenorrhea **[6]**.

EM or endometriosis is the abnormal growth of endometrial tissues (gland and stroma) which grows outside of uterus. The 2nd-most frequent benign condition of the women's genitalia, after uterine myoma, is EM **[7]**. Around 15% of reproductive-age women have EM **[8]**. Symptoms of EM include infertility, abnormal uterine haemorrhage, secondary dysmenorrhea, dyspareunia, chronic pelvic pain, and other symptoms. Feeling pain or discomfort prior to or while having your period is a serious sign of secondary dysmenorrhea. In 78.7% of women with EM, the primary symptom leading to diagnosis, was painful periods or dysmenorrhea, which greatly affects the quality of life of women **[9]**.

Medical or surgical alternatives to treatments are present for EM dysmenorrhea. NSAIDs are important for decreasing menstruation discomfort in mild situations. Hormone replacement treatment, which includes progestogenics, gestrinone, danazol (androgen derivatives), and GnRH hormone agonists to manage pain, is an alternative for cases that don't respond to these medications **[10]**. Those who are unable to take oral medications require surgical procedures as well. Nonsteroidal anti-inflammatory medications are ineffective for about 18% of women with dysmenorrhea **[11]**.

The dysmenorrhea caused by EM are due various factors like Immune factors, Prostaglandin (PGE2, PGI2), Activation of mechanoreceptors, increased expression of neovascularization and neurological factors as described in **Figure 1**.

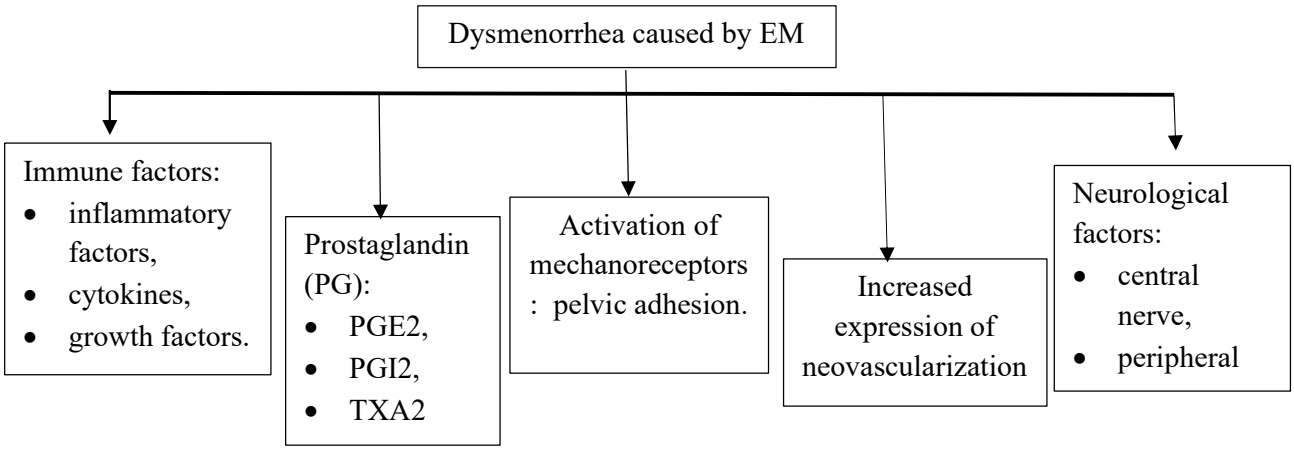

Figure 1:- EM dysmenorrhea risk factor [12]

The current study focuses on the preparation of Churna for dysmenorrhea according to Ayurvedic formulary of India. Cinnamon, Ginger, dill, fennel, fenugreek, and Ajwain were used to prepare the churna.

MATERIALS AND METHODS

Collection of the Powder Drug

Churna consists of the six main ingredients in the dry powder form, the powder of cinnamon, dill, fennel, fenugreek, ginger and ajwain. They were procured from local market of Kharar dist. SAS Nagar (Punjab) and was authenticated by Department of pharmacognosy UIPS Chandigarh University, Mohali.

Formulation composition [13]

Churna was prepared in the following procedures mentioned in the Indian Ayurvedic formulary. All the components were measured out in equal portions, combined, and then placed in a dry, airtight container for storage as described in **Table 1** and shown in **Figure 2** below.

Figure 2: Prepared herbal churna

Table 2: Ingredients of Churna

Sr.no	Constituents	Common name	Parts
1.	*Cinnamomum zeylanicum*	cinnamon	5gms
2.	*Anethum graveolens*	dill	5gms
3.	*Trigonella foenumgraecum*	fenugreek	5gms
4.	*Zingiber officinale*	ginger	5gms
5.	*Foeniculum vulgare*	fennel	5gms
6.	*Trachyspermum ammi*	ajwain	5gms

Organoleptic evaluation

Foreign material adhered to the surface of the substance were cleaned off after it was checked for possible adulterants. Organoleptic examination was used to identify sensory characteristics such as color, odor, taste, shape, texture,size and fracture **[14]**.

Qualitative Phytochemical Screening [15]

Test for Tannin: 2-3 ml of an aqueous or alcohol-based extract of powders were thoroughly evaluated using several tannins test reagents, such as:

a) **5% $FeCl_3$ Solution:** The test is positive when deep black-blue colour appeared.
b) **Lead Acetate Solution:** The test is positive if there is a white precipitate.
c) **Bromine Water:** Bromine water slowing down indicates a positive test result.

d) **Dilute Iodine Solution:** The test is positive when the colour becomes transient red.

Test for Alkaloids: Filtration followed by hydrolysis with diluted HCl of 50 mg solvent-free extract. The filtrates were examined for alkaloid content using the following test reagents:

a) **Dragendroff's Test:** 1-2 millilitre of Dragendroff's reagent were mixed with few millilitres of filtrates. The appearance of a bright yellow precipitate indicates a positive test result.
b) **Wagner's Test:** Three drops of Wagner's reagent were added to 5 millilitres of filtrates at the side of test tube. The test is considered positive when a reddish-brown precipitate forms.
c) **Mayer's Test:** Three drops of Mayer's reagent were mixed with five millilitres of filtrates at the test tube's side. If precipitation is seen, it will be white or creamy, which means alkaloids are present.

Physico-Chemical Investigation

Foreign organic matter: - The original sample should be precisely weighed at 250 g or the amount mentioned in monograph, then spread thinly. The samples must be examined by hand or with the use of a magnifying glass (6X or 10X), and the foreign organic matter must be physically separated as thoroughly as possible before being weighed **[16]**.

Moisture content: - A weighed sample was placed in a tared evaporating dish at a weight of 10 g (without first drying it). It was dried for 5 hours at 105 °C, with 1-hour break, until the difference between two subsequent weights was not greater than 0.25% **[15]**.

Ash Value

Determination of Total Ash: - Weighed out precisely 2-3 g of carbon-free sample at a temperature of no more than 45 °C and kept in a tared silica dish. It was weighed once it had cooled. The amount of total ash in the air-dried sample was calculated **[15]**.

Acid insoluble Ash- The entire amount of ash was then boiled in 25 ml of diluted HCl for five min., after which the ashless filter paper was used to collect the insoluble material, warmed in a hot water & ignited to maintain a constant weight. The amount of acid-insoluble ash in the drug that was air dried was computed **[15]**.

Water-soluble Ash: - In 25 ml of water, the ash used to calculate total ash was boiled for 5 minutes. The insoluble material was placed on ashless filter paper, and washed away with hot water. The insoluble ash was transferred into a tar-coated silica crucible and ignited for 15 minutes at a temperature not higher than 45°C. After deducting the weight of the insoluble material, the weight of the total ash was calculated. The weight difference was taken into account when

calculating the water-soluble ash in relation to the air-dried drug **[15]**.

Physical Characteristics: -

Bulk Density (BD): -It is the proportion of the bulk volume to the mass of the powder. It is calculated by transferring a precisely weighed amount of sample powder to the graduated cylinder using a funnel. The initial volume was noted. The weight to volume ratio was computed **[17]**.

BD = Wt. of the sample powder (M) / bulk vol. (V_b)

Tapped density (TD): - The measuring cylinder was tapped fifteen times on a soft surface until a constant volume was observed, & the measurements were made using the formula below **[17]**.

TD = Wt. of the sample powder(M) / tapped vol. (V_t)

Compressibility Index: - The powder has a tendency to become compressed. The formula below can be used to calculate the percentage compressibility of the powder according to the apparent bulk density and the tapped density **[17]**.

Compressibility Index = [(TD – BD)/TD] ×100

Hausner's Ratio: - It shows the powder's flow characteristics. Hausner's ratio is the proportion of the powder's tapped density to its bulk density **[15]**.

HR= TD/BD

Angle of Repose: - The angle of repose is the internal angle formed between the horizontal surface and the surface of the powder pile. The powder is fed through a funnel that is attached to a burette and raised 4 cm. On the table, a graph paper is set down next to the funnel. The pile's height and radius were measured. The formula was used to determine the powder's angle of repose **[15]**.

$\theta = \tan^{-1}(h/r)$

Where, h = pile's height (in cm)

r = pile's radius (in cm)

Solvent Extractive Value

Alcohol soluble extractive value

5g of a dried, coarse powder was mixed with 100 ml of alcohol in a sealed flask for 24 hours, with the first six hours involving frequent shaking and the remaining 18 involving standing time. The filtering process was then completed quickly while being careful not to lose any solvent. A twenty-five ml sample of the filtrate was dried and weighed after being evaporated in a flat-bottomed dish at 105°C. The percent of an extractive which is soluble in alcohol according to the air-dried drug was calculated and it's shown as a percentage value **[14][15]**.

Water soluble extractive value

5g of the coarsely powdered, air-dried formulation was macerated in 100 ml of chloroform water for a total of 24 hours in a closed flask. During the first six hours, the

mixture was frequently stirred and for remaining eighteen hours were left to stand. It was then filtered rapidly while safety precautions were taken to prevent solvent loss. Before being weighed, a 25-millilitre sample of the filtrate was dried at 105°C to a constant weight. A percentage (%) value is displayed to indicate how much water-soluble extractive was calculated in relation to the drug that had been air-dried **[14][15]**.

RESULT AND DISCUSSION

Churna was prepared in-house in accordance with the guidelines and rules outlined by the Ayurvedic Formulary of India (AFI). The various parameters of evaluation of churna were performed.

Macroscopic evaluation

Organoleptic studies showed that the prepared herbal churna is in coarsely powdered form which is light yellow in colour. The odour is characteristic and the taste of herbal churna is bitter as shown in **Table 2**.

Phytochemical study

The prepared herbal churna extracts contained the compounds like tannins and alkaloids according to preliminary phytochemical screening of the churna **(Table 3)**.

Physiochemical study

Several physicochemical parameters, including ash, extractive values, and loss on drying, were determined. The findings are summarized in **Table 4, Table 5 and Table 6**. These data were useful in identifying and determining the purity of the crude drug prepared.

Physical Characteristics

The various physical characteristics of the prepared herbal churna was determined and results were stated in **Table 7**.

Table 2: Organoleptic Evaluation of Churna

Parameters	Result
Colour	Light yellow
Odour	Characteristic
Taste	Bitter
Appearance	Coarse powder

Table 3: Qualitative Phytochemical Screening

Test	Result
Tannin test	
5% $FeCl_3$ solution	+
Lead acetate solution	+
Bromine water	+
Dilute iodine solution	+
Alkaloids test	
Dragendroff's test	+
Wagner's test	+
Mayer's test	+

Table 4: Moisture Content

Characteristics	Result
Moisture content	1.24

Table 5: Ash Values

Type of ash	Result
Total ash value	6.63
Acid insoluble ash value	2.55
Water soluble ash value	2.20

Table 6: Extractive Values

Characteristics	Result
Water	3.6
Alcohol	1.25

Table 7: Physical Characteristics

Characteristics	Result
BD	0.39 gm/ml
TD	0.56 gm/ml
Carr's Compressibility Index	0.30
Hausner's Ratio	1.43
Angle of Repose	43.1

CONCLUSION

This study presents a novel method for treating dysmenorrhea by herbal churna. A mixture of herbs with antispasmodic and analgesic properties were used to make the churna. The results of this study show how traditional medical system can be used to create all-natural treatments for menstrual disorders. Because they have few side effects and are inexpensive, using herbal remedies is becoming more and more common. This study shows how effective herbal remedies are at treating menstrual disorders. To determine the churna's active ingredients and learn more about how it works, more research is required. Overall, for the treatment of dysmenorrhea, the herbal churna represents a promising substitute for traditional painkillers.

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