Mucoadhesive Bilayer Vaginal Tablet As A Potential Treatment For Cervical Cancer

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What is cervical Cancer?

Cervical cancer is a cancer of the cells of the cervix
It is the 2nd most common cancer affecting women
>270,000 women die from it annually
>500,000 women worldwide are diagnosed

SYMPTOMS
- Abnormal vaginal bleeding or discharge
- Bleeding between regular menstrual periods, after menopause or after sexual intercourse
- Pelvic pain, pain during sexual intercourse or urination

RESEARCH AIM
To develop a Mucoadhesive Bilayer Tablet

OBJECTIVE 1 : Vaginal drug delivery

- Location of cervix allows localized (direct) drug delivery*
- Does not effect other healthy cells in other parts of the body
- Avoids the first pass-effect
- Decreases systemic side effects*
- Self-administration is possible

OBJECTIVE 2 : Mucoadhesive Properties

- The tablet need to be mucoadhesive in order to bind to the vaginal mucus lining*
- Chitosan (CHN) and polyacrylic acid (PAA) was used*
- Both are non-toxic and non-irritating*

OBJECTIVE 3 : Drug Synergism

- Two or more drugs are given in combination.
- When combined effect is greater than that predicted by their individual potencies, the combination is said to be synergistic
- A synergistic interaction allows the use of lower doses of the drugs involved, which can help reduce the adverse reactions from the drugs
- Therefore, a bilayer tablet can deliver two drugs from a single dosage form and prevent drug-drug interactions

Formulation

5-fluourouracil (5FU)
- First line anti-cancer drug since 2015
- Destroys DNA synthesis of cancer cells
- More often used as a backbone of combination chemotherapy regimens in the management of various cancers
- SIDE EFFECTS: nausea, vomiting, epithelial ulceration along GI tract, mucositis, diarrhea and ‘chemo log’ brain

Beta- Glucans
- β-glucans belong to a group of polysaccharides located in the cell wall of bacteria, fungi including mushrooms, as well as cereals such as barley and oats
- They are considered biological response modifiers with immunomodulatory and health beneficial effects including anticancer properties
- The mechanism of action is suggested to be through its stimulation of the immune system

Preliminary tests on Beta glucan (Single tablets)

Physical Evaluations
The single tablets has good uniformity
Average Weight 199.57 mg (SD 3.80)
Average Thickness 1.36 mm (SD 0.04)
Friability test 0.08%
Less than 1% limit set by USP

Quantification using optical density

Calibration Curve using Beta glucan standard (Curdian)
- y = 0.13x + 0.0037
- R² = 0.9954

Immune Potential

Swelling Test for Mucoadhesive ability

Dissolution Test (in vitro)
Maintained at 37°C ± 1' for 100 rpm

Solubility in 1M NaOH

References