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Research Article

Formulation and evaluation of Polyherbal tablet by using Neem, Tulsi, Turmeric and Ginger extract

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Abstract



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Introduction: Cold and cough is the common disease condition which effects patient of every age. The treatment approach of medicinal herbs has been recognized for many decades and even longer for the treatment and prevention of cold and cough. The aim of the study was to evaluate the safety and efficacy of polyherbal tablet. Polyherbal tablet containing herbs like Neem (*Azadirachta indica*), Tulsi (*Ocimum tenuiflorum*), Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*) is used for curing cold and cough. This tablet formulation reduces the healing time for sore throat and boost up the immunity.

Materials and methods: The preparation of the extract and manufacturing of the polyherbal tablet is by processing technique with extract based herbal formulation and evaluation for analytical standardization including qualitative and quantitative determination were carried out. The tablets were weighed individually, the hardness and thickness were measured, friability of the tablet was measured, and the disintegration time was observed. The colour was observed to be brownish yellow and no odour.

Discussion: When combining the multiple herbs in a particular ratio, it will give a better therapeutic effect and reduce the toxicity. This review mainly focusses on importance of the polyherbalism and its clinical significance.

Keywords: Polyherbal tablets, formulation, evaluation, hardness, disintegration time.

INTRODUCTION:

Traditional medicine is practised over the world. It is now the subject of intense activity of studies on various plant species and their therapeutic tenets ¹. Because of their wide therapeutic range—effective at low doses and safe at large doses, but with fewer negative effects when misused—polyherbal formulations are quite popular. The different plant parts—seed, root, bark, stem, gum, leaves, flowers, fruit, etc.—are utilised in Ayurvedic therapy ². The polyherbal tablet which we have made is to reduce cough, cold and soothe sore throat ³. We chose the majority of these medicinal plants for our study and used QbD approaches to prepare polyherbal tablet formulation ⁴. The ingredients which have been used have effective results which not only cures but also boost up immunity. We have used Tulsi this on lengthy racemes, the purple blooms are arranged in tight whorls ⁵. This are the aroma compounds found in Tulsi essential oil ⁶. Next is turmeric it has Some 34 essential oils are present in turmeric, among which turmerone, germacrone, atlantone and zingiberene are major constituents ⁷⁻⁹. The main chemical constituent of turmeric is curcumin has the potential to reduce inflammation in the body linked to excessive coughing and sneezing ^{10,12}. Ginger it is the most common herbal remedy for cough and cold provides negligible content of essential nutrients, with the exception of manganese (70% DV) ¹². It has antibacterial, anti-inflammatory and antiviral activity thus it can reduce cough and sore throat. The last ingredient is neem

leaves ¹³. The major chemical constituents of neem are terpenes and limonoids ¹⁴. Neem leaves contain protein, phosphorus, vitamin C, carotene, and several fatty acids. They also contain amino acids such as glutamic acid, alanine, proline, glutamine and cystine ¹⁵.

Aim and Objectives:

Aim: To prepare and evaluate polyherbal tablet.

Objective:

- To prepare the extract of *Ocimum tenuiflorum*, *Curcuma longa*, *Azadirachta indica*, *Zingiber officinale*.
- Formulation of Polyherbal Tablet by using four plant extract and starch (binder), tale (Flow ability enhancer) as excipients.
- Evaluation of prepared tablets with different Parameters.

MATERIALS AND METHODS:

PLANT COLLECTION:

Collection of Neem -

The leaves of *Azadirachta indica* (Neem) were collected from Jalpaiguri, West Bengal. After that the leaves were shade dried and coarsely powdered using mortar and pestle.

Collection of Tulsi -

The leaves of *Ocimum tenuiflorum* (Tulsi) were collected from Dhubri, Assam. After that the leaves were shade dried and coarsely powdered using mortar and pestle.

Collection of Ginger -

The rhizomes of *Zingiber officinal* (Ginger) were collected from Majhitar, Sikkim. After that the leaves were shade dried and coarsely powdered using mortar and pestle.

Collection of Turmeric -

The rhizomes of *Curcuma longa* (Turmeric) were collected from Cooch Behar, West Bengal. After that the leaves were shade dried and coarsely powdered using mortar and pestle.

CHEMICALS REQUIRED:

Chloroform, Distilled water, Starch, Talc etc.

PREPARATION OF SOLVENT EXTRACT:**Extraction of *Azadirachta indica*:**

- a. Fresh neem leaves are collected and shed dried for 15 days.
- b. The dried leaves are then powdered using a motor and pestle.
- c. The Powdered Neem leaves are sieved and weighed 38.84 g and macerated in a beaker using 600 ml of distilled water with continuous stirring.
- d. The prepared mixture is kept covered with aluminum foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper.
- e. The excess solvent is evaporated using a Rotary evaporator and then the remaining mixture was dried on a hot water bath.
- f. The dried extract was collected and kept in desiccator for cooling.
- g. The prepared extract is weighed.



Figure 1: Dry Leaves of Neem



Figure 2: Evaporating of extract on water Bath

Extraction of *Ocimum tenuiflorum*:

- a. Fresh Tulsi leaves are collected and shed dried for 7 days.
- b. The dried leaves are then powdered using a motor and pestle.
- c. The Powdered Tulsi leaves are sieved and weighed 25.72 g and macerated in a beaker using 200 ml of distilled water with continuous stirring.
- d. The prepared mixture is kept covered with aluminium foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper.
- e. The Solvents mixture was dried on a hot water bath.
- f. The dried extract was collected and kept in desiccator for cooling.
- g. The prepared extract is weighed.

Extraction of *Curcuma longa*:

- a. Fresh Turmeric rhizomes are collected and shed dried for 7 days.
- b. The dried Turmeric rhizomes are then powdered using a motor and pestle.
- c. The Powdered Turmeric rhizomes are sieved and weighed 48.87 g and macerated in a beaker using 800 ml of distilled water with continuous stirring.

- d. The prepared mixture is kept covered with aluminum foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper.
- e. The excess solvent is evaporated using a Rotary evaporator and then the remaining mixture was dried on a hot water bath.
- f. The dried extract was collected and kept in desiccator for cooling.
- g. The prepared extract is weighed.



Figure 3: Dry Leaves of Tulsi



Figure 4: Dry rhizomes of Turmeric



Figure 5: Filtration Process of the Turmeric

Extraction of *Zingiber officinal*:



Figure 6: Dry rhizomes of Ginger

- a. Fresh Ginger rhizomes are collected and shed dried for 10 days.
- b. The dried Ginger rhizomes are then powdered using a motor and pestle.
- c. The Powdered Ginger rhizomes are sieved and weighed 19.88 g and macerated in a beaker using 200 ml of distilled water with continuous stirring.

d. The prepared mixture is kept covered with aluminium foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper.

e. The Solvents mixture was dried on a hot water bath.

f. The dried extract was collected and kept in desiccator for cooling.

g. The prepared extract is weighed.

FORMULATION OF POLYHERBAL TABLETS:

Procedure:

1. A mixture of powdered herbs of each 200gm weighted separately to prepare 25 (approx.) tablets.
2. After weighing, the powder herbs were pulverized properly using mortar pestle.
3. After uniform mixing of all the particles, sieving was performed by using sieve No. 85.
4. After that the powder material were taken for compression. By automatic tablet compression machine, 25 tablets were compressed. This is how poly-herbal tablets were prepared.



Figure 7: Tablet Compression Machine



Figure 8: Polyherbal tablets after compression

EVALUATION OF POLYHERBAL TABLETS:

- 1. Colour and appearances:** The compressed tablets were examined for the colour and appearance.
- 2. Thickness:** Dimension of the tablets measured using a calibrated dial calliper. Five tablets sample formulation are picked out randomly and its thickness is measured individually. Mean value of thickness is observed.
- 3. Weight variation:** Twenty tablets were selected at random and weighed individually. The individual weights were compared with the average weight for determination of weight variation. The percentage deviation was calculated and then compared with IP limit.
- 4. Hardness:** Five tablets were selected at random individually. The amount of force needed to crush tablets

during a compression test. The procedure for assessing a tablet's hardness involves crushing the tablet between two jaws. The Pfizer tester was used to determine the tablet's hardness. kg/cm² is the unit of hardness.



Figure 9: Vernier calliper



Figure 10: Hardness checking by Monsanto hardness tester

- 5. Disintegration Time:** Disintegration time is the length of time it takes for a pill to disintegrate into tiny grains or pieces. The disintegration test is conducted in a device that has a basket rack assembly with six glass tubes, each measuring 7.75 cm in length and 2.15 mm in diameter, with a 10-mesh sieve at the bottom. 28 to 32 times per minute, the basket is lifted and lowered in 900 cc of medium that is kept at a constant 37 °C. Each tube held six tablets, and the time it took for all of the tablet fragments to pass completely through sieve number 10 was taken as the tablet's disintegration time.
- 6. Friability:** The toughness of a tablet is measured by its friability. The friability of the pill was assessed using the Roche Friabilator. 10 pills were precisely weighed and put into the friabilator chamber, which rotates at 25 rpm for 4 minutes, dropping the tablets over a 6-inch space with each revolution. 100 rotations took 4 minutes to complete, after which the pills were reweighed.



Figure 11: Disintegration time checking by disintegration apparatus



Figure 12: Roche Friabilator for friability check

RESULT AND DISCUSSION:

- 1. Colour and appearance:** Five tablets were taken for evaluation of colour and appearance. It was found that all tablets were brownish yellow in colour and pills like structure.
- 2. Thickness:** Five tablets were taken for evaluation of thickness and the thickness was found to be around 2.5%.
- 3. Weight variation:** 25 tablets were measured individual and average weight was found to be 0.195gm and was about 3.8%.
- 4. Hardness:** 5 tablets were tested for their hardness and has produced crack at 4.1Kg/cm².
- 5. Friability:** The friability test was conducted for 4mins and the weight change was observed at 0.4%.
- 6. Disintegration time:** The disintegration time was observed to be 20secs.

Table 1: Values on different evaluation parameters

SL NO.	PARAMETERS	STANDARD VALUE	OBSERVED VALUE
1	COLOUR AND APPEARANCE	-	Brownish Yellow and pill shaped
2	THICKNESS	5%	2.5%
3	WEIGHT VARIATION	5%	3.8%
4	HARDNESS	2.5 – 5 Kg/cm ²	4.1 Kg/cm ²
5	FRIABILITY	0.5 – 1.0%	0.4%
6	DISINTEGRATION TIME	15 min	20 sec

DISCUSSION:

The prepared poly herbal tablet appeared to be brownish yellow and had no odour. The tablets were measured singularly and the average weight was found to be 0.195g. The parameter range of tablets were carefully taken out. The tablets thickness was measured that was 2.5% which is between the ideal range. The hardness of the tablet was around 4.5 Kg/cm² where the ideal range must be 2.5 – 5 Kg/cm². The tablets disintegration time was determined by using 6 tablets in disintegration test apparatus where the water temperature was maintained 37 ± 2°C and the disintegration time was about 20 secs. The friability of the tablet was measured with the help of Roche Friabilator for 4 mins and then %friability was calculated and the result was 0.8 % which is in the ideal range of 0.5 – 1.0 %.

CONCLUSION:

Polyherbal tablet using ginger, turmeric, neem, tulsi extract was prepared and evaluations were carried out for the following parameters physical appearance /visual inspection, thickness, weight variation, hardness, friability and disintegration time. The formulated polyherbal tablet was not only safer than the chemical agents but also reduces Cough and cold. This tablet reduces the irritation in the throat and clears the throat from cough within no time. A radical approach in popularising the polyherbal tablet which will be used for removing cough and cold is to change the consumer's expectation with emphasis on safety and efficacy. The evaluation parameter data was shown in acceptance range. Further studies are appreciated for comparing this preparation with the marketed one and establishing some effective results for better quality and safety use of the Tablet.

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contributed to sample preparation. Tanmoy Dey, Prabin Koirala and Sidhant Tamang contributed to the interpretation of the results. Soumik Bhattacharya and Souvik Paul took the lead in writing the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

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