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Research Article

Antihypertensive Tablets of *Beta vulgaris* & *Trachysperum ammi*.

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Abstract

High blood pressure is nothing but hypertension, a medical term which deals elevation of blood pressure in the arteries. In the early and also long term high blood pressure do not show symptoms but making major contribution for arising coronary heart disease which lead to stroke and heart failure. If the medication is not proper way then its leads to vision loss, chronic kidney disease and also dementia.

In present study an effectiveness of ajwain (*Trachysperum ammi*.) was used with beet root (*Beta vulgaris*) juice for lowering the blood pressure. The present studies have shown that the presence of certain phytochemical and antioxidants in ajwain and beet root was used for to manage conditions like systolic and diastolic blood pressure i.e. hypertension and heart disease. Formulation of herbal tablet was done by the process of maceration of *Beta vulgaris* (1 kg in 70% 1.5 L ethanol) and *Trachysperum ammi* (50 gm in 80% 250 ml ethanol) followed by filtration and evaporated to drying.

The evaluation of herbal tablet of beet root and ajwain was done by various physicochemical parameters such as hardness of tablet (6.6), weight variation (0.01gm), disintegration (11 min) and also dissolution and friability test shows (0.3 gm) significant effect for the management, regulation and control of blood pressure.

Keywords: Beet root, Ajwain, maceration, hypertension, phytochemical and evalution test.

INTRODUCTION

Heart disease is caused due to high blood pressure in which the very high force of the blood against the artery walls. Determination of blood pressure can be done by using the amount of blood from the heart pumps and the amount of resistance to blood flow in the arteries. This condition leads to more blood in heart pumps and the narrowing the arteries, means high the blood pressure. The high blood pressure (hypertension) from long way without any symptoms that damage to blood vessels and increase the risk of serious health problems, such as heart attack and stroke. Some people with high blood pressure have observing the symptoms such as headaches, shortness of breath and also nosebleeds, but these symptoms are not specific and usually don't occur until high blood pressure has reached a severe or life-threatening stage (Mestel, 2015).

High blood pressures are of two types, most of the adult person in which cause of the high blood pressure does not know, then this type of high blood pressure is called primary

(essential) hypertension which comprises systolic pressure ranging from 130 to 139 mm Hg and a diastolic pressure ranging from 80 to 89 mm Hg. Whereas some people have high blood pressure caused due to some condition such as, obstructive sleep apnea, destruction of kidney, tumors of adrenal glands, thyroid problems, and congenital condition of blood vessels as well as over dose of certain medications such as birth control pills, cold remedies, cocaine and amphetamines categorized as secondary blood pressure which comprises systolic pressure of 140 mm Hg and higher the diastolic pressure that is 90 mm Hg. This high blood pressure has many risk factors, including age, race, family history, overweight or obese, using tobacco, more salt (sodium) in your diet, and very little potassium in your diet, drinking too much alcohol, stress and certain chronic conditions (Lagranha et al., 2018).

High blood pressure are controlled by changing the life style such as eating less salt containing heart-healthy diet, doing regularly physical activity to balance the weight of the body that is avoiding obesity and the most important is limitation of the amount of alcohol drinking. But depending

upon your body's condition and also your age factor such as you are adult age of 65 or older or adult younger below age of 65 and also you have history regarding chronic kidney disease, diabetes and coronary artery disease decides the treatment to (High blood pressure, 2016).

Now a day there are a number of types and classes of drugs available for the management and treatment of high blood pressure. On the basis of patients medical condition and also any other existing health problems like diabetes, kidney disease etc specific drugs are chosen to treat high blood pressure. So in present research Red betalains (betacyanins), Betaxanthines, Vulgaxanthine-1 and vulgaxanthine- II, kaempferol glycoside of beet root with monoterpenes such as p- cymene, γ -terpinene, β -pinene, β -phellandrene, myrcene, α - pinene, α -terpinene, α -thujene, β -selinene and their phenol derisvatives such as thymol, terpinene-4-ol, carvacrol, terpinolene, trans-sabinenhydrate, linalool and α -terpineol of ajwain were used to make herbal tablet for to manage the blood pressure of mankind (L'Hirondel and Nitrate, 2001; Vanhatalo et al., 2010).

High levels of dietary nitrate (NO_3) are present in beetroot. The dietary nitrate converts into active nitrite (NO_2) and nitric oxide (NO), these dilates blood vessels. Medical researchers have recently returned to this plant product to investigate its effect on blood pressure and explore opportunities to put it to use in modern medicine (Wilson, 2018). According to Lorna C. Gee, (2016), dietary nitrate supplementation with beet root juice in reduction of blood pressure among essential hypertensive and it is also a complementary treatment for hypertensive because of its high content of inorganic NO_3 . This systematic met analysis of Zahra Bahadoran, 2019 shows several aspects of beet root juice supplementation on systolic and diastolic blood pressure. Yaman Walid Kassab, 2018 have shown that the presence of certain phytochemical antioxidants in beet root can manage hypertension, whereas according to Manmohan Singhal et al. (2019) shows *Trachyspermum ammi* (ajwain) is a stimulant, carminative and flatulence were used in combination to Beet root to enhance pharmacological activites for lowering of blood pressure because it is one of those rare spices that fulfill branchodilating actions (Jackson et al., 2018; Puddey and Beilin, 2006).

So in present research medicinal plant such as Beet root (*Beta Vulgaris*) and ajwain (*Trachyspermum ammi*) used to control the blood pressure by making herbal tablets and also perform evaluation test assessing tablets that's related to manage normal blood pressure.

MATERIALS AND METHOD

In the present research work, we make below mentioned plan of work for making herbal tablet for lowering of blood pressure.

- Selection of drug and excipient
- Experimental work

- Evaluation test of tablet such as Hardness test, Weight variation test, Friability test, Disintegration test and Dissolution test
- Evaluation test of powder such as Angle of repose, Bulk density, Carr's index and Hausner's ratio

EXPERIMENTAL METHODOLOGY

Extraction of Beet Root

Beet roots were washed with cold running water and gently rubbed with a towel to remove dirt. They were then peeled, cut into smaller pieces and pulverized into fine particles using an electric blender. The particles were macerated in 2800 ml of ethanol for 24 hours, filtered and the filtrate was concentrated to dryness using an oven at 40°C - 50°C and stored in a refrigerator until it was used (Lackland and Weber, 2015).

Extract of Ajwain

Seeds of ajwain were ground and powdered and the dry powder (50 g) was suspended in 250 ml of solvent (n-hexane, methanol, or aqueous-ethanol 20/80, v/v) at room temperature and shaken for 48 h in the darkness. Then, the suspension was centrifuged at 2000 rpm for 10 min and the supernatant was separated. The solution was allowed to dry in darkness at room temperature (Table 2).

Celery seeds were ground and powdered and the dry powder (50 g) was suspended in 250 ml of solvent (n-hexane, methanol, or aqueous-ethanol [20/80, v/v]) at room temperature and shaken for 48 h in the darkness. Then, the suspension was centrifuged (2594 g for 10 min) and the supernatant was separated. The solution was allowed to dry in darkness at room temperature (Table 3).

Celery seeds were ground and powdered and the dry powder (50 g) was suspended in 250 ml of solvent (n-hexane, methanol, or aqueous-ethanol [20/80, v/v]) at room temperature and shaken for 48 h in the darkness. Then, the suspension was centrifuged at 1500 rpm for 10 min and the supernatant was separated. The solution was allowed to dry in darkness at room temperature.

The tablet preparation can be comprised by doing some stages and these are granules preparation, mixing of lubricant, compression and coating of tablet. The required apparatus we're cleaned and dry them well. Weighed accurately required quantities of all the ingredients separately. Transferred the active ingredients to a mortar and mixed them well by added ascending order. Prepared the damp mass with the granulating solvent. The mass was passed through mesh no. 12 to obtain wet granules. The wet granules were dried in the thermostatically controlled ovens then dry screening. The dried granules were passed through mesh no 16 to break the aggregates. Mixed with the other ingredients a dry lubricant, anti-adherent and glidants were passed through mesh no 100 on to dry

Table 1. Phytochemical screening of Ajwain and beet root.

Sr.no.	Phytochemical constituents	Ajwain	Beet root
1	Alkaloids	absent	absent
2	Flavonoids	absent	present
3	Tannins	present	present
4	Glycosides	present	present
5	Carbohydrates	absent	present
6	Proteins and amino acids	absent	present
7	Resin	absent	absent
8	Lipids	present	absent
9	Saponins	absent	Present
10	Triterpenes	absent	Present

Table 2. Solvent Extractive values of Ajwain and beet root.

Sr. No.	Solvent for extraction	Extractive Value of Ajwain (%V/V) Mean(n=3)±SD	Extractive Value of beet root (%V/V) Mean(n=3)±SD
1	n-hexane	5 ±0.01	-
2	methanol	6.2±0.02	-
3	aq. ethanol	15.2±0.03	20.2±0.01

Table 3. Formulation of Herbal Tablet preparation for management of Blood Pressure.

Sr. No.	Ingredients	Quantity Taken	Uses
1.	Beet root powder	8.93gm	Management of Blood Pressure
2.	Ajwain Powder	6 gm	Management of Blood Pressure
3.	Microcrystalline cellulose	3.75 gm	Diluents
4.	Hydroxy propyl methyl cellulose	1.25 gm	Binder
5.	Magnesium stearate	0.5 gm	lubrikant
6.	Silicon dioxide	0.125 gm	Gludent
7.	Talc	1.25 gm	Antiadherent
8.	Croscarmellose sodium	0.5 gm	superdisintegrants
9.	Starch	2.5 gm	Disintegrants
10.	Sweetning agent	0.19 gm	Sweetning agent

granules and blended in a closed polythene bag. The tablet granules were compressed into tablets on tablet punching machine to a specific hardness, round and flat punches (Galis et al., 2016; Hodgson et al., 1999; Larson et al., 2012).

RESULT AND DISCUSSION

The present research work is an attempt to develop a herbal tablet for the management of blood pressure. As per WHO guideline Pharmacognostic study of all plant parts like microscopy, physical parameters, and extractive values were studied and also tablet formulation were subjected to various test such as thickness, hardness, friability, weight variation, content uniformity, dissolution and powder flow properties were also studied. The formed antihypertensive tablet is used to deliver the therapeutic effect and extended the drug release for 24 hrs for the better and extended clinical effect (Figure 1). The formed formulation reduces the side effects, increase the clinical effects and also subsequently lower the dose and cost of the treatment. The herbal tablet that is made from powder of beet root and ajwain. *Beta vulgaris* Linn. that is beet root belongs to family Chenopodiaceae have great medicinal importance, and *Trachyspermum ammi* (L.) that is ajwain known as Bishop's weeds the plant is erect, aromatic, annual herb

with white flowers and small brownish fruits that is belongs to the family 'Apiaceae'. Indian traditional system of medicine used the above mentioned two herb for so many different clinical disorders and one from them is hypertension (Blood Pressure). So in present research, standardization of roots of beetroots and seeds of ajwain was done for the purpose to understanding its morphological and microscopic characters, physico – chemical parameters, solvent extraction, organic matter as well as P^H of aqueous solution were determined and Favonoid and phenolic content was also determined. Whatever the results obtained by pharmacognostic study and standardization of roots of *Beta vulgaris* and seeds of ajwain was used for the determination of purity and quality of isolated drug for making herbal tablets for to control the blood pressure (Larson et al., 2001).

In the present study phytochemical screening profiles of two crude drugs that is beet root and ajwain were performed (Table 1). The transverse section of fruit of ajwain showed the polygonal cells, lignified parenchyma, tracheids, oil globules and vittae. Whereas the powder microscopy of the ajwain showed the presence of parenchymatous cells and endosperm containing crystal of Ca oxalate. The measurements of various cell and tissues are provided respectively. The phytochemical test of the methanol

extract of the drug indicated the existence of glycosides, flavonoids and terpenoids. The fruit powder was studied for its physic-chemical constants which included ash values and fluorescence analysis (Leach and Peter, 2012; Kapil et al., 2015).

The organoleptic character of beet root was observed and it shows that shape and size is globular (8cm), color is reddish purple with very small hair with strong astringent odor. Microscopical characters of beet roots shows, vacuolated cell with cortical parenchyma whereas the pith are in a deep red in colored. Conductive tissue that represent as concentric circle, are viewed as a part of secondary

structure. In the cross section of root shows xylem to center and protoxylem and metaxylem on outwards to pith. Phloem is present in cambium provided from the pith rays that enhances to produce secondary xylem and secondary phloem (Zhang et al., 2011).

The results obtained from pharmacognostic study and standardization of seeds of ajwain with roots of *Beta Vulgaris* is helpful for determination of quality and purity of crude drug that are used in tablet to manage the blood pressure (Tables 4-6).

Phytochemical analysis of the beet root and ajwain was conducted for the detection of alkaloids, cardiac glycosides,



Figure 1. Antihypertensive tablets of Beet root and ajwain.

Table 4. Evaluation test of Powder.

Sr. No.	Parameters	Result Obtained
1.	Angle of repose	28
2.	Bulk density	0.6gm/cm
3.	Tapped density	0.72 gm/cm
4.	Carr's index	15.8 %
5.	Hausner's ratio	1.3

Table 5. Evaluation test of Tablet.

Sr. No.	Name of Test	Result Obtained
1.	Total Dimension	3.44+0.9 -3.65+0.65
2.	Hardness	3.8
3.	Weight Variation	0.01
4.	Friability	0.3

Table 6. Weight variation test of tablets, revealed that the tablets of all the formulations were within the range of pharmacopoeial specifications.

Sr. No.	Tablet	Weight (gm)
1.	W ₁	0.21
2.	W ₂	0.22
3.	W ₃	0.22
4.	W ₄	0.22
5.	W ₅	0.22
6.	W ₆	0.22
7.	W ₇	0.22
8.	W ₈	0.21
9.	W ₉	0.21
10.	W ₁₀	0.21



Figure 2. Evolutionary test of granules of Beet root and Ajwain Powder.



Figure 3. Hardness and Friability of tablets.

flavonoids, tannins, anthraquinones, saponins, volatile oils, cyanogenic glycosides, coumarins, sterols and triterpenes. The phyto-chemical screening of beetroot extracts shows presence of flavonoids, saponins, sterols and triterpenes whereas ajwain extracts shows presence of tannins, glycosides, lipids and saponins. The formulated granules was characterized with respect to angle of repose, bulk density, tapped density. All granules from formulation show excellent flow property. All formulation shows acceptable flow property. All these aspect showing the good result then tablet granules were compressed into tablets on a tablet punching machine to a specific hardness, round and flat punches. The formed tablets run under evolutionary parameters such as dimension of tablets, showing its thickness which is range from 3.44+ 0.19 to 3.65+ 0.21 mm., this shows the good compaction characteristic of the full material and quality of force applied during compression. When formulation should be directed at optimizing tablets hardness without applying excessive pressure then it shows hardness of all formulation was found to be within the limits. Weight variation test revealed that the tablets of all the formulation were within the range of pharmacopoeial specifications. Friability and content uniformity within the range and the limits, whereas the tablets are well dissolved in the gastric PH range (Figures 2 & 3). This can be observed by UV spectroscopy by using dissolution method. The tablets are properly dissolved.

From all study, we conclude that the herbal antihypertensive tablet of the extract of beet root and ajwain shows satisfactory therapeutic effect, reduce the side effects, increase the clinical effects and subsequently lower the dose of treatment.

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