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RESEARCH ARTICLE

FORMULATION DEVELOPMENT OF GARLIC POWDER (Allium sativum) FOR ANTI-DIABETIC ACTIVITY ALONG WITH PHARMACEUTICAL EVALUATION

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Abstract

Allium sativum is an edible garllic known for its nutritional & bio-medicinal properties. The methanolic extract of Allium stivum for phytochemical screening performed & phytochemical analysis reveals that the extracts were rich source of phytoconstituents containing Alkaloids, Carcogydrate, Glycosides, Protien, Flavanoids, Saponins, Phenolic, Steroids.Some of them are responsible for anti-diabetic activities. In the present study oral administrable dosage form of Allium sativum (garlic) were prepared Herbal Tablets and Cream . A Compressed Tablets were evaluated. Garlic has been utilized securely since antiquated times as both food and medication in human populaces, however investigations of its adequacy in the administration of diabetes have yielded clashing outcome. This study has assessed the hypoglycemic impacts of garlic in patients.

Introduction:-

Herbal medicine is the oldest form of healthcare known to mankind. Herbal had been utilized by all culture over the entire course of time. WHO report 80% of the total populace depends on the medication from normal beginning. Various conventional herbal medical practices have been embraced for the analysis, anticipation and treatment of different infections. The target of improvement of herbal formulation detailing is to give the synergistic, potentiated, agonistic/adversarial pharmacological specialists within them self and work together in a powerful manner to deliver maximum therapeutic value with minimum side effects[1]. Garlic (Allium sativum) under the family Liliaceae, is a well-known herb with medicinal value and has been used for both nutritional and medicinal purposes since ancient times. . It is native to central Asia and cultivated in other parts of Asia, Africa, and Europe[2]. Ancient medical traditions of

India like Tibbi, Unani and Ayurveda, made extensive use of garlic, as a central part of the healing efficacy. Recent studies also reveal the beneficial effects of garlic or its preparations, in combating various diseases and thus validate the ancient literature with experimental proofs[3,4] . Hypolipidaemic, antiatherosclerotic, anticoagulant, antihypertensive, antimicrobial, anticancer, antidote, hepatoprotective and immunomodulatory activities of garlic are now well established from animal and human studies. The salutary effect of garlic in controlling diabetes is also well documented. Diabetes mellitus is a complex metabolic disorder characterized by impaired insulin release from pancreas and variable degrees of insulin resistance leading to high blood glucose levels. According to World Health Organization (WHO) estimations, the death ratio of the people with diabetes will get doubled by 2030[5]. . Diabetes is a chronic condition that requires careful monitoring and control of blood glucose levels. Without proper

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management, diabetes can lead to vascular dysfunctions, organ damage including kidney failure and other metabolic complications[6]. There is an increasing need to identify nutritional agents or herbs for those patients who are intolerant to adverse effects of modern antidiabetic drugs and those who cannot afford expensive medical expenditures especially in economically poor and developing countries. Among all nutritional agents, garlic plays an important role in the prevention of diabetes and its progression. Scientific literature described the application of garlic in the control of diabetes. garlic or garlic powder containing allicin as a major component to reduce the diabetes and its related complications[7].

Material And Method:-

Material

Allium sativum were gathered from neighborhood market.

Method:-

Extraction Process-

The starter phytochemical screening of the example includes extraction of the material and recognizable proof of the dynamic constituent.

Method for extraction

Continous hot process by utilizing soxhlet assembly. It is utilized to Follow materials-. Soxhlet apparatus; Methnol; Distilled water; Conceal dried coarse powder of Allium sativum.

Dried powder of Allium sativum was taken in conical flask filterd with condenser and methanol was included the proportion of (1:10). This combination was warmed on waterbath for 4 hours and concentrate was sifted through Whatman No. channel paper. This concentrate was cooled at room temperature and afterward permitted to stand for the time being adversary methanol to evapotate[8]. The subsequent phytochemical screening of the example is show in table-1

Preparation of stock solution

Standard stock solution of extract was prepared by dissolving 100 mg of powder of Allium sativam in 100 ml methanol in 100 ml volumetric flask & filtered.

Preparation of working standard solution and concentration of standard graph

To construct Beer's law plot for extract, the stock solution was further used to prepare working standard of concentrations ranging from 1 to 6µg/ml different aliquots of solution of extract was transferred separately into a series .The standard graph for extract was plotted by taking concentration of the extract on x-axis & y-axis at 240 nm.

Formulation

Preparation of tablet

Herbal tablets were ready by wet granulation strategy. All the plan fixings referenced in table 4 were weighed appropriately and blended in a motor and pestle. This powder mix was then permitted to wet for few seconds and afterward permitted to wet for few seconds and afterward again blended well. Mix was compacted by rotary machine[9].

Table 1:- Composition of Tablet.

Sr. No.	Name of ingredients	F_1	F_2	F_3	F_4	F_5	F_6
1	Extract	500mg	500mg	500mg	500mg	500mg	500mg
2	Acacia	10 mg	40 mg	8.8 mg	8.8 mg	20 mg	10 mg
3	Di calcium phosphate(DCP)	40 mg	10 mg	40 mg	40 mg	40 mg	40 mg
4	Methyl Paraben	6 mg	6 mg	6 mg	5 mg	7 mg	7 mg
5	Propyl Paraben	3 mg	3 mg	3 mg	3 mg	3 mg	3 mg
6	Sodium starch glycolate(SSG)	15 mg	25 mg	15mg	30mg	30mg	30mg
7	Magnesium stearate	23 mg	23 mg	23 mg	23 mg	23 mg	23 mg

8	Talc	20 mg	20 mg	20 mg	20 mg	20 mg	20 mg

Evaluation of tablet

All the formulated tablets were exposed to following evaluation boundaries.

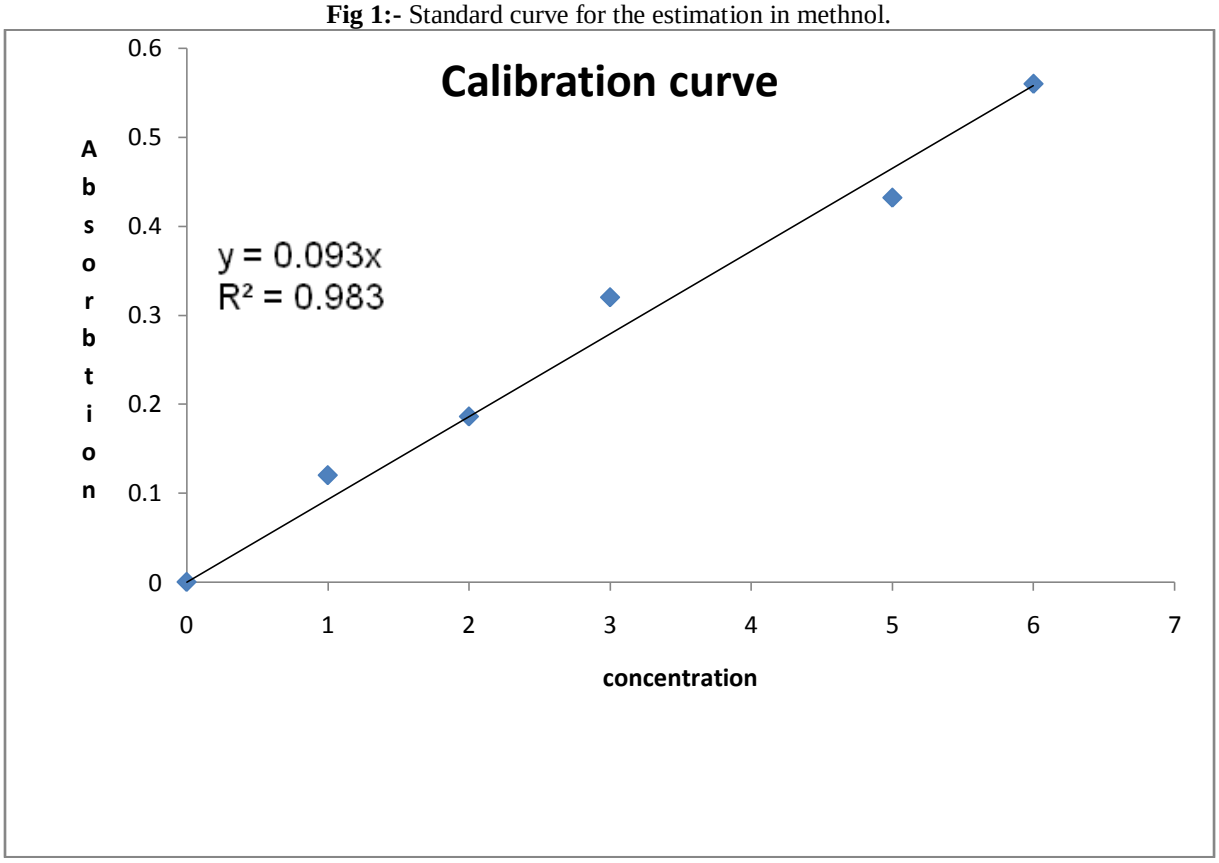
1. **Weight variation test-**Every individual tablets in a bunch ought to be in uniform weight also, weight variety in inside admissible cutoff points. By haphazardly choosing and gauging 20 tablets, "the average weight was determined"
2. **Hardness and friability-**For every formulation, the hardness and friability of 20 tablets each were determined using the Pfizer hardness analyzer and Electro lab friabilator test mechanical assembly, individually.
3. **Thickness-**The thickness of the tablets were resolved utilizing a Vernier caliper, 20 tablets from each group were utilized and normal values were determined.
4. **Disintegration time-**Six tablets were put in the cylinders alongside a plastic circle over the tablets. The plate gives strain on the tablets. The cylinders were permitted to climb what's more, down in the media as 29-32 cycle each moment in water media kept up with at 370C. Time expected to go everything tablets through the cross not entirely set in stone as its breaking down time.[10]

Results:-

Phytoconstituents	Biochemical Test	Result
Alkaloids	Mayer's Test	+
	Wagner's Test	+
Carbohydrate	Molisch's Test	+
	Fehling's Test	+
Glycosides	Legal's Test	+
	Keller-Killani Test	+
Protien	Millon's Test	+
Flavanoids	Alkaline Reagent	+
Saponins	Forthing Test	+
Phenolic	Lead acetate Test	+
Steroids	Salkowski Test	+
Triterpenoids	Salkowski Test	+

Note * (+) Presence & (-) Absence

Fig 1:- Standard curve for the estimation in methnol.



The linear relationship between the concentration of extract and the corresponding absorbance values was shown by- Y= 0.093x.

A positive relationship between's the convergence of concentrate and comparing absorbance values was observed (connection coefficient, r =0.983). How much concentrate in all the definition was determined involving the straight relationship as given above or directly from the standard diagram as show in Fig.1

S.N.	Parameter	Powder blends for					
		F1	F2	F3	F4	F5	F6
1	Angle of repose	27.62+0.71	25.94+1.07	27.7+0.68	26.61+0.23	30.01+0.03	28.34+012
2	Bulk density	0.57+0.01	0.60+0.03	0.63+0.02	0.58+0.04	0.62+0.01	0.65+0.02
3	Tapped density	0.65+0.04	0.63+0.03	0.58+0.03	0.65+0.02	0.69+0.01	0.65+0.12
4	Hansuer ratio	1.68+0.02	1.31+0.02	1.31+0.04	1.64+0.01	1.34+0.04	1.64+0.04
5	Carr's index	40.53+2.11	35.53+3.09	32.33+0.39	35.48+2.11	28.69+2.52	35.45+32.02

Tablet 5:- Evaluation of tablets.

Formulation code	Shape &Size	Thickness	Content uniformity (%)	Weight variation	Hardness (kg/cm^2)	Friability	Disinte gration (min)
F1	Round,10mm	+	90.52	+	6.1	+	20
F2	Round,10mm	+	92.70	+	6.6	+	28
F3	Round,10mm	+	91.36	+	5.8	+	25
F4	Round,10mm	+	89.95	+	8.3	+	30
F5	Round,10mm	+	92.68	+	7.4	+	28
F6	Round,10mm	+	91.65	+	7.1	+	25

+Pass the test

Result:-

From the above taste formulation 4 F4 was optimized, since all other formulations (F1 F2F3 F4 fF3 F4 F5 & F6) passed all the evaluation parameters except disintegration test (which were more than 15 min). But the disintegration time for F3 was found to be 13 min. which is within the specified range.

Discussion:-

Although tablets were prepared by wet granulation process, but the major limitation was found to be the dissolution. Since the extract was found to be insoluble both in 0.1N HCL and phosphate buffer. It was not possible to carry out the dissolution studies. Therefore further work can be carried out in order to enhance the solubility of the extract, so as to overcome the dissolution problem. An appropriate method can also be developed to carry out further development in this aspect. Thus, the present work reveals that, tablet formulation is quite unsuitable for this extract.

Conclusion:-

In light of the outcome got from the current review it very well may be finished up Allium sativum have the counter diabetic movement. The consequence of fundamental phytochemical investigation are recognize the bioactive compound viz alkaloids, starch, glycoside, protein, flavonoids, saponin, phenolic, steroids and they are accounted for to have a great many drug properties, for example, antidiabetic impacts. Oral natural measurement types of Allium sativum like tablet and cream showed great style.

The herbal tablets were ready by wet granulation technique. Tablets were arranged utilizing acacia was use as a fastener, methyl paraben as an additive, propyl paraben as retentive, sodium starch gylcolate as disintegrant and suspending specialist and magnesium stearate as grease. Seven groups of the tablets were ready and micromeritic, still up in the air for all actual combination of Allium sativum. The actual properties of all not entirely set in stone and the consequences of the Uniformity of weight, Hardness, Friability, Disintigration time was viewed as OK. As per the disintegration rate study and actual properties of all detailing the group 7 are the advanced. Herbal cream was ready and strength boundaries were assessed. World wellbeing association rules and boundaries are presently extremely fundamental for creating natural items for different illnesses. Additionally drug definition as cream many require additives, shading, seasoning specialists and other comparable added substances. Consequently, the need of adding an additive at the ideal level along with its physical and substance similarity with different constituents of the restorative item should be illustrated. All solidness boundary are ideal stable and satisfactory at variable temperature. There was no tremendous change seen in physicochemical and organoleptic conduct. In this manner created cream was OK. After fostered all formlations we have exhibited that the Allium sativum have critical antihyperglycemic exercises.

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