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PHYSICOCHEMICAL & ORGANOLEPTIC EVALUATION OF POWDERED CRUDE DRUGS OF *Mangifera Indica, Cucumis Sativa* AND *Annona Squamosa*

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ABSTRACT

Powdered dried materials were extracted successively by non polar to polar solvents. Dried powdered materials of Mangifera indica, Cucumis sativus and Annona squamosa (500 g each) separately were soxhlated using petroleum ether 60-80ºC, chloroform and methanolas non-polar to polar solvents. The solvent was recovered using recovery unit and traces ofsolvent were removed under vacuum and percentage yield of extracts were calculated. w/wcalculated. Yield of Mangifera indica, leaves with extracts i.e. pet ether (20.81%), chloroform (8.49%) and methanol (58.37%) was found. Yield of Cucumis sativus stems and leaves with extracts i.e. pet ether (14.98%) chloroform (11.4%) and methanol (54.68%) were found and yield of Annona squamosa leaves with extracts i.e. pet ether (8.98%) chloroform (10.94%) and methanol (62.96%) was found.

Key words_: **Alpha-Amylase and α-Glucosidase,**

INTRODUCTION:

There has been radical change in way of life and sustenance propensities in a decade ago, particularly in the developing countries like India. This has conjointly resulted in changes in status of health and disease. Prevalence of metabolic issues like diabetes mellitus and hypertension has risen to pestilence levels. Against the voluminous increment in predominance of diabetes there has been little advancement in drugs utilized in administration of diabetes mellitus (DM).[1-2] Most medications utilized in treatment of DM address the issue of hyperglycemia. In any case, the ongoing discoveries have demonstrated that, numerous elements other than carbohydrate metabolism play critical part in pathogenesis of DM. Components like chronic inflammation, activation of immune system, oxidative pressure, disturbance of protein and lipid digestion all play vital role in disease progression and recovery of diabetic complication. A few studies have proposed that hypoglycemic agents don't adequately give assurance against target organ harm caused by diabetes mellitus. As an outcome, diabetes mellitus

in long haul comes full circle in micro and macro vascular intricacies like, neuropathy, nephropathy, retinopathy, cardiomyopathy and coronary vein ailment.[3-5]

The term diabetes was coined by the Greek physician Aeretaeus in the principal century A.D. In the seventeenth century, Willis saw that the pee of diabetics as wonderfully sweet as though imbued with nectar or sugar. The presence of sugar in the pee of diabetics was shown by Dobson in 1755. Novel drug delivery system is gainful in conveying the herbal constituent at ideal rate and delivery of medication at the site of activity which limits the toxicity and enhances bioavailability of the medications. In novel drug delivery system, distribution of medication is controlled by entrapping the medication in carrier or by altering the structure of the medication at atomic dimension. Herbal constituents are becoming more popular in the modern world for their application to fix assortment of maladies with less poisonous impacts and better restorative impacts.[6-7] Anyway a few restrictions of herbal concentrates/plant actives like instability in exceptionally acidic pH, liver digestion and so forth prompted medication levels underneath restorative focus in the blood bringing about less or no remedial impact. Incorporation of novel drug delivery technology to herbal or plant actives minimizes the drug degradation or pre-systemic metabolism, and serious side effects by accumulation of drugs to the non-targeted areas and improves the ease of administration in the paediatric angeriatric patients. Different novel drug delivery systems, for example, liposomes, niosomes, microspheres and phytosomes have been accounted for the delivery of herbal medications. Incorporation of herbal medications in the delivery system likewise helps to increment in dissolvability, upgraded stability, protection from toxicity, enhanced pharmacological action, enhanced tissue macrophage distribution, sustained delivery and protection from physical and chemical degradation.[8-9]

MATERIALS AND METHOD

Methods and procedures

Identification of Collected Plant Materials

The plants *Mangifera indica, Cucumis sativus* and *Annona squamosa* were collected from local farmers of different region of Uttar Pradesh, India. Plant materials were dried under shade and powdered coarsely before extraction.

Drying of the Plant Material

The cleaned and washed collected plant materials were shade dried. After drying, the material packed in polythene bags and bags were closed tightly. Whenever required, the plant materials were taken from these stocks, powdered coarsely and used for extraction.

Organoleptic Evaluation of Powdered Crude Drugs

The crude drugs are derived from natural sources like plants, animals and minerals. It is important that they should be properly identified and characterized for their physical and chemical characteristics, So that a control on their quality could be enforced. Organoleptic evaluation of drugs is the evaluation on the basis of morphological and sensory profile of drugs. The powdered crude drugs were evaluated for their organolepticproperties, i.e. color, taste and odor (Table 4.1).

Physicochemical Evaluation of Selected plant Drugs

Physicochemical evaluation of chosen drugs of *Mangifera indica, Cucumis sativa* and *Annona squamosa* was done to establish their authenticity and purity .

I. Determination of Foreign Organic Matter

Two hundred gm of material was spread on a glass plate. The sample was observed with a magnifying glass and the foreign organic matter present in the sample was removed and after completing this exercise the drug material weighed and difference was calculated.

II. Moisture Content (LOD)

A far more than water in plant materials can result in microorganism growth and deterioration following reaction. Therefore, limits for the number of water ought to be set for each given stuff. This is often necessary for material that absorbs moisture simply or deteriorates quickly within the presence of water.

The wet content of a drug ought to be decreased so as to forestall decomposition of crude drug either attributable to chemical changes or microorganism contamination. LOD can be determined for material, which do not contain compounds, which are volatile at the temperature of drying.

Approximately 2 gm of sample was accurately weighed and transferred in a previously weighed weighing bottle. The bottle was stoppered loosely, placed for 30 minutes in an oven at 105°C. After drying the bottle was cooled to room temperature in a desiccator and weighed till a constant weight. With reference to air dried sample LOD was calculated. The results are given intable no. 4.3.

III. Determination of Total ash

Total ash of a crude drug represents its inorganic contents which represent the purity of particularly drug. Total ash was determined as per procedure of IP. Dried crude drug (2 gm) placed in antecedently weighed clean and dry oxide vessel and incline rated at a temperaturenot extraordinary 450°C till free from carbon that is confirmed by the white color of the ash then placed in desiccator and allowed to chill until a continuing weight obtained. The proportion of ash was calculated with relation to the air dried drug. From this total ash the acid insoluble ash and water soluble ash was determined (I.P.1996).

IV. Acid Insoluble Ash

Boiled total ash with hydrochloric acid for 5 minutes then filtered, insoluble matter was collected, washed with hot water, ignited, cooled in a desiccator and weighed. The percentage of acid insoluble ash was calculated with reference to air dried drug (I.P. 1996)

V. Water-soluble ash:

Water soluble ash is that the calculated distinction in weight between the whole ash and also the residue remaining when treatment of the whole ash with water. The whole ash was stewed with twenty five milliliter of water for five minutes and filtered through ash less paper.

The residue collected on the paper was washed with hot H_2O. The paper was allowed to dryand lit for quarter-hour at 450°C. The load of insoluble ash was resolute and deducted from the whole ash taken to get the water soluble ash. The proportion of water soluble ash was calculated with respect to air dried sample.

3.2.3 Extraction of Plant Materials

Dried and coarsely powdered *Mangifera indica, Cucumis sativus* and *Annona squamosa* were subjected for successive solvent extraction using Soxhlation method. On the basis of solvent polarity index (PI), the powdered herbal drugs were encompassed from non-polar to polar order which ensure complete extraction of phytoconstituents from plants cellular matrix (Lorenz *et al.*, 1991). Following successive extraction, powdered drug was packed in Soxhletand petroleum ether 60-80ºC (PI = 0.1), chloroform (PI=4.3) and methanol (PI=6.6) was used as non-polar to polar solvent respectively.

Scheme for successive solvent extraction:

In order to successive extraction, coarsely powdered plant material was extracted with 60-80ºC of petroleum ether, chloroform and methanol respectively. After first solvent treatment in order (60-80ºC of petroleum ether) complete defatting was ensured, and extract was filtered and solvent recovered using recovery unit and filtrate concentrated under vacuum. Marc obtainedwas air dried completely and subjected to next solvent extraction using chloroform. After completion of chloroform extraction, extract was filtered and filtrate concentrated under vacuum and obtained marc was dried to remove chloroform and subjected to methanol extraction. Extracts obtained with each solvent was weighted (w/w) and percentage yield was calculated.

Table No. 3.3: Plant extracts

Drug	Extract
Mangifera indica	Petroleum ether(60-80ºC) extract
	chloroform extract

	Methanol extract
Cucumis sativus	Petroleum ether(60-80ºC) extract
	chloroform extract
	Methanol extract
Annona squamosa	Petroleum ether(60-80ºC) extract
	chloroform extract
	Methanol extract

RESULT & DISCUSSION

Organoleptic evaluation and Physicochemical Evaluation

Table No. 4.1 Organoleptic evaluation of selected drugs in powder form

Characteristics	***Mangifera indica* leaves**	***Cucumis sativa* stem and leaves**	***Annona squamosa* leaves**
Colour	green	Light green or green	dull-green on the upperside, pale, with a bloom, below; slightly hairy whenyoung
Taste	Slightly bitter	Slightly bitter	Slightly bitter
Odour	Aromatic	aroma	Aromatic

Table No. 4.2: Physicochemical Evaluation of *Mangifera indica, Cucumis sativa* and *Annona squamosa*

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Parameter	*Mangifera indica* (Leaves) (Values: % w/w)	*Cucumis sativus* (Stem and Leaves) (Values: % w/w)	*Annona squamosa* (Leaves) (Values: % w/w)
Foreign organic matter	0.16±0.45	0.17±0.18	0.15±0.13
Moisture Content	9.70±1.20	8.78±1.31	12.11±1.30
Total ash	9.71±1.51	11.29 ±1.99	11.13 ±1.71
Acid insoluble ash	2.91±0.48	3.11± 0.20	3.62±0.47
Water soluble ash	1.94 0.09	1.25± 0.11	2.86± 0.05

Successive solvent extraction and yield of derived extracts

Table No. 4.3: Polarity based successive solvent extraction and yield of derived extracts

Plant material	Extract			
	Type and extract name	Texture	Color	%Yield (w/w)
Mangifera indica (Leaves)	Petroleum ether (60-80°C) Extract	Semisolid sticky mass	Light green	20.81
	Chloroform extract	Solid sticky	Dark green	8.49
	Methanol Extract	Solid sticky	Light green	58.37
Cucumissativus (Leaves)	Petroleum ether (60-80°C) Extract	Semi solid	Brownish black	14.98
	Chloroform extract	Solid	Dark brown	11.4
	Methanol Extract	Semi solid	Light Brown	54.68
Annona squamosa (Leaves)	Petroleum ether (60-80°C) Extract	Solid	Light brown	8.98
	Chloroform extract	Semi solid	Dark brown	10.94
	Methanol Extract	Semi solid	Light brown	62.96

CONCLUSSION-:

The leaves of the *Mangifera indica*, stems and leaves of the *Cucumis sativus* and leavesof *Annona squamosa* were collected and authenticated. The materials were shade dried andpowdered to sieve 80 sizes. To meet the quality standards, the dried powdered materials were subjected to various quality control parameters. They were first evaluated by organoleptic characterization using parameters like appearance, color, taste, odour and texture, followed by physicochemical evaluation.

The foreign organic matter was found to be 0.16±0.45% for Mangifera indica,0.17±0.18% for Cucumis sativus and 0.15±0.13 for Annona squamosa. To determine themoisture contents in the drugs, loss on drying was determined and it was found to be9.70±1.20% w/w for Mangifera indica, 8.78±1.31% for Cucumis sativus and 12.11±1.30% for Annona squamosa. Further, total ash (9.71±1.51%w/w for Mangifera indica, 11.29 1.99% for Cucumis sativus and 11.13 1.71% w/w for Annona squamosa); acid insoluble ash (2.91±0.48% w/w for Mangifera indica, 3.11 0.20% for Cucumis sativus and 3.62 0.47%w/w for Annona squamosa) and Water soluble ash (1.94 0.09% w/w for Mangifera indica, 1.25 0.11% for Cucumis sativus and 2.86 0.05%w/w for Annona squamosa)confirm the quality of herbs selected for the study.

REFERENCES

1. Manach C, Scalbert A, Morand C Polyphenols: food sources and bioavailability. Am J ClinNutr 2004; 79: 727-747.

2. Bhattacharya S, Ghosh A. Phytosomes: the Emerging Technology for Enhancementof Bioavailability of Botanicals and Nutraceuticals. The Internet Journal of Aesthetic and Antiaging Medici 2009; 2(1): 141-153.

3. Ansari SH, Islam F, Sameem M. Influence of nanotechnology on herbal drugs: Areview. J Adv Pharm Technol Res. 2012; 3(3): 142 6.

4. Chaturvedi M, Kumar M, Sinhal A, Saifi A. Recent development in novel drug deliverysystems of herbal drugs. Int J Green Pharm. 2011; 5(2):87 94.

5. Devi VK, Jain N, Valli KS. Importance of novel drug delivery systems in herbalmedicines.

Pharmacogn Rev. 2010; 4(7): 27 31.

6. Shaikh MS, Derle ND, Bhamber R. Permeability enhancement techniques for poorlypermeable drugs: A review. J Appl Pharm Sci. 2012; 02(06): 34 9. –

7. Kesarwani K, Gupta R, Mukerjee A. Bioavailability enhancers of herbal origin: Anoverview. Asian Pac J Trop Biomed. 2013; 3(4): 253 66.

8. Mascarella S. Therapeutic and anti-lipoperoxidant effects of silybin-phosphatidylcholine complex in chronic liver disease, Preliminary results. Curr Ther Res. 1993; 53(1): 98-102.

9. Chauhan NS, Gowtham R, Gopalakrishna B. Phytosomes: a potential phyto- phospholipid carrier for herbal drug delivery. J Pharm Res; 2009; 2(7): 1267- 1270.

10. Rathee, S., & Kamboj, A.. Optimization and development of antidiabetic phytosomes bythe Box-Behnken design. J Liposome Res, 2018; 28(2), 161-172.

11. Ittadwar, P.A., & Puranik, P.K. Novel Umbelliferone Phytosomes: development and optimization using experimental design approach and evaluation of photo-protective and antioxidant activity. Int J Pharm Pharm Sci, 2017;. 9(1), 218-228.

12. Vankudri, R., Habbu, P., Hiremath, M., Patil, B.S., & Savant, C. Preparation and therapeutic evaluation of rutin-phospholipid complex for antidiabetic activity. Journal of Applied Pharmaceutical Science, 2016. 6(01), 090-101.

13. Udapurkar, P., Bhusnure, O., Kamble, S., & Biyani, K. Phyto-phospholipid complex vesicles for phytoconstituents and herbal extracts: A promising drug delivery system. International Journal of Herbal Medicine, 2016. 4(5), 14-20.

14. Patil, P.S., Salunkhe, V.R., Magdum, C.S., & Mohite, S.K. Phytosomes: Increasing bioavailability of phytoconstituents. International Journal of Universal Pharmacy and BioSciences, 2016. 5(4), 81-94.

15. Sharma, S., &Sahu, A.N. Development, characterization, and evaluation of hepatoprotective effect of *Abutilon indicum* and *Piper longum* phytosomes. Pharmacogn Res, 2016. 8, 29.

16. Saoji, S.D., Raut, N.A., Dhore, P.W., Borkar, C.D., Popielarczyk, M., & Dave, V.S. (2016). Preparation and Evaluation of Phospholipid-Based Complex of Standardized Centella Extract (SCE) for the Enhanced Delivery of Phytoconstituents. The AAPS, 1, 102-113.

17. Vora, A., Londhe, V., & Pandita, N. Herbosomes enhance the in vivo antioxidant activity and bioavailability of punicalagins from standardized pomegranate extract. J Funct Foods; 2015, 12, 540-8.

18. Bhosale, A.P., Patil, A., &Swami, M. Herbosomes as a novel drug delivery system for absorption enhancement. World Journal of Pharmacy and Pharmaceutical Sciences, 2015.5, 345-355.

19. Zahra, H., Saeed, G., & Hamed, H. Preparation and Characterization of Rutin-loaded Nanophytosomes. Pharmaceutical Sciences, 2015. 21, 145-151.

20. Dhase, A.S., &Saboo, S.S. Preparation and Evaluation of Phytosomes Containing Methanolic Extract of Leaves of *Aegle Marmelos* (Bael). International Journal of PharmTech Research, 2015. 8(6), 231-240.

21. Zhang, Z., Chen, Y., Deng, J., Jia, X., Zhou, J.,& Lv, H. Solid dispersion of berberine-phospholipid complex/TPGS 1000/SiO_2: preparation, characterization and in vivo studies. Int J Pharm, 2014. 465(1-2), 306-16.

22. Abubakar, N.A., Oise, A.E.,& Saidu, A.N. Phytochemical Constituents and Hypoglycemic Effect of Aqueous and Ethanolic Extracts of *Murraya Koenigii* in Alloxan-Induced Diabetic Rats. IOSR Journal of Dental and Medical Sciences, 2014. 13(9), 08-12.

23. Gauttam, V.K., & Kalia, A.N. Development of polyherbal antidiabetic formulation encapsulated in the phospholipids vesicle system. J Adv Pharm Technol Res, 2013. 4(2), 108-17.

24. Khan, J., Alexander, A., Saraf, S., & Saraf, S. Recent advances and future prospects of phyto-phospholipid complexation technique for improving pharmacokinetic profile of plant actives. Journal of Controlled Release,2013. 168, 50-60.

25. Obayed Raihan, A. Brishti, E. Bahar, F. Islam, M. Rahman, S. Mohd. Tareq and Md. A.Hossain.; Antioxidant and anticancer effect of methanolic extract of Aerva lanata Linn.against Ehrlich Ascites Carcinoma (EAC) in vivo; Orient Pharm Exp Med;2012;12:219 225

26. Zaveri, M., Gajjar, H., Kanaki, N.,& Patel, S. Preparation and evaluation of drugphospholipids complex for increasing transdermal penetration of phyto constituents. Int. J. Inst. Pharm. Life Sci, 2011. 1, 80 93.

27. Kidd, P.M. Bioavailability and activity of phytosome complexes from botanical polyphenols: the silymarin, curcumin, green tea, and grape seed extracts. Altern Med Rev, 2009. 14, 226 246.

28. Wagman, A.S. Nuss, J.M ;Current Therapies and Emerging Targets for the Treatment ofDiabetes, Current Pharmaceutical Design, Volume 7, Number 6, 2001, pp.417-450(34)1.

29. Tyler, V.E., Brady, R.L., Robbers, E.J., Pharmacognosy, 19th ed., K.M. VargheseCompany, (1988) 4-6.

30.Evans, W.C., Trease and Evan's: Pharmacognosy, 14th ed., Saunders Company Ltd., (1996) 3-5, 434-435.

31. Kinghorn, A.D., Pharmacognosy in 21st Century, J. Pharm. Pharmacol., 53 (2001) 135-148.