



EXPLORING THE ANTIOXIDANT POTENTIAL OF POLYHERBAL FORMULATIONS PREPARED FROM TRADITIONAL MEDICINAL PLANTS: A COMPARATIVE STUDY OF EXTRACTION AND FRACTIONATION METHODS

Mrs. Hema Kamalja¹ & Dr. Rakesh Kumar Jat²

¹*Ph.D. Research Scholar, Department of Pharmacy, Shri JJTU, Rajasthan, India*

²*Professor & Research Guide, Department of Pharmacy, Shri JJTU, Rajasthan, India*

Corresponding Author – Mrs. Hema Kamalja

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Abstract:

A polyherbal definition (PHF), including *Azadirachta indica* (Neem), *Aloe barbadensis* (Aloe vera), *Allium sativum* (Garlic), *Acacia arabica* (Babul), and *Aegle marmelos* (Bel), is ready for ongoing review and can be used to treat diabetes. Drug and antioxidant properties have been studied using *in vitro* models. Prepare PHF and air-dried powders from five medicinal spices isolated in equal amounts using the Soxhlet method. Polar and non-polar solvents are used. α -Amylase retention is used to study anti-diabetic viability of PHF after phytochemical screening. Subsequent concentrates are further subjected to inhibition studies using (DNS) dinitrosalicylic acid as the caustic. We used the innovative DPPH Screen Test, H₂O₂ Screen Test, and Ski Lift Test to quantify antioxidant activity. Polyherbal Detailing (PHF) containing medicinal spices such as *Boswelliaserrata*, *Commiphora wightii*, *Alpinagalanga* powder, *Glycyrrhiza glabra*, *Tribulus terrestris*, *Tinospora cordifolia* concentrate, *Rumalaya* Strength tested for antioxidant and free-radical seeking effects *Vitro*.

Keywords: Antioxidant, Polyherbal, Medicinal, Plants, Formulations

Introduction:

The field of home grown medication has encountered quick extension as of late. Because of its normal beginning and not many adverse consequences, it is turning out to be more well known in agricultural countries. It is classed in the customary Indian clinical framework. A synthetic that might keep different particles from oxidizing is known as an antioxidant. The compound course of

oxidation includes the exchange of electrons from a material to an oxidizing specialist. Free revolutionaries can be created through oxidation processes. These extremists can then set off a progression of occasions that hurt cells. Antioxidant breaks these chains of occasions by searching free revolutionaries and forestalling extra oxidation processes. Antioxidants, for example, thiols, ascorbic corrosive, or polyphenols, regularly

capability as decreasing specialists since they forestall oxidation without anyone else.

Various examinations have shown that phenolic content in plants and their antioxidant exercises are connected. Polyphenol particles, which are tracked down in plants, have antioxidant properties. The most continuous technique for making free extremists in food, medicine, and, surprisingly, organic frameworks is through the oxidative cycle. Oxygen revolutionaries make up the main part of free extremists that hurt organic frameworks. Also, antioxidants capability as hydrogen contributors, electron benefactors, singlet oxygen quenchers, peroxide decomposers, catalyst inhibitors, and metal chelating specialists. Regular antioxidants, which are innocuous and nontoxic rather than fabricated antioxidants, which are noxious to people, are required on account of the effect on the insusceptible framework.

The skin utilization of home grown medicines is among the most remarkable in the most essential customs of medical services since plants contain different components that have a neighborhood actual activity on substantial tissues. Antioxidant limits of *Momordicacharantia* Linn. products, *Eugenia jambolana* Linn. bark, *Ziziphusmauritiana* Lam. products. and bark of *Acacia Catechu* Wild.

Researched to support the use of certain botanicals in Ayurveda. . This review's objective was to decide the polyherbal definition (PHF's) antioxidant action involving in vitro tests and contrast it with that of ascorbic corrosive, another notable antioxidant.

Elective medicines are more understanding viable and practical for treating wounds than current prescriptions. They likewise make less antagonistic impacts. The comprehension of antiquated customs, for example, siddha, ayurveda, unani, Chinese, and society medication, is the groundwork of elective treatments. Spices are regularly utilized as a primary component of medication in such frameworks. Customary therapies give more consideration regarding the patient's overall wellbeing than to a particular disease or sicknes. The utilization of home grown cures is best for cleaning, debriding, and keeping a sodden climate, as well concerning advancing normal injury mending liberated from unfavorable results.

Starting from the dawn of mankind, natural cures have been utilized to treat wounds, either all alone or in mix with different substances. They are popular since they are promptly accessible, less poisonous, and make not many or no adverse consequences. The Indian arrangement of medication utilizes north

of 163 plant species to treat wounds. Most of plants that are utilized to treat wounds frequently come from a few families, including the Rubiaceae, Euphorbiaceae, Moraceae, and Acanthaceae. Regularly, natural cures comprise of either a solitary spice (monoherbal) or a mix of plants (polyherbal).

Review of Literature:

As per Ayurveda, jamun bark is severe, lovely, stomach related, astringent to the digestive organs, anthelmintic, and useful for sore throats, bronchitis, asthma, thirst, biliousness, loose bowels, blood contaminations, and the treatment of ulcers, as indicated by Kirtikar and Basu¹. The leaves can reinforce teeth and gums, fill in as a liver tonic, and make a great cream for treating head ringworm.

Natural products are astringent to the digestive organs, chilly, dry, and severe, as per Priyavtra Sharma and Mehta³. They support "Vata" and take out foul breath from the mouth. As indicated by Unani medication, they reinforce teeth and gums, function as a liver tonic, improve blood, and make a strong moisturizer for treating head ringworm. The natural product's vinegar can treat spleen conditions and is tonic, astringent, and carminative. The seeds are astringent to the entrails, heavenly, and accommodating for diabetes. The

fledglings are astringent to the entrails, carminative, and refrigerant.

Nadkarni has viewed at the utilization of powdered seeds as a treatment for diabetes and menorrhagia. To treat loose bowels and diarrhea, grow the spleen, and go about as a diuretic in instances of meager or subdued pee, seeds were pounded and joined with mango portions prior to being taken with curd. Leaf oil is likewise useful for treating skin conditions.

As per Chopra et al. ⁹, the bark is viable in treating sore throat, diabetes, blood debasements, and the runs and diarrhea as well as being astringent to entrails, carminative, diuretic, stomach related, febrifuge, clogging, and anthelmintic. It is additionally really great for treating bronchitis, asthma, thrush, fever, gastropathy, and dermatopathy. Seeds lower glucose levels and simplicity diabetic nervousness. It has diuretic, yunani (stops urinary release), astringent, and carminative impacts. Powdered seeds are for the most part utilized in diabetes and lower how much sugar in pee.

As per Prajapatiet al.⁸, seeds are hypoglycemic and can assist with diabetic side effects. It is diuretic, astringent, and represses urinary release (yunani). Powdered seeds are for the most part utilized in diabetes to bring down how much sugar in pee. Foods grown from the

ground are tonics that are utilized to treat diabetes, loose bowels, splenopathy, ringworm, pharyngitis, and different circumstances. As per reports, the roots have an antidiuretic impact. Organic product juice is utilized as a diuretic, stomachic, carminative, and in the treatment of the runs and spleen extension.

As per Parrotta⁹, leaves have antibacterial and antidysentric properties. To reinforce the teeth and gums, apply leaf ash. seeds lower glucose levels and simplicity diabetic side effects. Its foods grown from the ground are tonic, while the bark is utilized to treat diabetes, loose bowels, splenopathy, ringworm, and pharyngitis. It likewise makes astringent and carminative impacts, goes about as a diuretic and represses urinary release (Unani). Making mouthwash and rinses with diabetes and blood contaminations likewise makes an antimicrobial difference.

As per Elizabeth and Williamson⁷, the bark is astringent to entrails, carminative, diuretic, stomach related, febrifuge, obstructing, and anthelmintic. It is additionally really great for treating bronchitis, asthma, thrush, fever, gastropathy, dermatopathy, sore throat, diabetes, and blood pollutants. It is additionally used to make mouthwashes and rinses and has antibacterial properties.

Antibacterial and antidysentric, leaves. To reinforce the teeth and gums, apply leaf debris. The delicate leaves due of queasiness. Products of the soil are tonics and are utilized for ringworm, pharyngitis, diabetes, looseness of the bowels, and splenopathy.

Materials and Methods:

Instruments and Chemicals:

The different spices were separated using Soxhlet gear. Hexane, benzene, chloroform, boiling water, and cold water are the substance solvents or dissolvable counterparts utilized in this cycle. A lab exchange lab Aurangabad, Maharashtra, India gave the PPA (porcine pancreatic amylase) and a rear. Scientific grade synthetic substances were utilized all through.

Plant Materials:

This study's essential objective is to assess the insect diabetic viability and alpha-amylase restraint of a polyherbal definition considering the foundation data gave. Table 1 records the chose plants' natural pieces

Sample Collection:

Botanist Dr. Madhava Chetty from the Branch of Organic science at Sri Venkateswara College in Tirupati, India, accumulated and checked the plant test.

Sample Preparation:

The plant parts were cleaned with water prior to being dried in the shade. A processor was utilized to powder the dried materials. The structure is made by

equitably conveying every part, totally consolidating until homogeneity is accomplished, and afterward putting away in a fixed holder until extraction.

Table 1: The herbal plant composition is listed

Plant name	Synonyms	Family	Parts of a plant used	Mass (g)
Azadirachta indica	Neem	Maliaceae	Leaves	26
Aloe barbadensis	Aloe vera	Liliaceae	Gel	26
Allium sativum	Garlic	Amaryllidaceae	Rhizome	26
Acacia arabica	Babul	Fabaceae	Seeds	26
Aeglemarmelos	Bel or bilva	Rutaceae	Leaves	26

Preparation of Polyherbal Formulations (PHF):

A Soxhlet extractor was utilized to make the PHF extricate. With polar and nonpolar solvents, the natural powder piece was progressively separated. Hexane, benzene, chloroform, ethanol, heated water, and cold water were the solvents utilized.

1. Cold Water Extract:

To make cold water remove, refined water was added to the ground item in a 1:5 proportion, and the combination was then shaken for a day at 37°C and 120 rpm. The sifted separate is saved in the cooler for one day.

2. Hot Water Extract:

100 gram of natural powder was joined with 400 ml of hot, refined water to make the heated water remove.

3. Successive Solvent Extraction:

Like this, the Soxhlet strategy was utilized to remove bioactive substances from medicine powder in a 1:4 proportion. The resultant harsh concentrate was placed into a vial and put away in a cool stockpiling unit for additional exploration.

In Vitro PPA Inhibition Assay:

DNS investigation: how much decreasing sugar delivered during this assessment was utilized to quantify alpha-amylase restraint. A diminishing in the delivered unit of glucose was utilized to exhibit the chemical's inhibitory activity. 1 ml of 1-unit PPA chemical was hatched with plant extricates with fixations going

from 10 to 100 g for 30 minutes at 37 °C. The combination is then additionally brooded for 10 minutes at RT (room temperature) subsequent to being hatched for 1 ml with 1% cradled starch. By adding 1 ml of DNS reagent, the response was stopped. The blend was then warmed in a bubbling water tube for 5 minutes. The catalyst is subbed with a comparable amount of 0.1 M phosphate support to make a clear without any plant separate. There was likewise a control that addressed 100 percent chemical action without plant separate. In an UV spectrometer, the absorbance was learned at 540 nm. The standard chart was utilized to decide what might be compared to the diminishing sugar created from starch. Standard enemy of diabetic prescription acarbose is utilized as a +ve control while investigating the counter diabetic impact of hindering alpha-amylase. Alpha-amylase restraint might be utilized to address the level of hindrance, and the accompanying recipe can be utilized to decide it:

$$\% \text{ inhibition} = \frac{\text{absorbance of control} - \text{absor}}{\text{absorbance of conti}}$$

The chart of level of hindrance versus fixation (g/ml) has been utilized to

concentrate on the IC50 worth of acarbose and PHF extricate in different solvents. The concentrate focus expected to hinder half of PPA movement is alluded to as the IC50 esteem.

Antioxidant Activity:

The GTA (green tea antioxidants) movement, the DPPH extremist searching test, and the thiobarbituric corrosive receptive substance examine (Ski lifts) [26] have all been utilized to compute the polyherbal detailing's antioxidant action.

Statistical Analysis:

The information were introduced as mean standard deviation (SD), with each examination being run in three-fold. The one-way examination of change (ANOVA) test and Tukey'smulticomparison test were utilized to survey contrasts. At p, contrasts were considered significant.

Results:

1. Preliminary Phytochemical Screening:

As shown in Table 2 subjective phytochemical examination distinguished the presence of sugars, glycosides, alkaloids, steroids, terpenoids, flavonoids, phenol, tannins, and saponins.

Table 2: Screening for quality in phytochemicals.

Test	Hexane extract	Chloroform extract	Benzene	Ethanol extract	Cold water extract	Hot water extract
Carbohydrate	+	+	+	+	+	+
Glycosides	+	+	+	-	+	+
Alkaloids	-	-	-	-	-	+
Steroids	+	+	+	-	+	-
Terpenoids	-	-	-	+	-	+
Flavonoids	-	-	-	-	-	-
Phenol	+	+	+	-	+	+
Tannins	-	-	-	+(G)	-	+(G)
Saponins	-	-	-	-	-	-

2. Alpha-Amylase Activity:

PHF concentrates from five specific blends were considered major sinks or reduced α -amylase activity in the ongoing evaluation of polyherbaldetails. Procaine pancreatic

alpha-amylase from 15.65% to 55.30% As indicated by the inhibitory potency of the assay and the IC₅₀ value of 90.35 ± 0.20 μ g/mL (Table 3, Figure 1), acarbose is a commonly used adversary for prescription by diabetic patients.

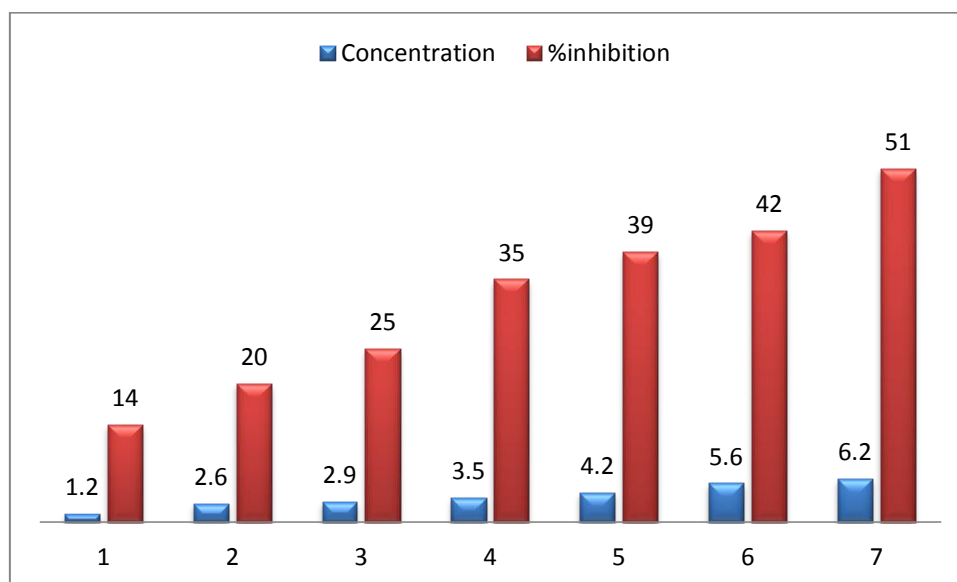
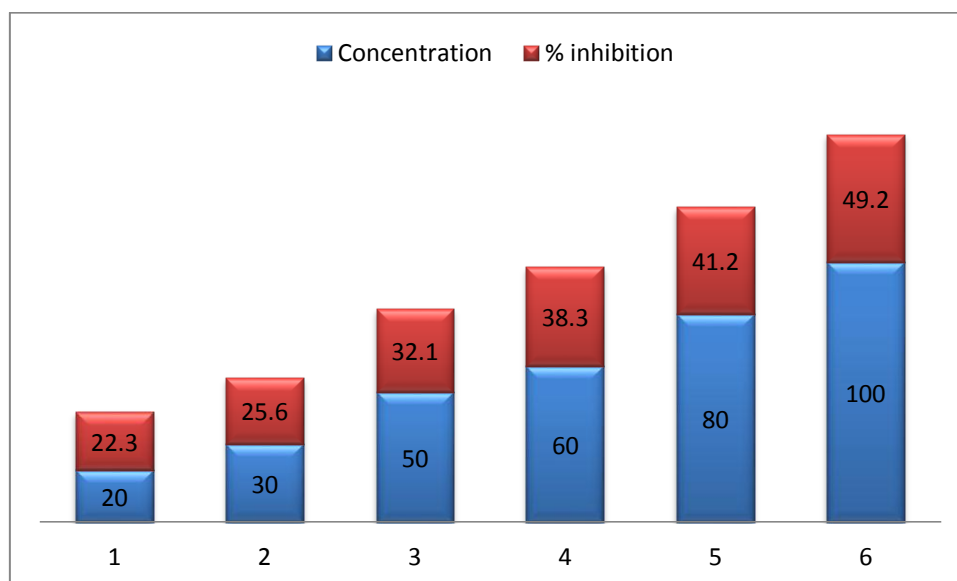
**Figure 1: Acarbose % inhibition.**

Table 3: Acarbose's alpha-amylase inhibition IC50 value.

Standard Drug	Concentration	% inhibition	IC50 value
Acarbose	20	22.3	90.35 ± 0.20
	30	25.6	
	50	32.1	
	60	38.3	
	80	41.2	
	100	49.2	

**Figure 2:** Acarbose's alpha-amylase inhibition IC50 value.

3. Antioxidant Activity:

As shown in Figure 3 and Table 4 the PHF enacts at different portions in the DPPH revolutionary rummaging test. As a benchmark, it is stood out from ordinary ascorbic corrosive. It ends up being the best DPPH extremist rummaging test when utilized in fixation. The reach starts at 50 g/ml and goes up to 250 g/ml. The 250 g/ml fixation created the best outcome, which was around 77.2 0.05 and

measurably huge when contrasted with the control (a: p 0.01; b: p 0.001).

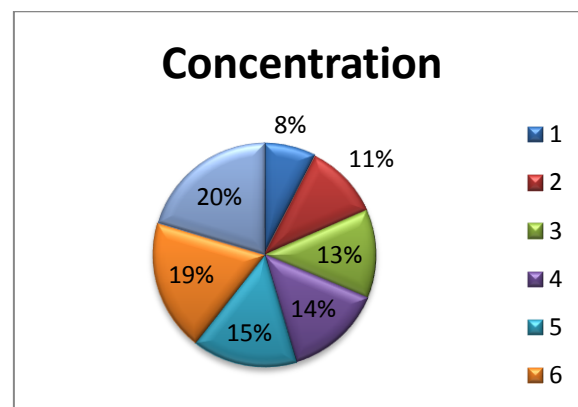
**Figure 3:** PHF demonstrating the ability to scavenge DPPH radicals

Table 4: PHF demonstrating the ability to scavenge DPPH radicals.

Concentration	% inhibition \pm SD	
	Ascorbic acid	PHF
50 μ g/ml	60 \pm 0.02	59.3 \pm 0.036
100 μ g/ml	72.6 \pm 0.09	65.2 \pm 0.04
150 μ g/ml	83.5 \pm 0.5	81.3 \pm 0.04
200 μ g/ml	83.4 \pm 1.23	79.4 \pm 0.08
250 μ g/ml	75.4 \pm 0.9	85.1 \pm 0.06

Discussion:

Certain alpha-amylase inhibition studies evaluate PHF. The results show that removing He PHF(1) from boiling water basically affects alpha-amylase with an IC₅₀ of 90.35 \pm 0.20, which is not exactly acarbose. This indicates that hot PHF concentrates provide better efficacy as they contain phytochemicals that may be considered potential alpha-amylase inhibitors such as glycosides, steroids, phenols and triterpenoids. The best results of the innovative DPPH search to estimate antioxidant activity were obtained at a concentration of 250 g/ml. This was approximately 77.2 \pm 0.05 virtually significant in contrast to controls (a: p0.01; B: p0.001). Results for the GTA strategy yielded the most significant results with convergence at 250 g/ml, which is approximately 78.2 \pm 0.05.

PHF offers the most remarkable antioxidant therapeutic potential in contrast to individual spices, which are

excellent for diabetics. Azadirachta indica (Neem), Aloe barbadensis (Aloe Vera), Allium sativum (Garlic), Aegle marmelos (Bel), and Acacia arabica (Babul) were used to develop polyherb definitions in an ongoing review. Using the ski lift test and the free DPPH research test, this study evaluated the antioxidant effects of PHFs and individual plant extracts. Free antioxidant DPPH is a reliable, nitrogen-centric tissue. Our study showed that PHFs varied more in their antioxidant limits than any single plant. increase. The action of normal antioxidants is strongly influenced by the dynamic fixation structure of natural cosmetics and concentrates. Alpha amylase inhibitors are used as dietary supplements to control carbohydrate absorption and absorption. The use of sham inhibitors produces a variety of random antagonistic effects reminiscent of smooth face against colon, diarrhea, and stomach pain. and our PHF separates have high alpha amylase activity.

Conclusion:

Polyherb details in this study are made from five medicinal plants. Azadirachtaindica, Aloe barbadonsis, Allium sativum, Acacia arabica, Aeglemarmelos. All of these plants contain optional metabolites and bioactive moieties with healing potential. As the results show, PHF from boiling water is said to contain more bioactive components. It was found that the polyherbal blend made by consolidating the barks of three unmistakable medicinally critical plants had great antibacterial and antioxidant exercises. Various phytochemicals from different plants were believed to be the reason for the detailing's antimicrobial and antioxidant action. The polyherbal separate has moderate antibacterial viability toward gram-negative microscopic organisms and solid antimicrobial action against gram positive microbes. The results shown that this definition might be used to stop MRSA and the parasitic disease C. albicans contaminations that happen in medical clinics. This antimicrobial property can support overseeing and forestalling contamination of the injury.

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