

## AN INVESTIGATION ON EXTRACTION OF COMPONENTS FROM MANGO SEED KERNELS USING DIFFERENT SOLVENTS

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### ABSTRACT:

The kernels obtained from the seeds of *Mangifera indica* were powdered, extracted using different solvents such as hydroalcoholic, chloroform, n-hexane, ethyl acetate. Actually, different extraction procedures like Soxhlet extraction, maceration were employed for the extraction of components from *Mangifera indica* seed kernels. The above obtained extracts were studied for the phytochemical, proximate analysis and mineral composition. The preliminary phytochemical tests revealed the presence of Cardiac glycoside, alkaloids, flavonoids, phenols, coumarins, terpenes etc., Most of the components were found in methanolic extract and ethyl acetate extracts. The proximate composition revealed moisture content (4.5%), crude protein (4.59%), ash (2.3%), crude fibre (0.39%), carbohydrate (79.24%). The mineral composition was found to be sodium (26.1ppm), potassium (121.1ppm), calcium (0.31ppm), magnesium (0.49ppm). These seed kernels may be considered as a good source of nutrition. The presence of few components may serve in mitigating some diseases. Some studies have proven this and evaluated the compound responsible for this. Most of the components are found in hexane and aqueous methanolic extracts than the chloroform and ethyl acetate extracts.

**Keywords:** *Mangifera indica*, Soxhlet extraction, Maceration, Ethyl acetate, Proximate analysis.

### INTRODUCTION:

*Mangifera indica* is the scientific name for mango tree. It belongs to the family Anacardiaceae. It is also known to be the king of fruits. Mango tree has very good importance in our ayurvedic texts. Various parts of mango tree are used to treat various diseases. The taxonomical classification of *Mangifera indica* is as follows:

Kingdom: Plantae

Class: Mangoliopsida

Phylum : Mangoliophyta

Order : Sapindales

Family : Anacardiaceae

Genus : *Mangifera*

Species : *Indica*

There are various species of *Mangifera* which include, *Mangifera zeylanica*, *M. similis*, *M. longipes*, *M. decandra*, *M. quadrifida* etc., Mango trees grow up to a height of 110-140 feet. *Mangifera indica* is reported to possess numerous therapeutic uses such as analgesic, anti-inflammatory, antioxidant and antidiabetic [1-2]. This is because

of the presence of c-glycoside, tannins, polyphenolic compounds, and flavonoids. There are several reports which demonstrated antioxidant activity of different parts of *M. indica* such as leaves, seed, bark, peels, fruit [3]. Mangiferin is the compound found in all the above parts. It is the active constituent present in *Mangifera indica*. The present study is aimed at extracting the mangiferin and other components using different solvents.

Many researches have proven that mangiferin protects against different human cancers through the suppression of factor tumour necrosis factor alpha expression, induction of apoptosis[4]. mangifera is reported to be the stable component to acid and enzymatic hydrolysis[5]. Ultra sonic extraction can also be done to extract to that c-glycoside[6].



Figure no.1: Structure of Mangiferin

the seed kernels of *Mangifera indica* were taken dry powdered and then extracted using the methods like Soxhlet apparatus.

### Materials and methods:

The seed kernels were decoated and chopped into pieces, they were dried and ground to fine powder this powder were stored at room temperature. The solvent such as methanol in water, ethyl acetate, n-hexane, chloroform were used to extract mangiferin.

### Soxhlet extraction

150g of the above ground powder was taken in to the thimble with 250ml of solvent methanol in water 70:30(v/v)per set up. The extraction was carried out for 24 hours and the temperature was maintained at 45°C constantly until the completion of extraction. After 24 hours the extract was collected and allowed to air dry. After 3 days it was reconstituted with methanol in water (7:3) and the phytochemical tests were performed. This is the procedure for hydro alcoholic extraction of mangiferin by Soxhlet apparatus. Fraction of hydroalcoholic extract with ethyl acetate, n-hexane, chloroform were performed.

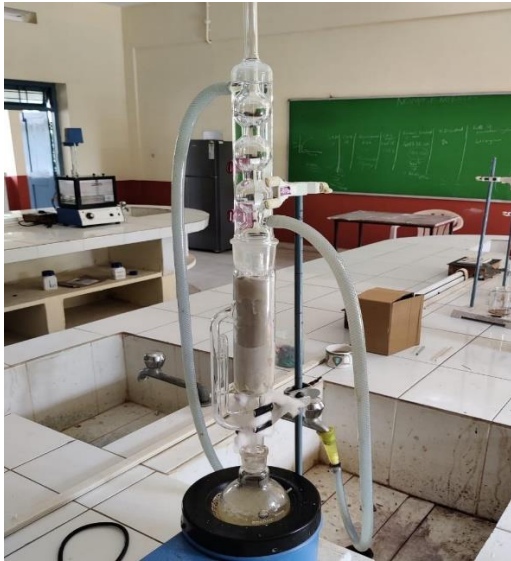


Figure no2: Extraction using Soxhlet apparatus

The above obtained extract was fractionated using ethylacetate and hexane. For this 50ml of above extract was added to 50ml of ethyl acetate and 50ml of hexane.



Figure no3: Fractionation sample

### **Maceration**

10g of powder taken in to the separating funnel. To that 70ml of ethyl acetate was added. It was then shaken vigorously for 30 minutes and left aside. Frequently the menstruum was adjusted for each separating funnel for about six days. On the seventh day the menstruum was again adjusted to level and then examined for phytochemical constituents. The same procedure was carried for other solvents such as hexane and chloroform then those were tested for phytoconstituents.



Figure no4: Maceration of *Mangifera indica* powder

**Phytochemical screening**

The above obtained extracts were screened for glycosides, tannins, alkaloids, terpenoids, saponins, steroids, coumarins, flavonoids, quinones, phenols.

**Proximate analysis**

The moisture content, ash content, crude fibre and protein determination were done using the methods performed by Joyce et al.

**Determination of minerals in dried extracts**

The mineral content present in the samples were analysed by using atomic absorption spectrophotometer (Thermo Scientific ICE 3000 series) after pre-treatment. The mineral contents determined were computed and recorded.

**Results**

The following table shows the results for phytochemical screening of mango seed kernels. Actually, the presence of alkaloids, glycoside, flavonoids, tannins, coumarins were reported in some extracts.

Table1: Phytochemical screening of different extracts

Test	MWE	EAE	HE	CE	FE1	FE2
Carbohydrates	+	+	+	+	+	+
proteins	++	++	++	+	+	+
Steroids	-	-	-	-	-	-
Alkaloids	+	+	+	+	+	+
Glycosides	+	+	+	+	+	+
c-glycosides	++	++	++	-	-	-
Coumarins	++	++	+	+	+	+
Flavonoids	++	++	+	+	+	+
Terpenes	+	+	+	+	-	-
Phenols	++	++	++	++	-	-
quinones	-	-	-	-	-	-
saponins	-	-	-	-	-	-

Where as, MWE -Methanol in Water Extract

EAE-Ethyl Acetate Extract

HE-Hexane Extract

CE- Chloroform Extract

FE1-Fractionated Extract1(50ml of aqueous methanolic extract + 50 ml of ethyl acetate)

FE2-Fractionated Extract2 (50ml of aqueous methanolic extract + 50 ml of hexane)

**Table 2**The proximate composition of *Mangifera indica* seed kernels

Test	Composition
Carbohydrate(%)	79.24
Fat(%)	8.98
Crude fibre(%)	0.39
Ash(%)	2.3
Moisture content(%)	4.5
Crude protein(%)	4.59
Sodium	26.1ppm
Potassium	121.1ppm
Calcium	0.31ppm
Magnesium	0.49ppm
Iron	0.02ppm

### Discussion:

The phytochemical analysis has shown the presence of various constituents such as glycosides, proteins, coumarins, terpenes, phenols, carbohydrates, flavonoids etc., any of these compounds may result in producing good therapeutic effects in treating some diseases. The proximate composition of *Mangifera indica* seed kernels was found to be carbohydrate (79.24%), fat (8.98%), crude fibre(0.39%), ash(2.3%), moisture content(4.5%), crude protein(4.59%), sodium(26.1ppm), potassium(121.1ppm), calcium(0.31ppm), magnesium(0.49ppm) and iron(0.02ppm). Due to the low moisture content it can serve for longer period as the higher content may spoil the food. The considerable amount of phenolic and flavonoid content may be present in these kernels.

## Conclusion:

The recent studies have shown many therapeutic effects of mangiferin. We are aimed at extracting the mangiferin and other secondary metabolites present in the seed kernels of *Mangifera indica*. We have used four solvents such as, ethyl acetate, hexane, chloroform and methanol in water to extract the majority of components through maceration procedure. And also we have extracted the components by performing Soxhlet extraction procedure. We found that the components like carbohydrates, proteins, alkaloids, cardiac glycosides, terpenes, phenols in the aqueous methanolic, ethyl acetate, hexane extracts. Flavonoids, coumarins and phenols are found in aqueous methanolic, ethyl acetate, hexane and chloroform extracts. Hence, the ethylacetate, methanol in water, hexane act as good menstrua for extracting the bio active components from *Mangifera indica* seed kernels.

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