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PRELIMINARY SCREENING OF PHYTOCHEMICALS IN PAPAYA LEAF, BARK AND PEEL OF PAPAYA FRUIT

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ABSTRACT

Plants provide pharmacological important substances. Preliminary phytochemical screening is a vital step to detect and isolate bioactive constituents who may lead to provide ecofriendly environment and help in novel drug discovery. The study was design to investigate the phytochemical screening of various solvents extract of different parts of *Carica papaya*. Phytochemicals, also known as bioactive constituents are secondary metabolites of plants which have medicinal uses. Alkaloids, flavonoids, steroids, saponin, tannin, glycosides are bioactive constituents present in *Carica papaya* commonly known as papaya plant. Papaya has not only nutraceutical value, it has potential medicinal properties also. The crude extract obtained from the leaves, bark and peel of *Carica papaya* in various solvents like petroleum ether, benzene, chloroform, acetone, ethanol, aqueous and extracts were subjected to phytochemical screening. The test conducted in triplicate and the qualitative determination of different metabolites was done using analytical standards published in a text book. The phytochemical screening revealed the presence of saponin in the extract of leaf and bark on the other hand it is absent in the peel of papaya. This research paper will be helpful for pharmaceutical industry in discovery of novel drug.

Keywords: *Phytochemicals, pharmacognosy, novel drug, extract, screening, secondary metabolites.*

I. INTRODUCTION

Plants are sources of chemicals used as drug in herbal medicine. The use of plants as source of remedies for the treatment of diseases can be traced back to the prehistoric times. Medicinal plants are useful for healing and curing human ailments; because plant based medicine have an advantage over synthetic drugs in having low toxicity in human. Plants have their own chemical constituents and medicinal value that may affect certain physiological action in the human body. These are termed as phytochemicals. (Nisar Ahmad *et al.*, 2011).

Phytochemicals are bioactive non –nutrient plant compounds that have protective or disease preventive properties. The word ‘phyto’-is derived from a greek word *phyto* which means-plant. (Mallikharjuna *et al.*, 2007) Phytochemicals also known as bioactive compounds of plant. Bioactive compounds are secondary plant metabolites eliciting pharmacological toxicological effects in man and animals. Bioactive constituents isolated from various parts of plants such as leaves, root, stem bark, flowers, fruits, seeds have been shown to retain medicinal properties. Plants contain bioactive constituents such as alkaloid, flavonoids, terpenes, glycoside, phenolics Terpenoids exhibit many pharmacological properties such as, anti-inflammatory, anti-viral, anti-bacterial activities anti-cancer, anti-malarial, inhibition of cholesterol formation. (Mahato S.B *et al.*, 1997). Flavanoids and tannin are the phenolic compounds that act as primary antioxidants and have an anti-inflammatory, antibacterial, antiallergic, anticancer properties. (Rievere, C *et al.*, 2009) Alkaloid is one of the largest group of phytochemicals that have power as pain killer medication (Kam PCA *et al.*, 2002). Alkaloids act as anaesthetic agent also. (Hérouart D *et al.*, 1988).

Carica papaya Linn. commonly called as paw-paw is one such a plant with potential medicinal value. *Carica papaya* belongs to the family *caroicaceae*. Papaya is perennial, herbaceous, succulent plant (Dick Gross, 2003). Papaya plant is a large single stemmed having 20-30ft height. The leaves are very large, palmately lobed or deeply incised with entire margin. The fruit is big oval in shape. Fruits are born axillary on the main stem, usually single but sometime in small cluster. Fruits weight from 0.5 up to 20lbs and are green, yellow and yellow –orange.

II. METHOD AND MATERIALS

Plant Material

The plant materials were collected from village Beganda of Dhar district of Nimar area in Madhya Pradesh during the period of March to April .The collected leaves, bark, and peel of papaya fruit washed with clean water and shade dry for 6 to 7 days. Shade dried parts of plant finally pulverized in to coarse powders .It was stored in a air tight container till usage.

Preparation of Extracts:

40g.drug powder were successively extracted with petroleum ether, benzene, chloroform, acetone, ethanol, aqueous by soxhlet apparatus and is used as test sample.

Phytochemical Screening

Qualitative analysis

The solvent extract of *Carica papaya* were subjected to routine qualitative chemical analysis to identified the presence of secondary metabolites by using the standard procedure .(Shah Biren N. and Nayak B.S.. 2015).

Test for Steroids (Libbermann – Burchard reaction): Mix 2ml.extract with chloroform. Add 1-2 ml acetic anhydride and 2 drops conc.H₂SO₄ from the side of test tube. First red ,then blue and finally green color appeared, it shown presence of steroid.

Salkowski Reaction : To 2ml of extract, add 2ml chloroform and 2ml conc.H₂SO₄, shake well. Chloroform layers appeared red in color and acid layer became greenish yellow fluorescence.

Test for flavonoids (FeCl₃ Test): To 2ml of extract, few drops of 10% FeCl₃ solution were then added. A green – blue or violet coloration indicated the presence of phenolic hydroxyl group (Trease and Evans, 2002).

Lead acetate solution Test: Test solution when treated with few drops of lead acetate (10%) solution would result in the formation of yellow precipitate .

Test for Glycoside (Keller killiani Test):Take 2ml plant extract, add glacial acetic acid one drop of 5% FeCl₃ and conc.H₂SO₄.Reddish brown color appeared at junction of the two liquid layer and upper layer

Legal's Test: To aqueous or alcoholic extract, 1ml pyridine and 1ml. sodium nitroprusside added,pink to red color appeared. It's shown presence of glycoside.

Test for Alkaloids: 1 ml.of 1% HCl was added to 3ml.of each extract in different test –tube. Each mixture was heated for 2 min. in a water bath while stirring continuously .It was cooled and filtered. With filtrate, perform following tests:

- Wagner's Test:** Mix 2-3 ml filtrate with few drops of wagner's reagent, reddish brown precipitate formed
- Hager's Test :** Mix 2-3 ml filtrate with Hager's reagent,on mixing it formed yellow precipitate .
- Dragendorff's Test:** To 2-3 ml filtrate, add few drops of Dragendorff's reagent,orange – brown precipitate is formed.

Test for Saponin (Emulsion Test): Three drops of olive oil was added to 3ml of each extracts and stirred, emulsion formed.

Foam formation Test: 3ml of distilled water was added to 2ml. of extract and the mixture was stirred vigorously for a stable persistent froth.

Test for Tannin(KOH Test): 1ml of freshly prepared 10% KOH was added to 1ml of each extract in different test tube, dirty white precipitate formed.

FeCl₃ Test: 0.5 ml 5% FeCl₃ was then to added to 2ml of the extract , greenish color appeared.

III. RESULT AND DISCUSSION

Preliminary phytochemical screening of leaf, bark and peel of fruit of *Carica papaya* extracts revealed the presence of various bioactive compounds , the results are summarized in table 1. Phytochemical screening of petroleum ether, benzene, chloroform, acetone, ethanol, aqueous extracts revealed the presence of steroids, flavonoids, alkaloids, tannin, saponin by test reagent. Study revealed that, steroid was present in only benzene extract of leaf, and in peel it was present in petroleum ether extract, whereas in bark found in petroleum ether and benzene both extract. Flavonoid was absent in peel, whereas it was found in appreciable amount in acetone, ethanol, water extract of leaf and bark of *carica papaya*. Phytochemical screening shown that maximum presence of bioactive constituents in acetone, ethanolic and aqueous extract of leaf ,bark and peel.

Plants having alkaloids are used in medicines for avoiding headache and fever. It has antibacterial and analgesic properties . (Pietta P.G ,2000). The presence of alkaloids in papaya leaves consist of quinine, which is anti-malaria. (Robinson, 1985). Saponin has cytotoxic effect in intestine. (Okwu and Okwu, 2004). Cardiac glycosides ,therapeutically have the efficiency to increase the heart-beat without increasing the amount of oxygen needed by heart muscles. (David, H.,1983).

In our studies it was investigated that tannin is present in all three parts of papaya plant, it present in appreciable amount in acetone, ethanolic and aqueous extract of leaf, whereas in previous study tannin was absent in leaf. The current research thinks about and past research considers result were distinctive so it may be because of the adjustment in area and hereditary variety because of cross fertilization.

Table :1 Phytochemical screening of leaves, bark and peel of *Carica papaya*.

Phytochemicals	Extract	solvents	Petroleum-ether	Benzene	Chloroform	Acetone	Ethanol	Aqueous
Steroids	Leaf		-	+	-	-	-	-
	Bark		+	+	-	-	-	-
	Peel		+	-	-	-	-	-
Flavonoids	Leaf		-	-	-	+	+	+
	Bark		-	-	-	+	+	+
	Peel		-	-	-	-	-	-
Glycoside	Leaf		-	-	+	-	-	-
	Bark		-	-	-	+	-	-
	Peel		+	+	-	-	-	-
Alkaloids	Leaf		-	-	+	+	+	-
	Bark		-	-	+	+	-	-

	Peel		-	-	+	-	-	-
Saponine	Leaf		-	-	-	+	+	+
	Bark		-	-	-	-	-	+
	Peel		-	-	-	-	-	-
Tannin	Leaf		-	-	-	+	+	+
	Bark		-	-	-	-	-	+
	Peel		-	-	-	+	+	+

IV. CONCLUSION

Medicinal plants play a vital role in curing various ailments. Plants have curative properties such as anti-inflammatory, anti-diabetic, anti-analgesic, anti-cancer, anti-bacterial, anti-fungal, anti-malarial. Phytochemical screening of medicinal plants are important in pharmaceutical industries for manufacturing of new drug as well as in research institutes. Preliminary phytochemical investigation of *Carica papaya*, revealed that presence of various effective bioactive constituents which may be helpful in formation of novel drug in pharmaceutical industries.

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