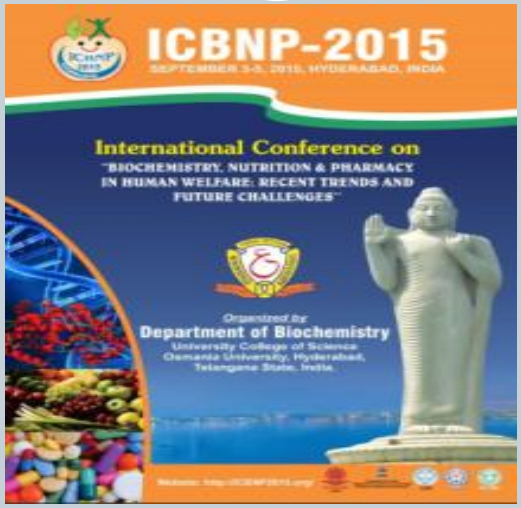
Comparative Analysis Of Phytochemicals, Nutritional And Antimicrobial Properties In Leaf Extracts Of *Moringa Oleifera* By Using Different Solvents.



Presented By
JIKASMITA DALEI
VITILUX ORGANICS (P)LTD
HYDERABAD, INDIA.

Introduction

- ***Moringa oleifera*** is a widely cultivated tree considered as a multipurpose plant. It includes its use as functional food, cleaning water, oil extraction for bio-fuel production etc.
- The “Moringa” tree is considered one of the worlds most useful trees, as almost every part of the tree can be used for the food or has some other beneficial properties.
- The fruit drumstick is quite popular as a vegetable in Asia and African countries.

Cont.

The leaves contains more vitamin A compared to carrots, more calcium than milk, more iron than spinach, more vitamin C than orange, more K than bananas, and the protein quality of moringa leaves rival of milk and eggs.

Objectives

- Extraction of phytochemicals from dry leaf powder of Moringa oleifera by using different polar to non-polar solvents.
- Detection of active constituents by phytochemical screening methods for secondary metabolites.
- Major Nutritional analysis of dry leaf powder.
- Biological screening for antibacterial and antifungal activity.

Methods

1. Sampling and preparation of extracts

- Plant leaves were collected from Tamil Nadu, India.
- Leaves were initially shade dried and oven dried at 40◦C . Dry leaves were pulverized into fine powder.
- 10g each leaf powder were taken and extracted for 48hr in 100ml of ten different solvents such as ; Water, Acetic acid, Methanol, Ethanol, Acetone, Ethyl acetate, Chloroform, Diethyl ether, Toluene and Petroleum ether by maceration method.
- All ten extracts were filtered separately by using Whatman no. 1 filter paper. Filtrates were concentrated by rotary-evaporator.

Methods contd..

2. Phytochemical analysis

- All 10 extracts were subjected to phytochemical screening to test the presence of primary and secondary metabolites.

- Alkaloids were determined by Mayer's test and Dragendorff's test; Tannins by Ferric chloride test; Phenols by Lead acetate test ; Terpenoids by Salkowski test; Saponin by Froth test; Flavonoids by Fluorescence test; Phytosterols by Liberdmann-Burchard's test; Carbohydrates by Fehling ; Glycosides by Legals test ; Proteins by Millon test and Biuret test ; amino acid by Ninhydrin test.

3. Major Nutrient analysis

- Carbohydrate(Anthrone),Protein(Lowrymethod), Fat, Energy, Fibre, Calcium, Vitamin A and Vitamin C were determined.

Methods contd..

4. Biological Screening

I. **Antibacterial activity:** The antibacterial activity of the all extracts were determined in accordance with the ***agar-well diffusion method*** described by Irobi et al. (1994). *Enterobacter, P.aeruginosa, Bacillus cereus* and *S.aureus* were taken as test pathogens.

II. **Antifungal activity:** Antifungal activity tests was done by agar well diffusion method on the SDA (Sabouraud dextrose agar) against *Fusarium, A.niger, A.flavus* and *Rhizopus*.

5.Thin layer Chromatography

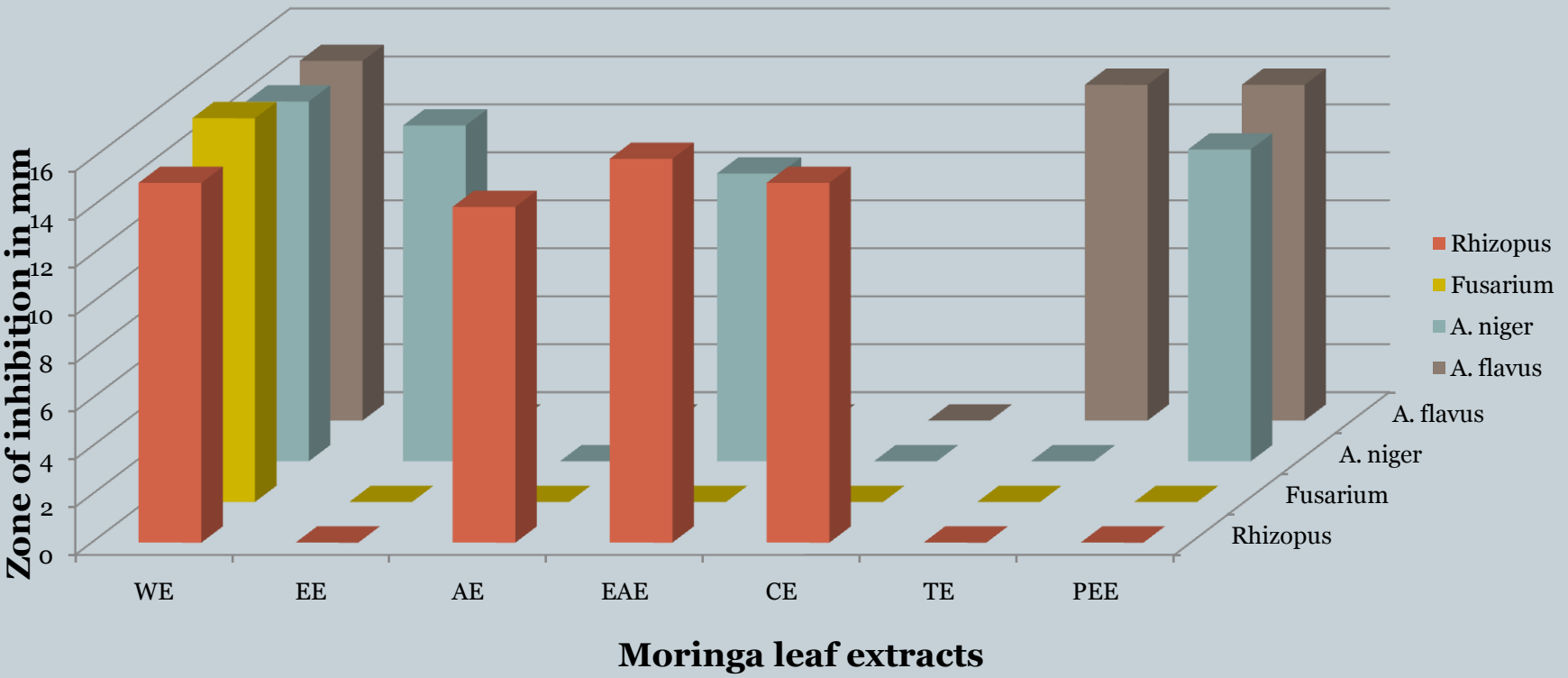
- TLC was performed for all ten extracts by using silica gel and Chloroform:methanol (8:2) as stationary and mobile phase respectively.

Results

Phytochemical analysis of dry leaf extracts of *Moringa oleifera*

Phytochemicals	WE	AAE	ME	EE	AE	EAE	CE	DEE	TE	PEE
Alkaloid	+ve	+ve	+ve	+ve	++ve	-ve	-ve	-ve	-ve	-ve
Carbohydrate	-ve	+ve	+ve	+ve	+ve	-ve	++ve	+ve	-ve	-ve
Glycosides	+ve	+ve	+ve	+ve	+ve	-ve	-ve	-ve	-ve	-ve
Terpenoids	-ve	+ve	+ve		+ve	+ve	+ve	+ve	+ve	+ve
Tannins	+ve	++ve	+ve	+ve	++ve	-ve	-ve	-ve	-ve	-ve
Flavonoids	+ve	-ve	+ve	-ve	+ve	-ve	-ve	+ve	-ve	-ve
Protein	+ve	+ve	+ve	+ve	+ve	+ve	-ve	+ve	-ve	+ve
Phenol	++ve	+ve	++ve	++ve	++ve	-ve	-ve	-ve	-ve	-ve
Saponin	++ve	-ve	-ve	+ve	-ve	-ve	-ve	-ve	-ve	-ve
Steroids	-ve	-ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	+ve
Quinone	+ve	+ve	+ve	+ve	++ve	+ve	-ve	-ve	+ve	-ve

Results contd.

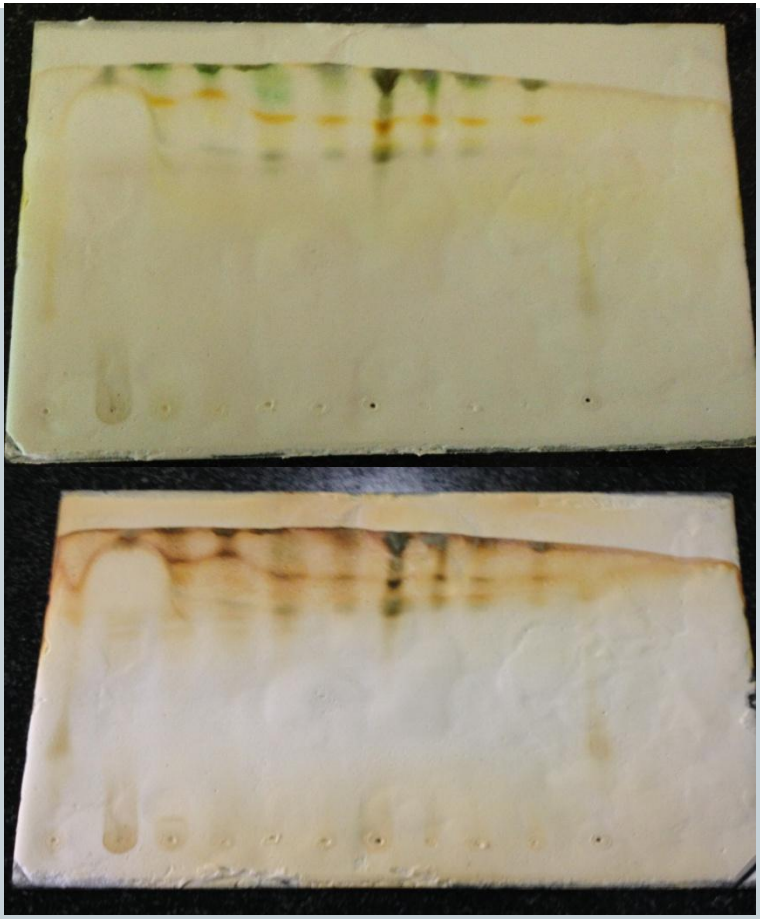


Water extract of moringa leaf powder (inhibition zone **14-16 mm**) was found to be more effective than other extracts against all four fungal pathogens .

Results contd..

Major Nutritional content in dry leaf powder of *Moringa oleifera*

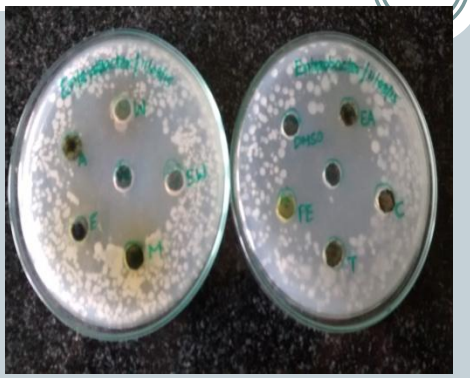
Nutritional parameter	Concentration per 100g of dry leaf powder
Energy(Calories)	348 Kcal
Carbohydrate	51.19 g
Protein	23.90 g
Fat	5.24 g
Vitamin A(mg/100g)	13.89
Vitamin C(mg/100g)	22.35
Calcium	1.8



TLC of different extracts of Moringa oleifera

Result contd…

Bacillus



Enterobacter

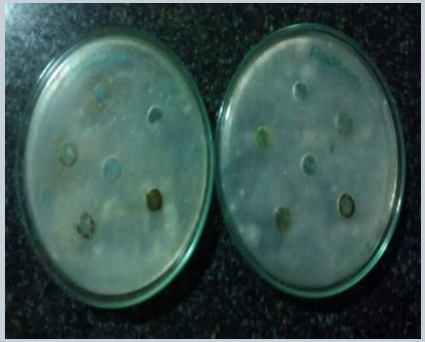
Staphylococcus

Pseudomonas

Antibacterial activity

A.niger

Rhizopus



Fusarium

A.flavus

Antifungal activity

Conclusion

- The above study indicated that *Moringa oleifera* contains variety of phytoconstituents such as alkaloids, phenols, flavonoids, steroid, glycosides and terpenoids. Methanol and Acetone can be used as a potential solvent for extraction of secondary metabolites from moringa leaves.
- The nutritional content including carbohydrate, protein, vitamins and phytochemical of leaf powder makes the leaf a rich nutritional source to be used as supplements.
- Moringa leaf powder has the potential to improve health status which manage a number of disease conditions such as Arthritis, Blood sugar, Inflammations, Ulcer, Gastroenteritis and tumors etc.
- From the present investigation it was revealed that the moringa leaves can be used as a potential antifungal agent as compared to antibacterial.
- It is concluded that *Moringa oleifera* leaves has an impressive range of medicinal uses with high nutritional value and could be a potential source of active antimicrobial agents, a detailed assessment of its *in vivo* potencies is ongoing.

Acknowledgement

The author express thanks to

- **Vitilux Organics & niTza Biologicals**, Hyderabad., for their help and support in carrying out this research work.

- ICBNP-2015 for accepting my research.

Thank You