Phytochemical Studies of *Momordica Charantia* Fruit: Seed Extraction *via* Aqueous Enzymatic Extraction and Pulp Maceration

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A B S T R A C T: The edible fruits of *Momordica charantia* or bitter melons have been used for over a decade in folk medicine for treatment of diabetes and malaria. The seeds usually have been discarded without any further use, however, it's can be a good source of biomass. Hence, this research aimed to isolate active constituents from *M. charantia* seeds after aqueous enzymatic extraction and pulp after maceration

Keywords : *Momordica charantia*, pulp, seed, maceration, aqueous enzymatic extraction.

INTRODUCTION

M. charantia (Cucurbitaceae) is a type of plant that easily grows in tropical area including Asia, Africa and the Caribbean. The Cucurbitaceae family consists of 125 genera and 960 species in which ranks among the highest of plant families for number and percentage of species used as human food. It is frequently cultivated throughout the year in mild, frost-free winter's areas. In the plain areas, the summer season crop is sown from January to June[1]. *M. charantia* is commonly utilized in various industries, such as, in the decolorization and removal of dyes in the textile industry as well as medicine to treat illness such as, diabetes[2] and malaria[3] with the limited knowledge on the specific active constituents that responsible to these beneficial properties.

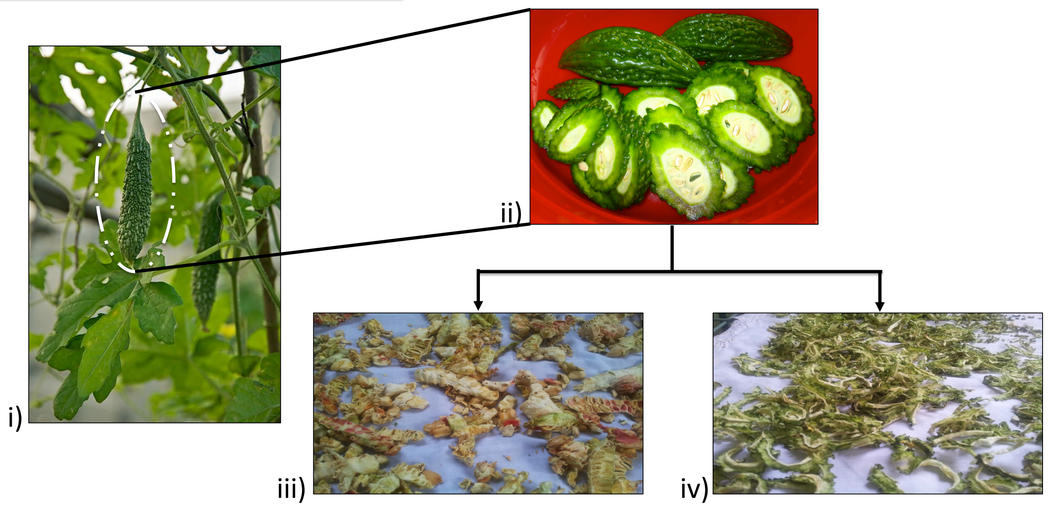

Figure 1: The *M.charantia* plant. i) *M.charantia* tree, ii) Cross section of *M.charantia* fruit, iii) Dried *M.charantia* seed, iv) Dried *M.charantia* pulp

M.Charantia Pulp Studies

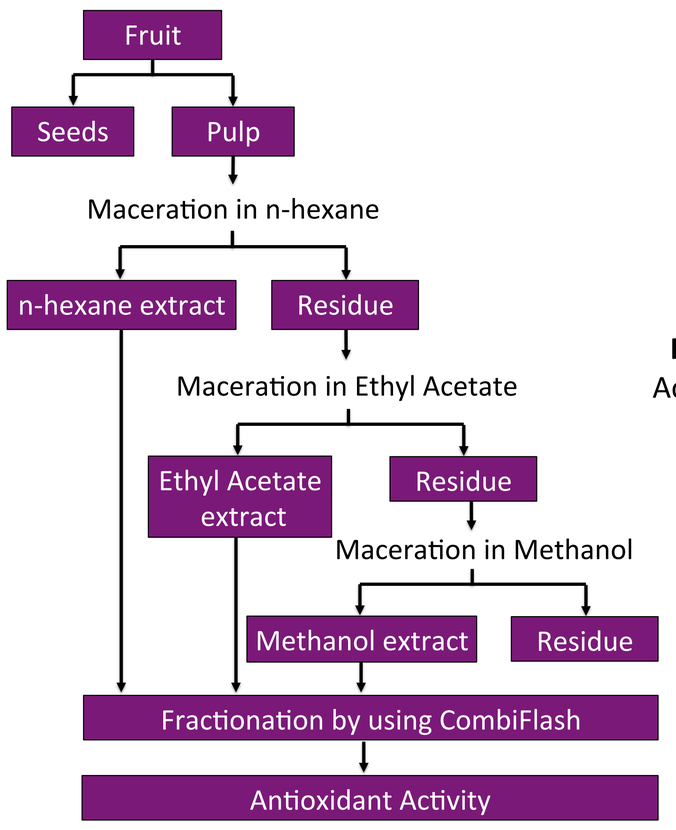

Figure 2: The Research Methodology

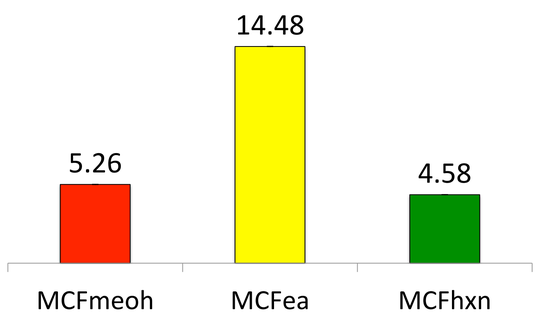

Figure 3: The Percentage (%) Antioxidant Activities of *M.charantia* Pulp Crude Extract

DPPH Radical Scavenging Test

- The Vitamin C used as reference (96.95 % antioxidant activity)
- MCFea displayed the highest activity
- MCFea : 6 fractions displayed 20 – 39 % activity out of 31 fractions tested.
- MCFhxn : 2 fractions displayed 10 – 13 % activity out of 10 fractions tested.

Table 1: List of Abbreviations

Abbreviations	Description
MCFmeoh	*M.Charantia* pulp methanol extract
MCFea	*M.Charantia* pulp ethyl acetate extract
MCFhxn	*M.Charantia* pulp n-hexane extract

M.Charantia Seed Studies

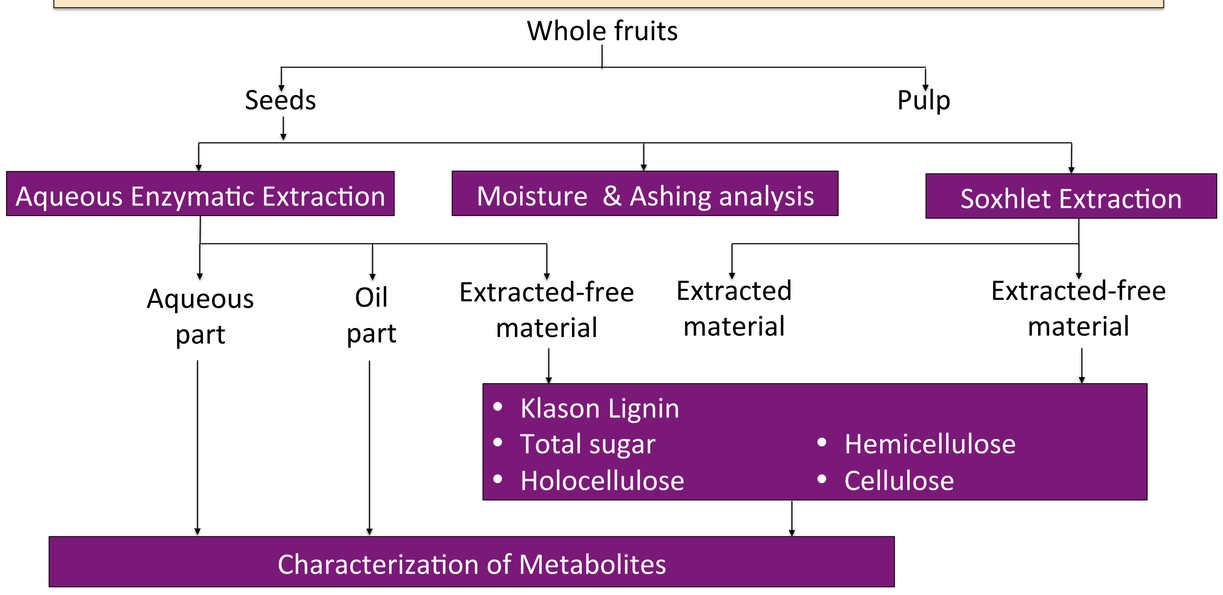

Figure 4: The Research Methodology

Table 2: List of Abbreviations

Sample Code	Enzyme (%)/Sample Weight(g)		
	HEL1	X7	Protease
M0	-	-	-
M1	5	-	-
M2	5	1.25	-
M3	5	2.5	-
M6	5	5	-
M7	5	5	5

- The *M.charantia* seed composed of 56% Celullose, 21% of Klason Lignin, 12% Hemicelullose and 10% others

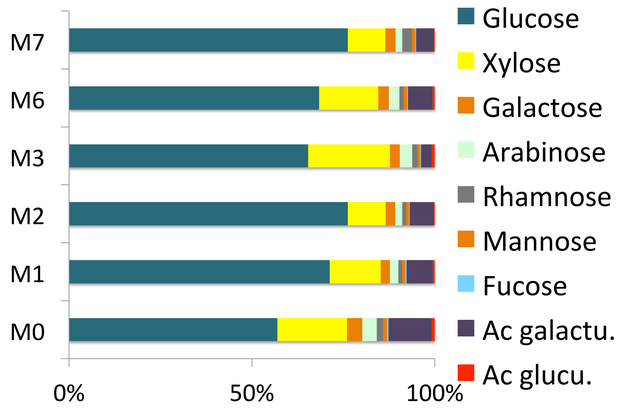

Figure 6: The Water-soluble Sugar in Seeds

- The percentage of glucose increased 10 – 20 % with the presence of enzyme

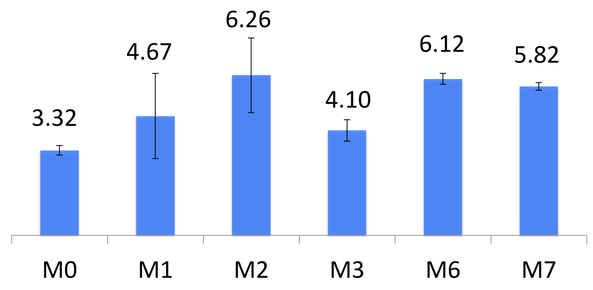

Figure 5: The Percentage (%) Yield of Residual Oil

- M2 - highest % oil, enzyme cocktail X7 facilitated enzyme cocktail HEL1

Table 3: The Fatty Acid Composition of M6

Fatty acid	Oil Yield (%)
Myristic acid (C14-0)	9.04
Palmitic acid (C16-0)	16.30
Stearic acid (C18-0)	18.58
Linolenic acid (C18-2)	7.65
γ-Linolenic Acid(C18:2n-6)	17.43
Linoleic acid (C18:2n-6)	9.04
α -Eleostearic acid (ctt, 9,11,13–18:3)	20.53

- Fatty acid composition of seed oil: saturated (43.92%), unsaturated (54.65%)

CONCLUSION

M.Charantia pulp ethyl acetate extract displayed good antioxidant activity compared with methanol extract and n-hexane extract. This extract will be further fractionated to obtain pure compounds. Meanwhile, aqueous enzymatic extraction can be an alternative method to extract other metabolites such as glucose and oil as the presence of enzyme increase the extraction yield.

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