Production of Polyphenol From Phyllanthus Emblica Using Extraction Process

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Abstract- *Vitamin C and polyphenols are found in Phyllanthus emblica. Phyllanthus emblica was used to extract a potential antioxidant polyphenol utilising a Soxhlet, microwave, and aqueous extraction procedure. The study was absorbed low yield of polyphenol obtained from 21% of Soxhlet extraction. medium yield of polyphenol obtained from 33% of aqueous extraction.Microwave extraction yielded the highest polyphenol production at 69.5 percent. The findings will aid in the knowledge of the amla fruit, which has a substantial quantity of polyphenol extract obtained by a microwave extraction procedure.*

Keywords- Antioxidant, polyphenol, Soxhlet extraction, microwave extraction, aqueous extraction,

I. INTRODUCTION

Polyphenols are micronutrients found in Phyllanthusemblica in their natural state. Polyphenols are a class of compounds that may be found in dried fruit. P.emblica fruits are nutrient-dense, high in vitamin 'C,' and have a wide range of medical applications. The fruit is also high in phenolic compounds (Kusirisin et al., 2009). In an ethanol-induced hepatotoxicity model, Kishori G. Apte. et al [2] Phyllanthus emblica bark hydroalcoholic extract was tested for its defensive properties (PEE). Total phenolic, flavonoid, and tannin content, as well as in vitro antioxidant activity, were assessed using H2O2 scavenging and ABTS decolorization assays. C. Manach, G. et al. [3] used the Folin-Denis reagentcalorimetric method to measure the amount of polyphenols extracted in the extraction operation and their phenolic content. [4] The dried fruits of P. emblica, together with those of Terminalia chebula and Terminalia bellerica, are used in an Ayurvedic medicine that has anti-inflammatory properties.

The main aim of these work is to study soxhlet extraction, microwave extraction, aqueous extraction of polyphenol. While comparing with the % of yield in the polyphenol with the help of the extraction process.

MATERIALS AND METHODS:

Raw materials used:

- Ethanol,
- Methanol,
- Gallic acid,
- Folin-denis reagent,
- Sodium carbonate.

SOXHLET EXTRACTION METHOD:

The Soxhlet device is a frequently used technique for extracting oil from various materials in numerous labs. The following is a step-by-step technique for extracting and separating polyphenols:

- The bark of the amla tree must be cleansed and dried before being collected.
- Using a grinder, it is ground into a powder with a 100 micro mesh size (150mm).
- Polyphenol extraction is done using this approach.
- A 100gm bark raw material is filtered using filter paper and placed into the instrument.
- The chosen solvent (Ethanol) of 150 mL is mixed with water in a 7:3 ratio.
- A minimum of three refluxes must be achieved in 30 minutes of extraction time.
- The powdered extract is stored in the refrigerator until ready.
- A paste extract is created by drying the substance at 75°C and then evaporating the liquid.

In order to produce powdered extract, the paste is dried in an oven at a low temperature (below 70°C).

- As a final step, the product is tested for total polyphenol content.

MICROWAVE EXTRACTION METHOD:

- The studies were conducted in a 22-litre, 800 W microwave oven.
- 5 g of P. emblica dried fruits were measured into a flask containing different amounts of water (solvent), between 50 and 250 microliters in volume, and microwaved.
- The flask was fitted with a reflux condenser. Thereflux condenser was used to cool the vapour that heated fluids emit.
- A magnetic mixer was positioned underneath the flask to replicate ideal mixing conditions. The temperature is measured using a digital thermometer.
- To monitor the temperature during MAE, a timer was utilised. P. emblica dry fruit polyphenols were extracted using water as the solvent for MAE.

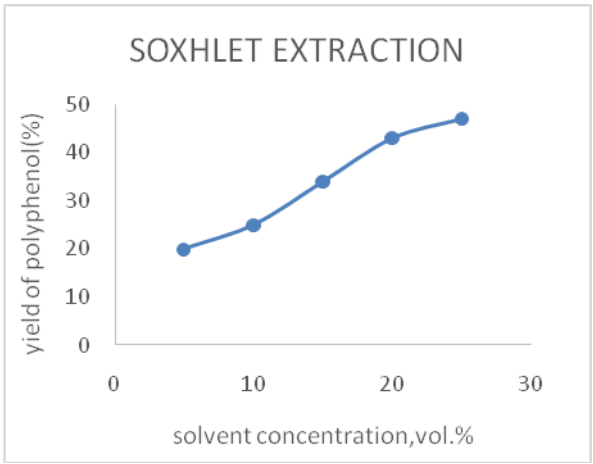
AQUEOUS EXTRACTION METHOD:

- The total phenolic content of the P. emblica extracts was determined using the Folin-Denis reagent.
- Each 0.5ml of the test reaction comprised 10 mg/ml extract, the Folin-denis reagent, and 10% Na2CO3, and was incubated at room temperature for 1 hour.
- A spectrophotometer was used to measure the absorbance at 780 nm.
- Gallic acid was used to generate a polyphenol calibration curve with a standard concentration range of 2-8 mg/L.
- Measured in grammes of gallic acid per 100 grammes of crude extract, the crude extract has a phenolic content.

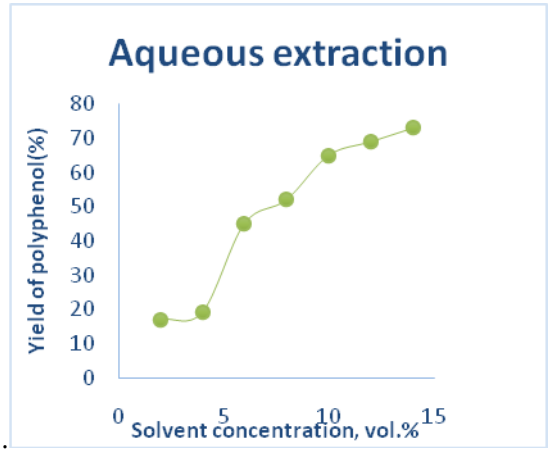
II. RESULTS AND DISCUSION

Effect of solvent concentration to yield of polyphenols(%):

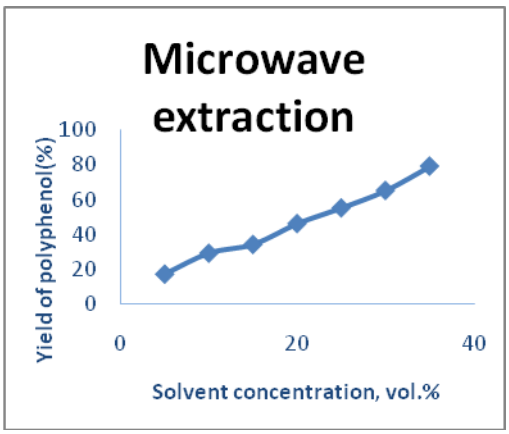
The solvent concentration is one of the most critical parameters that influences polyphenol yield. The influence of solvent volume fraction on polyphenol production from the bark of P.emblica. From soxhlet extraction, it was discovered that the yield rises with increasing solvent concentration, and that a larger volume fraction yields a polyphenol yield. At a concentration of 45 volume percent, the yield for ethanol is 21 percent.



• The aqueous extract of this fruit has 3% equivalents of total phenolic content, with a volume percent concentration of 60%.



With increasing irradiation duration up to 32.5 s and ethanol concentration up to 69.5 percent, the extraction yield of Total Phenolic Compounds (TPC) steadily grew and then gradually fell after reaching critical levels. TPC extraction increased as irradiation duration rose when microwave power and ethanol concentration were both at a specific level.



III. CONCLUSION

All of the phenolic compounds found in plants may be found in plant phenolic extracts. Methods including soxhlet extraction, microwave extraction, and aqueous extraction are used to extract phenolic compounds from their plant sources. The type and qualities of the solvent, as well as the process's operating parameters, influence soxhlet extraction. As a result, the polyphenol-rich bark of Phyllanthus Emblica was used in the extraction investigation. To successfully extract antioxidant phenolic components from emblic fruits, the microwave-assisted extraction (MAE) approach is straightforward and easy to apply. When all three extraction methods are compared, the microwave extraction yield percent is greater. Natural antioxidants from the fruits of P.emblica, according to the results of the aqueous extract, may be useful for hepato-, cyto-, and radioprotection, and may also help to reduce oxidative stress in a number of clinical conditions.

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