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ADVANCEMENTS IN PHYTOCHEMICALS

Priya Kumar^{1*}, Deepika Chandra¹, Rimmi Singh²

¹Department of Pharmaceutical Technology, Uttar Pradesh Technical University, Noida Region, Uttar Pradesh, India.

²Department of Pharmaceutical Sciences, Lovely Professional University, Jalandhar, Punjab, India.

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*For Correspondence

Priya Kumar, Department of Pharmaceutical Technology, Uttar Pradesh Technical University, Noida Region, Uttar Pradesh, India.

E-mail: priyavarunkumar@rediffmail.com

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INTRODUCTION

Phytochemicals are those substances which extracted from the plants in the form of different chemicals out of which many of them are responsible for their colour, odour and other organoleptic properties. Organoleptic properties are those substances which are experienced by the senses like smell, touch, taste, vision, etc. Different phytochemicals are used to manufacture varieties of different formulations. In the field of nanotechnology, phytochemicals are playing vital role by manufacturing different Nanomedicine. Nanomedicines are the applications of nanotechnology only, which has created a boon in the field of science & technology. Different analysis like GC-MS, HPLC and other pharmaceutical technological applications has been made to extract and determined phytochemicals from different plant sources ^[1-7].

From more than 1000 years ago, human depend upon nature for his basic needs like food, shelter, clothes and medicines too. With the change in time the tendency of human also changes and in this scientific era it turns into the use of chemicals which now can easily be extracted from the plants only which now termed as phytochemicals. People get so much interested in curing several diseases from those chemicals only which are extracted from the different parts of plants ^[8].

In a recent research on *Amaranthus caudatus* plant which is a versatile crop having 60 different species and is estimated that it was originated from Central and South America where it was cultivated from more than 8000 years & grown in a wide range of agro-climatic condition, which can easily resists in drought, heat & pests, and gets easily adapts into new environment ^[9,10]. Paranthaman R et al., researched on *Amaranthus caudatus* that five different flavonoids i.e. Gallic acid (GA), Caffeic acid (CA), Rutin (RU), Ferulic acid (FA) and Quercetin (QU) are present in its leaves that have been extracted and analysed using Reverse Phase High Performance Liquid Chromatography (RP-HPLC) method and have got excellent results. Not even this these were also analysed by using GC-MS (Gas Chromatography-Mass Spectroscopy) which showed the presence of phytochemicals in *Amaranthus caudatu* ^[11,12].

In a new research it was invented that phenolic phytochemicals are very important in the production of food, pharmacy and cosmetic industry because they consist of unique antioxidant properties in them. The research was done on Red Grape Pomace which is a solid waste of wine comes during its manufacturing process having high polyphenolic content in it. The result which was extracted from this was highly valuable in the production of different commercial formulations possessing high antioxidant activity [13-17]. Not even in the antioxidant activity but phytochemicals also possess high anti-fungal activity too which reduce up to 90-93% of same fungus at same concentration which was tested successfully in methanolic extracts in the leaves of several plants [18,19].

Phytochemicals are also now targeting angiogenesis to cure cancer of different organs. Angiogenesis is a physiological process in which the formation of new blood vessels made from the pre-existing vessels. It is a normal and essential process helps in the growth and development of the tissue. Angiogenesis process is now heading to cure the cancer cells too which is a major cause of death worldwide and it is considered as a critical progression in cancer stage. The formation of new vessels from the pre-existing vessels is a very tough process. Thus, this process of angiogenesis is a promising approach for anticancer therapy. Results have portrayed that people who are advised to use Green tea polyphenols (*Epigallocatechin gallate*) and soybean isoflavones (Genistein) involved in anti-angiogenic effect as both of these are phytochemicals [20-22]. In several other factors it has been concluded that the use of angiogenesis process if gets imbalanced then it will be one of the factors which is involved in the development of NL (Necrobiosis Lipoidica) and GA (Granuloma Annulare) which is a dermal disorder with unclear pathogenesis [23].

Phytochemical study was also done on anti-bacterial activity too. Study showed that powdered root material of *Ziziphus rotundifolia* gave significant results for anti-bacterial activity and was found to be most potent against *Proteus vulgaris*, *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* [24].

Phytochemicals being extracted from the plants are highly useful as pesticidal activity which aims that the people who work at industries and extract and formulate phytochemicals alone or combined with pesticides in that some of the phytochemicals are also very useful [25].

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