



Bioactivity and Pharmacological Directed Extraction and Formulation of Bioactive Components from *Costus spicatus*

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The therapeutic properties of various herbs are well recognized worldwide. The phytochemicals in these herbs exerts various pharmacological activities. The knowledge on the traditional medicine paved the way for the development of Phytopharma industries. More than 6000 herbs and its various parts are been used in traditional as well as modern medicine. *Costus spicatus* is one among the herb which is been used for its various therapeutic properties. *C. spicatus* is an erect, succulent, perennial herb, growing up to 2.7 meters height, arising from a horizontal rhizome. This herb is found in tropical region of India and also cultivated for its commercial and medicinal value. A large numbers of chemical con-

stituents were extracted, isolated, formulated and studied on various ailments. It is been observed that the plant possesses activities like anti diabetic, antioxidant, hepato protective astringent, anthelmintic, aphrodisiac, bitter, febrifuge and expectorant, purgative etc.

In the proposed study, a bioactivity and pharmacological directed extraction methods based on previous studies as referred in the Table 1, will be attempted. A proposed formulation of these extracts into nano particles, liposomes, nano emulsions, micro encapsulation and solid-lipid nano particles as a part of drug delivery.

Pharmacological activity	Plant part	Extracting solvent	Reference
Anti-Inflammatory and Antipyretic	Rhizome	Ethanol	[1]
	Leaves	Methanol	[5]
Anticariogenic	Rhizome	Ethanol	[2]
Spasmolytic	Whole plant	Ethanol	[3]
Antifertility	Rhizome and whole plant	Ethanol	[4]
Oestrogenic	Whole plant	Ethanol	[6]
Antifungal	Whole plant	Ethanol water	[7]
Antibacterial activity	Leaf and Rhizomes	Methanol Ethanol Aqueous Hexane	[8]

Adaptogenic activity	Rhizome	Alcohol	[9]
	Leaves	Juice	[10]
Antioxidant	Whole plant	Ethanol water	[11]
	Leaves	Chloroform	[12]
	Rhizome	Ethanol	[13]
Hepatoprotective	Rhizome	Ethanol	[14]
Antihyperglycemic and hypolipidemic.	Leaves	Ethyl Acetate	[13]
	Rhizome	Methanol	[15]
	Leaves	Hexane Methanol water	[15]
Larvicidal	Whole plant including rhizome	Aqueous	[16]
	Leaf	Alcohol	[16]
	Leaf, stem	Ethanol	[16]
Cooling to head and relief from headache.	Rhizomes	Juice	[17]

Table 1

Process flow diagram (PFD) of bioactivity directed extraction

Proposed formulations into a drug delivery system

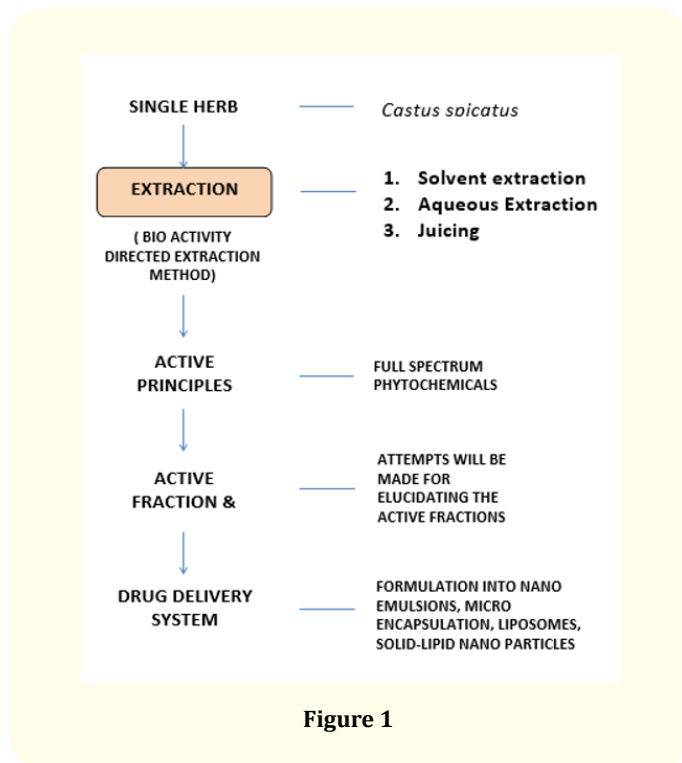


Figure 1

For many decades the herbal medicines were not considered for development as novel formulations due to lack of scientific justification and processing difficulties, such as standardization, extraction and identification of individual drug components. The modern phytopharmaceutical research has solved the scientific needs (such as determination of pharmacokinetics, mechanism of action, site of action, accurate dose required etc.) Hence it is now become easy to incorporate the bioactive principles into a drug delivery system, such as nanoparticles, microemulsions, matrix systems, solid dispersions, liposomes, solid lipid nanoparticles and so on.

Drug delivery technology offers a promising approach for the delivery of drugs through various routes of administration. Drug delivery technology is aimed at maximizing the drug delivery at the targeted site so as to increase the efficiency of drug and proposing improved patient compliance.

Administration of bioactive components extracted from *C. spicatus* into the human body requires the use of an appropriate vehicle for bringing an effective pharmacological effect. The desired site varies and it may be the blood stream, organs and cells, and so on.

It is known that the delivery of these bioactive compounds is significantly influenced by their physicochemical properties, such as water solubility, partition coefficient, lipophilicity and crystallinity, and so on. To address this incompatibility of the bioactive fractions of *C. spicatus*, it is proposed to formulate them into the following drug delivery.

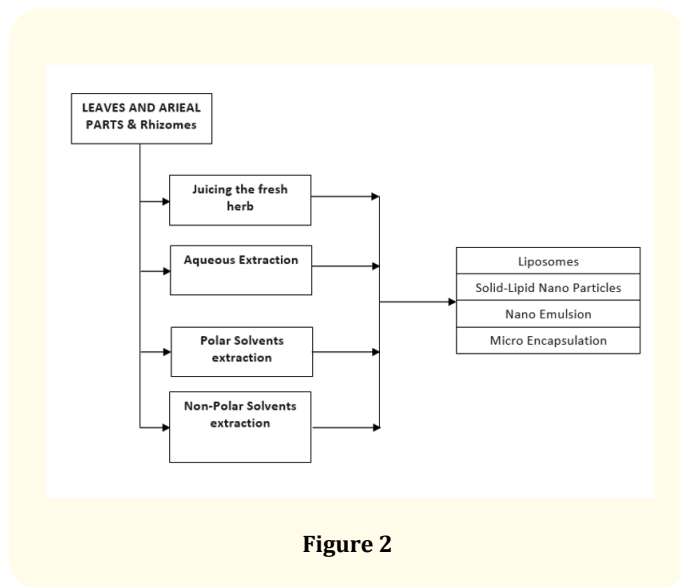


Figure 2

The physicochemical properties, phytochemicals profiling, *in vitro* and *in vivo* studies of these various formulations are being undertaken to prove the comparative pharmacological efficacy with conventional extracts [1-17].

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