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## Original Article

# Scientific validation and formulation of three Indian Folklore medicinal plants



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## ARTICLE INFO

## Article history:

Received 3 August 2013

Accepted 8 August 2013

Available online 30 August 2013

## Keywords:

Antioxidant property

Hepatoprotective activity

Preformulation studies

Precompression parameters

Post compression parameters

## ABSTRACT

**Aims:** The present study was aimed to study the *in vitro* antioxidant property by DPPH, superoxide, and hydroxyl radical scavenging assays, *in vivo* hepatoprotective activity by CCl<sub>4</sub> induced hepatotoxicity in albino rats, formulation of polyherbal hepatoprotective tablets containing equal quantities of methanolic extract of roots of *Begonia laciniata* Roxb., whole plant of *Cuscuta epithymum* (L.) L and whole plant of *Dendrobium ovatum* (L.) Kraenzl., which were used traditionally in Chittoor and Khammam districts of Andhra Pradesh, India.

**Methods:** Formulation was developed by direct compression method using super tab-11SD, primojel, talc and magnesium stearate as excipients and then subjected to evaluation of precompression and post compression parameters.

**Results and conclusion:** All the selected plants showed dose dependant antioxidant property, highest at 360 µg dose and significant dose dependant hepatoprotective activity, highest at a dose of 400 mg/kg b.w compared to standard drug silymarin, the histopathological studies also confirmed protective effects of extracts against CCl<sub>4</sub>-induced liver injuries. The observations from formulation support the ideal properties of compressed tablets and its feasibility for large-scale commercial production.

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## 1. Introduction

Since the introduction of the herbal medicines, many people were impelled to consider the importance of many herbs for treating several forms of disorders. However, several herbal products lining in those shelves are not really standardized in terms of its effectiveness and safety.

When two or more herbs are used in formulation they are known as polyherbal formulation. Herbal formulations are

usually prepared with the combinations of individually extracted single herbs to get the benefit of synergism or to prevent side effect arising from chief herb.<sup>1</sup>

Liver has a pivotal role in the maintenance of normal physiological process through its multiple and diverse functions, such as metabolism, secretion, storage and detoxification of variety of drugs. In the absence of reliable liver protective drugs in modern medicine, in India, a number of medical plants and their formulations are used to cure hepatic disorders in

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<http://dx.doi.org/10.1016/j.jopr.2013.08.012>

traditional systems of medicine.<sup>2</sup> There are numerous plants and traditional formulations available for the treatment of liver diseases. About 600 commercial herbal formulations with claimed hepatoprotective activity are being sold all over the world.<sup>3</sup> Treating liver diseases with botanical drugs has a long-tradition, but evidence for efficacy is sparse. Moreover, synthetic drugs available in the market may cause serious side effects. Keeping this in mind for giving scientific proof, the present work was designed and screened the three medicinal plants, which were used traditionally for treating liver disorders in Chittoor and Khammam districts of Andhra Pradesh, India.<sup>4</sup>

## 2. Material and methods

### 2.1. Materials

The roots of *Begonia laciniata*, whole plant of *Cuscuta epithymum* and whole plant of *Dendrobium ovatum* were collected from

Sathupally, Kuppam and surrounding villages (Medaram-Tadavi forest range, Berikonda, Thuvvakonda and Raakasi-gubbalu) of Khammam and Chittoor districts of Andhra Pradesh, India and authenticated by Dr. Madhava Chetty, taxonomist and HOD of Botany, Sri Venkateswara University, Thirupathi, India (Voucher specimen No's SVU-B-12, 13, 14), ascorbic acid (Sigma Aldrich Chemie, Germany), Riboflavin (S.D chemicals, India), 2-deoxyribose (Sigma Chemicals, USA), hydrogen peroxide (SD fine chemicals), carbon tetrachloride (Poona Chemical Laboratory, Pune, India), silymarin, gallic acid, and catechin (Nature remedies, Bangalore, Karnataka, India), SGOT, SGPT, SALP, BILIRUBIN estimation kits (Span Diagnostics, Surat, India), super tab 11SD (Spray dried lactose), primojel (sodium starch glycolate), talc, magnesium stearate and carboxy methyl cellulose (CMC) of pharmacopeial grade were gift samples from DFE Pharma, Bangalore, India; Wistar albino rats (purchased from Mahaveer Enterprises, Hyderabad, India), standard pellet laboratory diet (M/s. Rayans biotechnologies Pvt. Ltd., Hyderabad) All other solvents and

**Table 1 – WHO standardization of roots of *Begonia laciniata*, whole plant of *Cuscuta epithymum* and whole plant of *Dendrobium ovatum* and qualitative preliminary phytochemical analysis.**

S. no.	Parameter	<i>Begonia laciniata</i>	<i>Cuscuta epithymum</i>	<i>Dendrobium ovatum</i>
1.	<b>Organoleptic characters</b>			
	Color	Pale brownish white	Pale pinkish red	Pale greenish white
	Odor	Characteristic	Characteristic	Characteristic
	Taste	Characteristic	Characteristic	Characteristic
	Physical appearance	Free flowing powder	Free flowing powder	Free flowing powder
2.	<b>Physiochemical characters</b>			
	Water soluble extractive	57.13%	61.11%	72.45%
	Alcohol soluble extractive	79.27%	82.67%	80.00%
	pH 1% w/v solution	5.21	4.28	6.14
	Loss on drying	4.32%	5.56%	4.50%
	Ash content	4.02%	7.02%	6.32%
	Acid insoluble ash	0.63%	2.13%	0.63%
	Moisture content by K.F	3.41%	2.86%	1.21%
	Foreign organic matter	1.0%	1.92%	3.73%
3.	<b>Heavy metals</b>			
	Lead	5 ppm	6.04 ppm	5.00 ppm
	Arsenic	1 ppm	1 ppm	1 ppm
	Cadmium	0.2 ppm	0.3 ppm	0.2 ppm
	Mercury	1 ppm	1 ppm	1 ppm
4.	<b>Microbiological analysis</b>			
	Total aerobic count	280 CFU/g	327 CFU/g	410 CFU/g
	Yeast & mold	25 CFU/g	42 CFU/g	30 CFU/g
5.	<b>Pathogen analysis</b>			
	<i>Escherichia coli</i>	Absent	Absent	Absent
	<i>Salmonella</i>	Absent	Absent	Absent
	<i>Pseudomonas aeruginosa</i>	Absent	Absent	Absent
	<i>Staphylococcus aureus</i>	Absent	Absent	Absent
6.	<b>Qualitative preliminary phytochemical analysis</b>			
	Alkaloids	+	+	+
	Carbohydrates	–	+	+
	Flavonoids	+	+	+
	Glycosides	+	+	+
	Phytosterols	+	+	+
	Proteins & amino acids	–	–	–
	Saponins	–	–	–
	Tannins	–	–	–
	Triterpenoids	+	+	+

‘+’ Present, ‘–’ Absent.

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