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ANTI-CANCEROUS STUDY OF A HERBAL COMPOUND GOJIHWADI KWATHA

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ABSTRACT

Gojihwadi kwatha is a herbal compound used in the management of upper respiratory tract diseases. Respiratory diseases are considered as fatal & life threatening. The formulation is mentioned in of the latest classics, *Siddhayogasangraha*. It is a combination of *Gojihwa, yashtimadhu, draksha* etc. 16 herbal ingredients. The review of literature also reveals that the following ingredients viz *Gojihwa*,, *vasa*, *yasthimadhu*, *sonf*, *hansapadi*, *draksha*, *jufa* and *khubkala* have been reported to possess the antibacterial activity. The ingredients of the selected drug viz- *marich*, *badar*, *draksha* and *sonf* have been reported in the scientific papers that they possess the antioxidant property. Hence the present study has been contemplated to evaluate and verify the effectiveness of the Classical Ayurvedic remedies with special reference to pathogen *Agrobacterium tumefaciens* causing tumour in different samples of *Gojihwadi kwatha*.

Key words: *Gojihwadi kwatha*, Herbal compound, *Agrobacterium tumefaciens,* Anticancerous property.

INTRODUCTION

Agrobacterium tumefaciens[1] (updated scientific name: *Rhizobium radiobacter*) is the causal agent of **crown gall** disease (the formation of tumours). It is a rod shaped Gram negative soil bacterium. Symptoms are caused by the insertion of a small segment of DNA (known as the T-DNA, for 'transfer DNA'), from a plasmid, into the host cell, which is incorporated at a semi-random location into the genome.

During the course of infection, a defined portion of the Ti- plasmid (TDNA) is stably transferred to plant cell genome where it is integrated and expressed and expression of the integrated portion leads to the formation of neoplastic cell which forms the crown-gall disease[2]. The relevance of the crown-gall tumor system to the general cancer problem has been thoroughly reviewed. The use of highly specific, quantitative bioassays which require only a short period of time to obtain results are available for studying crown-gall tumor formation.

Crown-gall is a neoplastic disease of plants caused by *A. tumefaciens* following by the transfer and expression of its special type of DNA segment (TDNA) in the plant genome through type IV secretion system (T4SS)[3]. T4SS is also used by other patho-

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genic bacteria to deliver macromolecules detrimental to the host like plant, animal and human. Among those, *Bartonella henselae* and *Helicobacter pylori*, tumor causing bacteria in human share a similar pathogenicity strategy to plant pathogen *A. tumefaciens*. The above mentioned relation and previous studies have documented the similarities between crown-gall tumors and animal cancer, especially the correlation between antileukemic activity and inhibition of crown-gall tumor formation by some medicinal herbs in disc diffusion method.

Plant derived drugs serves as a prototype to develop more effective and less toxic medicines. So, if the effective plant extract would be find out for the inhibition of tumor forming mechanism, it would be used in drug developmental research for tumor treatment in human. Some medium polarity extracts of different *Plant* species showed effective antitumor and antibacterial activity by the presence of saponnins and phloroglucinol derivatives (flavonoids, triflavaspidic acids, dryocrassins, albaspidins and filixic acids) has been reported in more than 100 families of plants out of which at least 150 kinds of natural saponins have been found to possess significant anti-cancer properties. So, considering of its tremendous importance, it is very necessary to identify the native effective plant's extract for tumor treatment in human.

Materials and methods

Material

Among the various available classical formulations it is decided to opt for the formulations designed and developed by familiar physicians of this era instead of going for the formulations described in classical texts. Among the latest formulations the *Gojihwadi Kwatha*[4] which was designed and developed by none other than the famous physician of this era the great ***Vaidya Yadavji Trikamji Acharya*** has been selected for the study. The other reason for selecting this formulation is because of its inclusion in the official **Ayurvedic formulary of India vol-2**[5] and also because of its wide spread use in respiratory tract diseases and The review of literature also reveals that the following ingredients viz *Gojihwa*,, *vasa*, *yasthimadhu*, *sonf*, *hansapadi*, *draksha*, *jufa* and *khubkala* have been reported to possess the antibacterial activity. The ingredients of the selected drug viz- *marich*, *badar*, *draksha* and *sonf* have been reported in the scientific papers that they possess the antioxidant property. Hence the present study has been contemplated to evaluate and verify the effectiveness of the Classical Ayurvedic remedy

For this study, different samples of *Gojihwadi kwatha* were prepared, as follows with their codes:-

GKR → Raw ingredients in *Gojihwadi kwatha*.
GKG10 → kwatha prepared as per the guideline of *Siddha yoga sangraha.*
GKG16 → kwatha prepared as per the general guideline mentioned in *Sharangdhar samhita.*

Under the present research work, different samples of *Gojihwadi kwatha* i.e. GKR, GKG10, GKG16 were prepared as described earlier.

The anticancerous activity of extracts was tested on pathogenic bacteria ***Agrobacterium tumefaciens***. The pathogenic strain of *A. tumefaciens* was procured from 'Insti-

tute of Microbial Technology' (IMTECH), Chandigarh and the stock cultures were maintained at 'Mahatma Institute of applied science, sitapura ', Jaipur.

Preparation of plant extracts

Extracts of different samples of *Gojihwadi kwatha* were prepared as described earlier in antimicrobial study experiment no.1. The method employed was 'Continuous extraction by Soxhlet Appratus' (Trease & Evans' Pharmacognosy)

Sensitivity test of A. tumefaciens (as a partial assay)

To screening *A. tumefaciens* bactericidal assay in vitro Disc diffusion method was adopted[6]. The test organism was preceded using a sterile swab over previously sterilized culture medium plate. The zone of inhibition were measured around sterilized dried discs of Whatman No.1 paper (6 mm in diameter), which were of three different concentration

A1 = 1mg of test extract/disc

A2 = 5mg of test extract/disc

A3 = 10mg of test extract/disc

Plates were then incubated at 28-30^{0}C for 24 hours. The sensitivity test was evaluated by the measurement of inhibition zone's diameter (mm) against *A. tumefaciens* strain (AtTp0120).

Observation & results -

Table No.1 showing anticancerous efficacy of *Gojihwadi kwatha* samples :-

S.No.	E-tracts	Sample Codes	A1	A2	A3
1.	**Pet.Ether**	GKR	-	-	-
		GG10	-	10	-
		GG16	-	-	-
2.	**Benzene**	GKR	7	8	15
		GG10	-	10	-
		GG16	-	9	-
3.	**Chloroform**	GKR	12	17	15
		GG10	-	12	-
		GG16	-	9	-
4.	**Eth.acetate**	GKR	-	8	-
		GG10	-	7	-
		GG16	-	7	-
5.	**Methanol**	GKR	-	7	8
		GG10	-	-	-
		GG16	8	8	10
6.	**Water**	GKR	-	8	8
		GG10	7	7	7
		GG16	-	7	8

Out of all chloroform extracts of Gojihwadi samples only GKG10 of conc. 5mg/disc shown maximum inhibition zone.

In benzene extracts of Gojihwadi samples only GKR of conc. 10mg/disc showed max-

imum inhibition zone & GKG10 of conc. 5mg/disc next to it.

The various extracts of the drug including ghan and raw, have been subjected to anti-cancer study and found out of all, chloroform extracts of Gojihwadi samples only GKG10 of conc. 5mg/disc shown maximum inhibition zone.

In benzene extracts of Gojihwadi samples only GKR of conc. 10mg/disc shown maximum inhibition zone & GKG10 of conc. 5mg/disc next to it

CONCLUSION

The drug has showed moderate sensitiveness against all the microbes studied in different concentrations. The review of literature also reveals that the following ingredients viz *Gojihwa*,, *vasa*, *yasthimadhu*, *sonf*, *hansapadi*, *draksha*, *jufa* and *khubkala* have been reported to possess the antibacterial activity. The drug contains all these ingredients hence it will also possess the antibacterial property though it is not pronounced in its combined form has showed appreciable antioxidant action comparable to standard ascorbic acid. The ingredients of the selected drug viz- *marich*, *badar*, *draksha* and *sonf* have been reported in the scientific papers that they possess the antioxidant property. It is because of this reason the drug in trial also showed the antioxidant property. The drug also showed, some of the extract especially the chloroform extract, the anti-cancer activity and the ingredients like *draksha*, *yasthimadhu* and *anjeer* are said to possess the anticancer activity. Apart from this the drug is being used to treat many of the disorders related to respiratory tract predominantly the cough, cold etc. The most of the disorders of the respiratory tract are originated from kapha vata with the predominance of kapha. The ingredients of the selected possess the *kaphavilayana* , *kaphanissarak* and *kaphaghna* properties . Therefore the drug, though not showing much of anti-microbial potential – a cause for respiratory infections, might be acting and thereby pacifying the responsible humors in giving the relief to the patient in said condition.

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