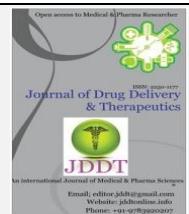


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Research Article

Muco-constriction: A ray of promise from medicinal plants

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ABSTRACT

JRK's Anti-coff was evaluated for blood purification benefit by phagocytosis. and surprisingly we found that *Anisochilus carnosus* showed muco-constriction benefit, while *Ocimum sanctum* and *Adathoda vasica* showed mucolytic property. The clinical implication of the above therapeutic benefits is discussed in detail in the article from the context of Siddha system of medicine. The findings are discussed in the article.

Keywords: Mucolytic, Anti-coff, Cough, N-acetyl cysteine, Xylometazoline

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INTRODUCTION

JRK's Anti-coff is the first Siddha proprietary medicine formulated to address both the underlying cause and the symptom of the most common medical problem i.e., continuous /short intermittent cough of infectious or non-infectious etiology.

The herbs used in the formulation are known to enhance phagocytosis and thus could eliminates/attenuate the pathogens or antigen or allergens responsible for the problem. We have scientifically proved the effect of JRK's Anti-coff in boosting phagocytosis against wide range of pathogens¹.

The science of blood purification otherwise called as the removal of antigens from the blood and its importance in the management of cough and early phase of allergic or infectious upper respiratory tract problems, JRK's Research and Pharmaceuticals is the first company to highlight and establish the above treatment strategy through intense research.

We have continued our quest to understand how the different herbs in JRK's Anti-coff can change or modify or lyse the mucous that is secreted during cough and upper respiratory tract infections.

Mucolytic agents are widely used but the importance of muco-constrictors along with mucolytic agents in the treatment of cough and upper respiratory infection is less known and studied². Further whether the herbs can be as effective as N-acetyl cysteine to lyse the mucous or would constrict the mucous to offer relief is not clearly studied.

In the present paper we have studied the effect of different herbs of JRK's Anti-coff for muco- constriction and mucolysis and have established that certain herbs have mucolytic property while some herbs have caused mucous constriction. The scientific importance and the medical interpretation of the above are presented in the paper. This is the first research work to show certain herbs can indeed constrict mucous.

METHODS

Formulation details of JRK's Anti-coff

JRK's Anti- Coff is formulated with following herbs such as *Anisochilus carnosus*, *Leucas aspera*, *Ocimum sanctum*, *Solanum trilobatum*, *Acalypha indica* *Adathoda vasica*

Extraction of the plant materials

All the above herbs were extracted individually in water by boiling process. The solvent to solute ratio was 1:10. It was filtered and the filtrate was stored in refrigerator until use.

Preparation of phosphate buffer solution

The phosphate buffer with pH 7 was prepared by mixing 50 ml of 0.2M dihydrogen phosphate potassium with 29.1 ml of 2N sodium hydroxide and diluted with carbon-free water. Finally the pH was adjusted.

Preparation of egg white

Three day old duck's egg was procured and the egg white was carefully separated from yolk. The egg white thus obtained was mixed with phosphate buffer solution at the

ratio of 20: 80 and then stirred to achieve a homogeneous solution.

Mucolytic study

The egg white solution was divided accordingly and the extracts of all the plants were incorporated into the egg white solution separately at 3 different concentrations such as 1, 2 and 3 %. The above experimental set up in triplicate was maintained for 15 minutes. Then the solution was tested for its viscosity using Brookfield viscometer. Untreated egg albumin in phosphate buffer (20:80) was kept as negative control and N- acetyl cysteine treatment was used as positive

control. Difference in the viscosity of the test was compared with positive and negative control accordingly the interpretation was made as mucolysis or muco constriction ³.

RESULTS

The medicinal plants such as *Ocimum sanctum* and *Adathoda vasica* showed strong mucolytic activity which was comparable to the activity of N-acetyl cysteine. Interestingly *Anisochilus carnosus* showed strong muco constriction activity. The medicinal plants such as *Leucas aspera*, *Solanum trilobatum* and *Acalypha indica* did not show any mucolytic or muco constriction activity. Table- 1

Table 1: Mucolytic and muco constriction activity of different herbs of JRK's Anti- coff

Herbs	Concentration (%)	The viscosity of the egg white Solution (cPoise)		
		12 rpm	30 rpm	60 rpm
<i>Anisochilus carnosus</i>	1	40,80	36,12	31,21
	2	41,19	37,14	32,18
	3	42,02	38,09	33,11
<i>Leucas aspera</i>	1	32,50	26,22	24,65
	2	31,30	25,22	23,73
	3	30,18	24,14	22,88
<i>Ocimum sanctum</i>	1	21,22	18,90	17,10
	2	20,24	18,05	17,00
	3	19,01	17,56	16,32
<i>Solanum trilobatum</i>	1	31,12	29,02	28,09
	2	29,15	28,81	27,22
	3	29,00	28,06	26,99
<i>Acalypha indica</i>	1	31,20	30,11	29,98
	2	30,25	29,00	28,01
	3	29,19	28,00	27,18
<i>Adathoda vasica</i>	1	18,99	17,25	16,01
	2	17,02	16,81	15,12
	3	15,99	14,11	13,08
Negative control		31,70	28,07	26,11
N- acetyl cysteine treatment (0.5%)		14,50	11,50	10,80

DISCUSSION

The present study has thrown an array of interesting facets of the medicinal plants and their possible divergent therapeutics. Mucolytic substances are exploited greatly for the treatment of cough and upper respiratory tract infection (URTI). Several plants have shown mucolytic activity. But this is the first study to the best of our understanding where a plant showing muco constriction activity.

Mucus is a slippery polymer produced by the cells found in the mucous glands which contain both serous and mucous cells. Mucus is a viscous colloid containing inorganic salts, antiseptic enzymes (such as lysozymes), immunoglobulins, and glycoproteins such as lactoferrin and mucins, which are produced by goblet cells in the mucous membranes and submucosal glands ⁴.

Although mucus serves a protective activity but during allergic and infectious conditions the abundant secretion of mucus will cause obstruction and discomfort to the patients. Therefore removal of the mucus is necessary. Mucolytic agents liquefy or dissolve the mucus and thereby aid their removal ^{5, 6}. However the underlying causes that might trigger the continuous secretion of mucus needs to be addressed for permanent solution.

The use of muco constrictors are less known. However the nasal vein constrictors such as Xylometazoline is used as a

decongesting agent during acute inflammatory nasal congestion ⁷.

The plant *Anisochilus carnosus* has exhibited muco constrictor property. Whether the above property can be extrapolated to the decongesting effect needs further research. However such benefit cannot be ruled out.

Considering the wide acceptance and clinical approval of JRK's anti-coff by the vaidyas of Indian systems of medicine, we presume that both the mucolytic and the muco-constrictor herbs may be complementing with each other instead of conflicting with each other and thereby offers the desired therapeutic benefit. The muco -constriction may be at the root level prevents the mucous secretion and the residual mucous is lysed by the herbs which has got mucolytic property. It is also possible that the muco -constrictor herb may sort and isolate the mucous for the lysis process to take place effectively.

The effect of certain plants in JRK's Anti-coff in boosting phagocytosis may also be linked with the muco-constrictor and mucolytic effect of other herbs in the formulation. The muco constrictor may thicken the mucus thereby the pathogens/allergens are packed effectively and thus their removal is achieved by the subsequent activity of the mucolytic agents.

The clinical acceptance of JRK's Anti-coff by the vaidyas of Indian systems of medicine along with the reports on proven clinical efficacy of JRK's Anti-coff in the treatment of cough and UTI strongly suggests that multiple mechanisms of action of different herbs in the drug is highly possible.

The blood purification effect of JRK's Anti-coff has been already established through invitro studies and in the light of the present study we believe that JRK's Anti-coff may be the first siddha drug to have multiple mechanisms such as blood purification, mucolysis, muco constriction benefits for the management of cough and UTI.

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