MICROBIOLOGICAL STUDY OF *ŚARKARĀDĪ KALKA* AND IT'S EFFICACY ON *KĀSA ROGA* (COUGH) IN CHILDREN

THESIS SUBMITED FOR THE DEGREE OF MASTER OF PHILOSOPHY (AYURVEDA)

BY

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5.1 Discussion of the Microbiological study of *Śarkarādi kalka*

This project is based on investigation of quality and microbiological studies related to preparation of ***Śarkarādi kalka***.

The `results obtained in this study indicate the presence of microorganisms in ***Śarkarādi kalka*** .

But according to the limits, adapted from the provisional guidelines established by an international consultative group (12) of WHO given for untreated plant material harvested under acceptable hygienic conditions are as follows;

Escherichia coli maximum 10^4 per gram

Mould propagules, maximum 10^5 per gram

For other plant materials which are pretreated and used internally

Aerobic bacteria, maximum 10^5 per gram

Yeasts and moulds, maximum 10^3 per gram

Escherichia coli, maximum 10 per gram

Other enterobacteria, maximum 10^3 per gram

Salmonellae, none

The microbial colony counts obtained in this study are less than the maximum amounts accepted by WHO.

Very few reports are available in literature on microbiological quality of ***Āyurvedic*** drugs. Most of the reports were based on qualitative evaluation.

According to the results, microbial contaminations of randomly selected market samples are relatively equal.

In the ***Śarkarādi kalka*** different bacteria were isolated. Most of them belonged to the genera *Bacillus*. The predominant bacteria present in ***kalka*** were gram-positive bacteria. They can be considered as contaminants. This can occur during preparation and packaging. Handling processes introduce some microorganisms. Especially preparation, packaging of food and pharmaceuticals should be done under control (microbial) conditions.

Not only bacteria, but certain fungi also were isolated from some samples of ***Śarkarādi kalka,*** but these numbers of colonies are few when compared to bacteria (less than 30 per plate).The genera of fungi isolated from samples of ***Śarkarādi kalka*** were identified as *Aspergillus, Rhizopus, Fusarium* species. They also may be contaminants. Those types of bacteria and fungi were commonly found in the atmosphere.

In the special culture mediums; Mc Conkey medium, Baird Parker medium and MRS medium colonies with characteristic morphological features of coli forms - *Escherichia coli,staphylococcus aureus* or *Lacto bacillus* were not found.

According to the observation of anti bacterial activity of ***Śarkarādi kalka*** an inhibition zone was only seen in the plate, which was seeded with *Pseudomonas aeruginosa.*

Due to limited time and resources identification of bacteria were carried out up to genera level.

5.2 Discussion of the clinical study

The recipe ***Śarkarādi kalka*** although being used for the management of ***kāsa roga*** in children since the ages, so far no study reported in scientific lines. The main objective of the present study was to explore the potential of the traditional recipe ***Śarkarādi kalka*** for the management of ***dośaja kāsa roga*** (types of cough) in children.

Fifty children were registered from the peadiatric clinic of the ***Āyurvedic*** teaching hospital, Borella. Children of 1-14 years of age, both sexes, complained of cough, not more than three months duration and free from other systemic diseases such as bronchial asthma, cardiac disorders ect. were included in this study.

The children were divided in to three groups according to their age. Group one (1-3 yrs) received 125 mg of ***Śarkarādi kalka*** three times a day after meals with 5ml of bees honey until the relief of signs and symptoms for maximum of three weeks. Children of group two were given (3-6yrs) 250 mg of drug whereas the children of group three (6-14 yrs) received 375mg of ***Śarkarādi kalka*** for three weeks.

Majority of the children (62%) were between the age group of 3-6 years (Table No CS 1).The reason for this can be given as, parents of age 1-3 group of children may be rushing them to other medical centers for treatment, expecting quick relief .And the age group of 6-14 years may be refusing to absent for their schools during week days, when they have to come to the clinic.

Exposure to the polluted air, smoke, dust, bacterial and viral infections in the school precipitates recurrence of attack of ***kāsa***. The data is supported by Eign et al (1982) that the children suffer more from upper respiratory tract infection on joining the school.

It is evident that the majority of children (36%) belong to middle income group (Table no CS III), which reflects its relation that parents are unable to give proper care due to their low income status. The least number of children presented from the group of income is above than 10000, the reason for this could be given as, their parents may be providing good health care or seeking treatments from private hospitals.

Majority of the children (78%) in the present study belongs to urban locality. Whereas 11% of children belongs to rural locality. It may be due to the situation of this teaching hospital in the heart of the city and more prevalence may be contribution of dust, smoke, industrialization, pollution, low immunity of patients, where as poor sanitation, natural allergens may attribute ***kāsa*** in rural area.

According to the diagnostic criteria or signs and symptoms of three types of cough mentioned in ***Āyurveda*** (such as; pain in cardiac region, headache, abdominal pain, dryness of the mouth, debility, dry cough, horipulation, fever, bitter mouth, burning sensation, thirst, acidity, stickiness of mouth, heaviness, loss of appetite, coating of throat, thick mucus, chest pain, running nose, severe bouts of cough, vomiting, according to the table No. CS1X) There were 23 children (46%) diagnosed as ***vātaja kāsa***, 13 children (26%) as ***pittaja kāsa*** and 14 children (28%) were diagnosed as they with ***kaphaja kāsa*** (Table no CS X).

When the children were investigated for their food habits 26 children had a history of onset of cough co-incided with foods such as Ice cream, Yogurt and cool drinks (Table no CS X1). Majority of them (50%) suffered from ***kaphaja kāsa***.

In the total study group there were thirteen out of fourteen children presented with ***kaphaja kāsa***, who had a history of onset of cough co- incided with above-mentioned foods. The reason could be state as for this, Ice cream, Yogurt and cool drinks having the property of aggravating the ***kapha doša*** and this may leads to facilitates the pathogenesis of ***kaphaja kāsa*** .

At the end of the follow up period of three weeks the effect of the drug on the children was evaluated. There were 35 patients (70%) considered as cured , 02 children (4%) as markedly improved ,09 children (18%) as improved and 04 children (08%) as unchanged (Table no CS X11).

The evaluation of the efficacy of the drug has been done on the basis of the type of ***kāsa*** to find out weather its effect on three types of cough is equal. It has been shown that the effect of the drug on three types of cough was not equql (Table no CS X11, CS X111, X1V). The effect of the drug on three types of cough is different. Among them drug was equally effective for ***vātaja*** and ***pittja kāsa***, but in it was not effective for ***kaphaja kāsa*** (Table no CS XV1, CS XV11).

The properties of the ingredients of ***Śarkarādi kalka*** have been given in the chapter pertaining to Drug review. According to that most of the ingredients predominantly of ***kaṭu rasa*** and combination of ***tikta rasa*** with ***dīpana karma*** (promotes the digestion) that helps to remove ***Āma*** (toxins) from the body. Most of the ingredients produce ***Uṣna vīrya***, which too do ***dīpana*** of ***Agni*** and pacify ***vāta*** and ***kapha doṣa***, which are the primary factors in

initiation of ***samprāpti*** (pathogenesis) of ***kāsa***. Thus ***samprāpti vighatana*** (destroying the pathogenesis) starts with removal of ***Āma*** and pacification of aggravating ***doṣas***.

Śarkarādi kalka consists of cane sugar in equal to the total weight of other ingredients. It has the property of ***Madhura rasa ,Ghuru guna*** and ***Shita virya*** which could be able to neutralize the ***Vāta*** and ***pitta doṣa*** and aggravate ***kapha doṣa***.

Therefore considering the properties of the ingredients of ***Śarkarādi kalka***, it is more effective for ***Vātaja*** and ***Pittaja kāsa*** rather than ***kaphaja kāsa***. It may be not effective for ***kaphaja kāsa*** because of its aggravating nature of the ***kapha doṣa***.

However, exact mode of action of ***Śrkarādi kalka*** in relieving cough, is still remaining the point of further scientific search.

5.3 Conclusions

1. Different bacteria were isolated from test market samples of ***Śarkarādi kalka***. But the predominant bacteria present were gram positive, belonging to Genus *Bacillus.*
2. As predominant fungal generas, mainly *Aspergillus, Fusarium, Rhizopus* were present in tested ***kalka*** samples.
3. *Lactobacillus, Staphylococcus aureus Escherichia coli* were absent in this tested samples.
4. According to the results of the microbiological study of ***Śarkarādi kalka***, almost all the tested market samples comprise of microbial flora of both bacterial and fungi but not exceeding WHO's limitations. Therefore the ***kalka*** is of microbiologically safe.
5. ***Śarkarādi kalka*** showed antimicrobial property against *Pseudomonas aeruginosa* in agar diffusion analyze.
6. ***Śarkarādi kalka*** has the equal capacity to control ***vātaja*** and ***pittaja kāsa***.
7. ***Śarkarādi kalka*** is less effective for ***kaphaja kāsa***.
8. Further studies will be needed to prove the mechanism of the drug.