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The Efficacy of "Kuka Cough Syrup" in the Management of Acute Cough and Throat Irritation.

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ABSTRACT

Kasa or cough is a condition of coughing. It is a disease itself & also occurs associated with other disease conditions like common cold, flu, respiratory tract infection etc. Kuka cough syrup is an Ayurvedic proprietary medicine from Multani Pharmaceuticals Ltd. It contains potent & well described active ingredients i.e. *Tulsi (Ocimum sanctum), Vasaka (Adhatoda vasica), Kulanjan (Alpinia galangal), Yashtimadhu (Glycyrrhiza glabra), Pippali (Piper longum) & Satpudina (Mentha piperata)*. This study has been planned to evaluate the effect of the same on acute cough & throat irritation. In order to evaluate the effect of Kuka cough syrup, subjects aged b/w 18 to 70 years. were enrolled into the study. The subjects between the ages of 18-70 years were advised to take one kuka cough syrup 10 ml (2 tsf) orally, four times a day before meals with warm water for a period of 7 days. Laboratory investigations were performed on Day 0. Clinical parameters physical health status & immunity health questionnaires were assessed at Day 0 & Day 14. This study is open labelled, single arm, single centric, interventional study. The final study outcome shows an improvement in day time coughing, night time coughing, throat irritation.

Keywords: *Kuka cough syrup*; Cough, Kasa; Throat irritation.

INTRODUCTION

Respiratory system is in continuous contact with the external environment from birth until one's lifetime, so it is most vulnerable to infections and considered as the prime victim of hyper sensitization in most of the circumstances.[1] In recent years, there has been an extraordinary increase of incidence related to Respiratory system. According to the National Center for Health Statistics, 62 million cases of common cold and cough occur each year. Cough is the fifth most common symptom for which patients seek medical care. Thus respiratory tract infections (RTI) account for more than 50% of patients attending the OPD in developing and even developed countries worldwide.[2,3] *Kasa* is a disease explained in Ayurveda which involves most of the presentations of a respiratory tract disease.

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In the pathogenesis of disease *Kasa*, vitiated *Kapha* obstructs the free flow of *Prana Vata* in *Kantha* and *Uras.*[4] Kasa has been described under various categories in the classics of Ayurveda– as independent disease,[5,6] Symptom,[7] Complication,[8] and sequel. Kasa is a common Upper Respiratory tract ailment prevalent nowadays and it is increasingly annoying and irritating the individual in his routine activity. Kasa or Cough is a condition of coughing. It is a disease itself and also occurs associated with other disease conditions like common cold, flu, respiratory tract infections etc. In Ayurvedic literature Kasa is described in a separate chapter, detailed description of its causes, pathogenesis, classification, clinical features, complications, treatment lines, medications like single herbs, herbal compounds, herbo-mineral formulations are described. Kuka cough syrup is an Ayurvedic proprietary medicine from Multani Pharmaceuticals Ltd. It contains potent and well described ingredients i.e. *Tulsi (Ocimum sancatum), Vasaka (Adhatoda vasica), Kulanjana (Alpinia galanga), Yashtimadhu (Glycyrrhiza glabra), Pippali (Piper longum) and Sat Pudina (Mentha piperata)* as its active ingredients (Table 1). In a preliminary study the formulation was found effective in Kasa (cough). The present study has been planned to evaluate the effect of the same on acute cough & throat irritation. Ayurveda has a lot to offer in this regard. *Vata* and *Kapha* are the two key pathological factors involved in the Samprapti of Kasa[9]. Kuka cough syrup has Kapha Vatahara property. Hence, this effort was made to access the action of drugs in Kasa.

The clinical study was conducted to evaluate the efficacy of Kuka cough syrup on acute cough and throat irritation. Time to relief from cough and throat irritation in first morning doses, duration of relief from symptoms after first morning doses in all the subjects were analysed to evaluate the efficacy.

METHOD

The subjects were enrolled, and informed consent was taken. The subjects were instructed regarding the study procedure and follow up visits. The subjects were advised to take Kuka Cough Syrup for 7 days. All the subjects were informed regarding the investigation that will be carried out during the period of the study.

In order to evaluate the effect of Kuka Cough Syrup, subjects aged between 18 to 70 years were enrolled into the study. The subjects between ages of 18-70 years were advised to take one Kuka Cough Syrup 10ml (2tsf) orally, four times a day before meals with warm water for a period of 7 days. Any noticeable adverse effects were noted down. The subjects were free to withdraw from the study if they so desired. No other medication intended for the same use as study medication was allowed for these subjects. Clinical parameters, physical health status and immunity health questionnaires were assessed at Day 0 and Day 14.

Inclusion Criteria

The participants within the age of 18-70 Years of either sex having the history of acute non-productive cough due to any cause, willing to give informed consent and ready to comply with the protocol and ready to provide regular follow up until the completion of the study were enrolled in the Study.

Exclusion Criteria

The following criteria were mentioned for exclusion of the participants from the study.

1. Participants with a history of acute lower respiratory tract infections such as pneumonia, bronchitis whooping cough, chronic obstructive pulmonary disease/asthma, tuberculosis, systemic bacterial infections for which specific drug therapy required;
2. Any underlying lung pathology such as lung abscess or cystic fibrosis, individuals with a history of myocardial infarction within 4 weeks prior to enrolment;
3. Individuals with known hypersensitivity to ingredients of study products; individuals with immediate life-threatening diseases such as pre-existing cardiovascular, liver, or neoplastic diseases or who received any immunosuppressant, sedative, hypnotic or tranquilizer within 14 days prior to enrolment;
4. Hypertensive patients on angiotensin-converting enzyme inhibitors; individuals or who had received any of the: -anti-histamines, cough suppressants, mucolytic, expectorants, or antibiotics 3 days prior to enrolment that may act as confounding factor;
5. Individuals with a history of Parkinson's disease and who are on monoamine oxidase inhibitors.

6. Individuals with any psychiatric illness which may impair the ability to provide written ICF.
7. Individuals participating in any other clinical trial.
8. Pregnant or lactating females.
9. Individuals under study treatment or any other condition due to which individuals deem unsuitable by the investigator for reason(s) not specifically stated in the exclusion criteria will be excluded.
10. Alcohol, smokers, and drug abusers.

Study Product

"*Kuka Cough Syrup"* is a polyherbal formulation recommended for the treatment of Kasa or Cough problems which is manufactured by Multani Pharmaceuticals Ltd., New Delhi.

Table 1. Content of Kuka Cough Syrup

S. No.	Ingredients (*Extracts of*)	Latin name
1.	*Tulsi*	*Ocimum sanctum*
2.	*Kulanjana*	*Alpina galangal*
3.	*Yashtimadhu*	*Glycyrrhiza glabra*
4.	*Pippali*	*Piper longum*
5.	*Vasa*	*Adhatoda vasika*
6.	*Sat Pudina*	*Menthol*

Study Design and Procedure

This study was an open labelled single arm study of 50 subjects with acute cough and throat irritation. In order to evaluate the effect of Kuka Cough Syrup, subjects aged between 18 to 70 years were enrolled into the study.

Dose: 10ml (2tsf) orally, four times a day before meals with warm water for a period of 7 days. Syrup was taken orally by the patient enrolled in the study.

Study Subjects

Total enrolled subjects were fifty (50). Among them four (4) discontinued the study and Forty six (46) completed the study. The results of forty six (46) were subjected for the analysis**.**

Criteria for Assessment of Results

Assessment of Subjective parameters

The clinical parameters recorded were assessed at Day 0, Day 3, and Day 7 and after one week of completion of the trial Day 14. Out of 50 subjects enrolled, only 46 completed the trial. The assessment is as follows, based on the Primary and Secondary Endpoints (Table 2).

Primary Endpoints were: 1. Daytime Cough Scale, 2. Night Time Cough Scale, 3. Changes in Throat Irritation.

Secondary Endpoints were: 1. Time to Relief, 2. Duration of Relief, 3. Drowsiness Scale, 4. Global Assessment Scale.

Bio Efficacy Affect Parameters

The efficacy of Kuka Cough Syrup was evaluated based on the verbal category descriptive
(VCD) scale scores Vs. Treatment days (0^{th} day; 3^{rd} day; 7^{th} day & 14^{th} day). The severity and impact of the cough was measured by a validated verbal category-descriptive (VCD) scores[10].

Primary Endpoints

a) Daytime Cough Scale
b) Night Time Cough Scale
c) Changes in Throat Irritation

Secondary Endpoints

a) Time to Relief
b) Duration of Relief
c) Drowsiness Scale
d) Global Assessment Scale

Adverse Effect Parameters

The Adverse effect parameters of Kuka Cough Syrup was evaluated based on before & after treatment days (0^{th} day & 14^{th} day)

a) Pulse rate
b) Blood pressure
c) Body weight
d) Respiratory rate
e) Body temperature

Bio efficacy effect Parameters

The efficacy of Kuka Cough Syrup was evaluated based on the verbal category descriptive
(VCD) scale scores Vs. Treatment days (0^{th} day; 3^{rd} day; 7^{th} day & 14^{th} day)

RESULTS

Table 2. Verbal Category Descriptive Scores Analysis

Parameter	0 Day (Mean±SD)	3 Day (Mean±SD)	7 Day (Mean±SD)	14 Day (Mean±SD)
Daytime Cough Scale	2.66±0.96	3.00±0.87	3.52±0.55	4.37±0.61
Night-time Cough Scale	4.28±0.83	4.37±0.80	4.59±0.58	4.83±0.38
Change in Throat Irritation	2.39±1.41	2.89±1.14	3.35±0.85	3.74±0.49
Time to Relief	2.41±1.36	3.22±0.59	3.54±0.50	3.72±0.46
Duration of Relief	0.33±1.08	2.37±0.90	2.78±0.73	3.09±0.69
Drowsiness Scale	1.98±0.15	1.96±0.20	1.96±0.21	1.93±0.25
Global Assessment	2.98±0.95	3.22±0.66	3.37±0.53	3.57±0.50

Data was measured as Mean ±SD. The assessments were done on Day 0, 3, 6 and 14 days for every parameter.

Primary Endpoints

1. Daytime Cough Scale

On Day 0, 0.0% subjects reported a distressing cough most of the day, 12.8% subjects reported frequent coughing, which interferes/interrupts usual day-time activities. 29.8% of subjects reported frequent coughing which did not interfere with usual day-time activities. 36.2% of subjects reported coughing for more than two short periods. 21.3% subjects reported cough for one or two short periods, 0.0% subjects reported no cough during the day.

On Day 3, 0.0% subjects reported a distressing cough most of the day, 2.2% subjects reported frequent coughing, which interferes/interrupts usual day-time activities. 30.4% of subjects reported frequent coughing which did not interfere with usual day-time activities. 32.6% of subjects reported coughing for more than two short periods. 34.8% subjects reported coughing for one or two short periods, 0.0% subjects reported no cough during the day.

On Day 7, 0.0% subjects reported distressing cough most of the day, 0.0% subjects reported frequent coughing, which interferes/interrupts with usual day-time activities. 0.0% subjects reported frequent coughing which did not interfere with usual day-time activities. 47.8% of subjects reported coughing for more than two short periods. 50.0% subjects reported cough for one or two short periods, 2.2% subjects reported no cough during the day.

On Day 14, 0.0% subjects reported a distressing cough most of the day, 0.0% subjects reported frequent coughing, which interferes/interrupts usual day-time activities. 0.0% subjects reported frequent coughing which did not interfere with usual day-time activities. 6.5% of subjects reported coughing for more than two short periods. 50.0% subjects reported cough for one or two short periods, 43.5% subjects reported no cough during the day.

2. Night Time Cough Scale

On Day 0, None of the subjects reported a distressing cough preventing any sleep and frequent coughs most of the night. 4.3% of subjects reported

frequent waking due to cough activities. 10.6% of subjects reported waking once or early due to coughing. 38.3% subjects reported cough on waking only, 46.8% subjects reported no cough during the night.

On Day 3, none of the subjects reported a distressing cough preventing any sleep and frequent coughs most of the night. 4.3% of subjects reported frequent waking due to cough activities. 6.5% of subjects reported waking once or early due to cough. 37.0% subjects reported cough on waking only, 52.2% subjects reported no cough during the night.

On Day 7, 0.0% subjects reported distressing cough preventing any sleep, 0.0% subjects reported frequent coughs most of the night. None of the subjects reported frequent waking due to cough activities. 4.3% of subjects reported waking once or early due to cough. 32.6% subjects reported cough on waking only, 63.0% subjects reported no cough during the night.

On Day 14, 0.0% subjects reported distressing cough preventing any sleep, 0.0% subjects reported frequent coughs most of the night. 0.0% subjects reported frequent waking due to cough activities. None of the subjects reported waking once or early due to coughing. 17.4% subjects reported cough on waking only, 82.6% subjects reported no cough during the night.

3. Changes in Throat Irritation.

On Day 0, 23.9% subjects reported 0% decrease in throat irritation, 0.0% subjects reported 0%-25% decrease in throat irritation, 2.2% subjects reported 26%-50% decrease in throat irritation, 60.9% subjects reported 51%-75% decrease in throat irritation, 13.0% subjects reported 76%-100% decrease in throat irritation.

On Day 3, 4.3% subjects reported 0% decrease in throat irritation, 13.0% subjects reported 0%-25% decrease in throat irritation, 4.3% subjects reported 26%-50% decrease in throat irritation, 45.7% subjects reported 51%-75% decrease in throat irritation, 32.6% subjects reported 76%-100% decrease in throat irritation.

On Day 7, 0.0% subjects reported 0% decrease in throat irritation, 6.5% subjects reported 0%- 25% decrease in throat irritation, 4.3% subjects reported 26%-50% decrease in throat irritation, 37.0% subjects reported 51%-75% decrease in throat irritation, 52.2% subjects reported 76%- 100% decrease in throat irritation.

On Day 14, 0.0% subjects reported 0% decrease in throat irritation, 0.0% subjects reported 0%-25% decrease in throat irritation, 2.2% subjects reported 26%-50% decrease in throat irritation, 21.7% subjects reported 51%-75% decrease in throat irritation, 76.1% subjects reported 76%-100% decrease in throat irritation.

Secondary Endpoints

1. Time to Relief

Day 0, 21.7% subjects reported no relief, 0.0% subjects reported relief >61mins, 6.5% subjects reported relief within 31-60 min, 58.7% subjects reported relief within 16-30 min, 13.0% subjects reported relief within 0-15 min.

Day 3, 0.0% subjects reported no relief, 0.0% subjects reported relief >61mins, 8.7% subjects reported relief within 31-60 min, 60.9% subjects reported relief within 16-30 min, 30.4% subjects reported relief within 0-15 min.

Day 7, 0.0% subjects reported no relief, 0.0% subjects reported relief >61mins, 0.0% subjects reported relief within 31-60 min, 45.7% subjects reported relief within 16-30 min, 54.3% subjects reported relief within 0-15 min.

Day 14, 0.0% subjects reported no relief, 0.0% subjects reported relief >61mins, 0.0% subjects reported relief within 31-60 min, 28.3% subjects reported relief within 16-30 min, 71.7% subjects reported relief within 0-15 min.

2. Duration of Relief

Day 0, 91.3% subjects reported no effect, 0.0% subjects reported relief up to 1 hour, 0.0% subjects reported relief up to 2 hours, 2.2% subjects reported relief up to 3 hours, 6.5% subjects reported relief up to 4 hours.

Day 3, 0.0% subjects reported no effect, 13.0% subjects reported relief up to 1 hour, 52.2% subjects reported relief up to 2 hours, 19.6% subjects reported relief up to 3 hours, 15.2% subjects reported relief up to 4 hours.

Day 7, 0.0% subjects reported no effect, 0.0%

subjects reported relief up to 1 hour, 39.1% subjects reported relief up to 2 hours, 43.5% subjects reported relief up to 3 hours, 17.4% subjects reported relief up to 4 hours.

Day 14, None of the subjects reported no effect and relief up to 1 hour, 19.6% subjects reported relief up to 2 hours, 52.2% subjects reported relief up to 3 hours, 28.3% subjects reported relief up to 4 hours.

3. Drowsiness Scale

Day 0, 2.1% subjects were drowsy and 97.9% of subjects were alert. Day 3, 4.3% subjects were drowsy and 95.7% of subjects were alert. Day 7, 4.3% subjects were drowsy and 95.7% of subjects were alert. Day 14, 6.5% subjects were drowsy and 93.5% of subjects were alert.

4. Global Assessment Scale

Day 0, 6.5% subjects reported poor efficacy, 0.0% subjects reported fair efficacy, 6.5% subjects reported good efficacy, 63.0% subjects reported very good efficacy, 23.9% subjects reported excellent efficacy.

Day 3, 0.0% subjects reported poor efficacy, 2.2% subjects reported fair efficacy, 6.5% subjects reported good efficacy, 58.7% subjects reported very good efficacy, 32.6% subjects reported excellent efficacy.

Day 7, 0.0% subjects reported poor efficacy, 0.0% subjects reported fair efficacy, 2.2% subjects reported good efficacy, 58.7% subjects reported very good efficacy, 39.1% subjects reported excellent efficacy.

Day 14, 0.0% subjects reported poor efficacy, 0.0% subjects reported fair efficacy, 0.0% subjects reported good efficacy, 43.5% subjects reported very good efficacy, 56.5% subjects reported excellent efficacy.

BIO EFFICACY AFFECT RESULTS

Primary Endpoints

Daytime Cough Scale

Verbal category descriptive (VCD)[11] scale scores were used for the assessment.

1- Distressing cough most of the day
2- Frequent coughing, which interferes/interrupts with usual day-time activities.
3- Frequent coughing which did not interfere with usual day-time activities.
4- Cough for more than two short periods.
5- Cough for one or two short periods
6- No cough during the day.

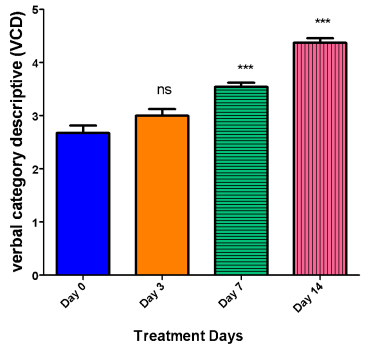


Figure 1

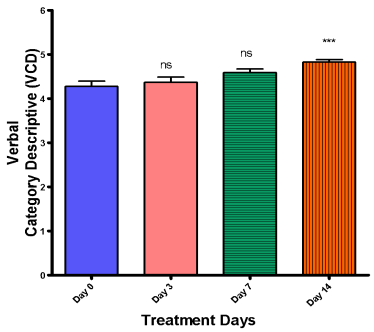
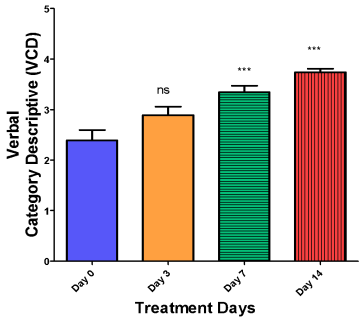


Figure 2



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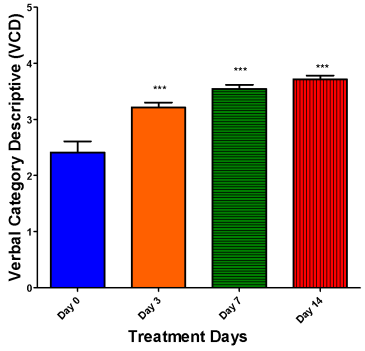

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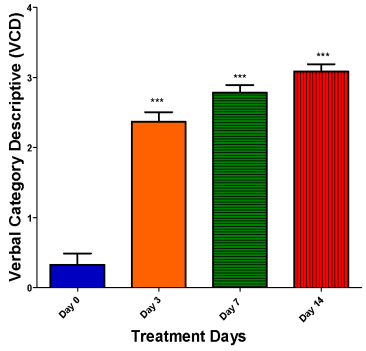

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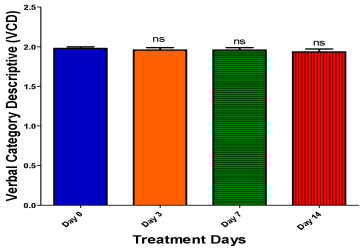


Figure. 6

Treatment with Kuka Cough Syrup for 07 days resulted in a significant Increase in the verbal category descriptive (VCD) scale score in day time cough scale from 2.66± 0.96 to 3.54± 0.55 & 4.37±0.61 (mean ± SD, $P = 0.0002$; t=7.878; t=11.94) on Day 7 & on Day 14. By considering lower VCD score, this result indicates that Kuka Cough Syrup is able to control the daytime cough with Cough for more than two short periods in Day 7& Cough for one or two short periods in day 14 from Frequent coughing from Day 0. However, there is no significant improvement in verbal category descriptive (VCD) scale score in day time cough scale on Day 3 from Day 0 treatment. **(Figure 1)**

Night time Cough Scale

Verbal category descriptive (VCD)[12] scale scores were used for the assessment.

1. Distressing cough preventing any sleep
2. Frequent coughs most of the night
3. Frequent waking due to cough activities
4. Waking once or early due to cough
5. Reported cough on waking only
6. No cough during the night

Treatment with Kuka Cough Syrup for 07 days resulted in a significant Increase in the verbal category descriptive (VCD) scale score in Night time Cough Scale from 4.28±0.83 to 4.83± 0.38 (mean ± SD, P<0.0001; t=5.612) on Day 14. By considering lower VCD score, this result indicates that Kuka Cough Syrup is able to control the Night time Cough Scale with Cough Reported cough on waking only on day 14. However, there is no significant improvement in verbal category descriptive (VCD) scale score in day time cough scale on Day 3 & on Day7 from Day 0 treatment. **(Figure 2)**

Changes in Throat Irritation

Verbal category descriptive (VCD)[13] scale scores

1. 0% decrease in throat irritation
2. 0%-25% decrease in throat irritation
3. 26%-50% decrease in throat irritation
4. 51%-75% decrease in throat irritation
5. 76%-100% decrease in throat irritation

Treatment with Kuka Cough Syrup for 07 days resulted in a significant Increase in the verbal category descriptive (VCD) scale score Changes in Throat Irritation from 2.39± 1.41 to 3.35± 0.85 & 3.74 ± 0.49 (mean ± SD, P<0.0001; t=5.927; t=7.524) on Day 7 & on Day 14. By considering lower VCD score, this result indicates that Kuka Cough Syrup is able to control Throat Irritation with 51%-75% decrease in throat irritation on day 7 & Day 14 of treatment from 26%-50% decrease in throat irritation on Day 0. However, there is no significant improvement in verbal category descriptive (VCD) scale score in Changes in Throat Irritation on Day 3 from Day 0 treatment. **(Figure 3)**

Secondary Endpoints

Time to Relief

Verbal category descriptive (VCD)[14] scale scores:

1. No relief
2. Relief > 61 mins
3. Relief within 31-60 min
4. Relief within 16-30 min

5. Relief within 0-15 min

Treatment with Kuka Cough Syrup for 07 days resulted in a significant Increase in the verbal category descriptive (VCD) scale score on Time to Relief from 2.41 ±1.36 to3.22 ± 0.59 & 3.54± 0.50& 3.72±0.46 (mean ± SD, P<0.0001; t=5.112; t=5.216, t=6.409) on Day 3, Day 7 & on Day 14 of treatment. By considering lower VCD score, this result indicates that Kuka Cough Syrup is able to relieve within 16-30 min from cough on Day 3, 7 & Day 14 of treatment from Day 0 with Relief within 31-60 min. **(Figure 4)**

Duration of Relief

Verbal category descriptive (VCD)[15] scale scores:

No effect -0
Relief up to 1 hour-1
Relief up to 2 hours-2
Relief up to 3 hours -3
Relief up to 4 hours-4

Treatment with Kuka Cough Syrup for 07 days resulted in a significant Increase in the verbal category descriptive (VCD) scale score in Duration of Relief from 0.33±1.08 to2.37 ±0.90 &2.78 ±0.73 & 3.09±0.69 (mean ± SD, P<0.0001; t=13.72; t=17.80, t=18.45) on Day 3, Day 7 & on Day 14 of treatment. By considering lower VCD score, this result indicates that Kuka Cough Syrup is able to relieve up to 2hr from cough on Day 3, 7 & Relief up to 3hr from cough on Day 14 of treatment from Day 0 with no effect on relief from cough. **(Figure 5)**

Drowsiness Scale

Verbal category descriptive (VCD)[16] scale scores

Drowsy-1
Alert-2

Treatment with Kuka Cough Syrup for 07 days resulted no significant effect in the verbal category descriptive (VCD) scale score in Drowsiness Scale from 1.98±0.15 to1.96 ±0.20 & 1.96±0.21 &1.93 ±0.25 (mean ± SD, P=0.7944; t=0.5731; t=0.5731, t=1.000) on Day 3, Day 7 & on Day 14 of treatment. By considering higher VCD score, this result indicates that Kuka Cough Syrup doesn't cause Drowsy from Day 0 of the treatment until end of treatment & observation on Day 14. **(Figure 6)**

Global Assessment Scale

Verbal category descriptive (VCD)[17] scale scores

Poor efficacy-0
Fair efficacy-1
Good efficacy-2
Very good efficacy-3
Excellent efficacy-4

Treatment with Kuka Cough Syrup for 07 days resulted in a significant Increase in the verbal category descriptive (VCD) scale score Global Assessment Scale in from 2.98±0.95 to 3.57 ± 0.50 (mean ± SD, P=0.0006; t=4.946) on Day 14 of treatment & to 3.37±0.53 (mean ± SD, P=0.0006; t=3.564) on Day 7 of treatment. By considering lower VCD score, this result indicates that Kuka Cough Syrup is having good efficacy on Day14 & Day7 from Good efficacy on day 0 of treatment on global assessment scale. **(Figure 7)**

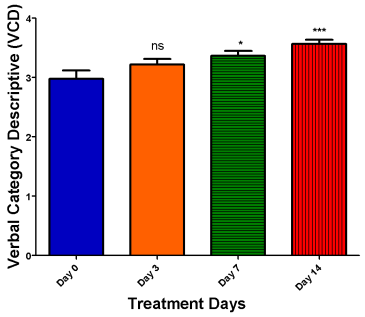


Figure. 7

Adverse Effect Parameters

The Adverse effect parameters of Kuka Cough Syrup were evaluated based on before & after treatment days (0th Day & 14th Day).

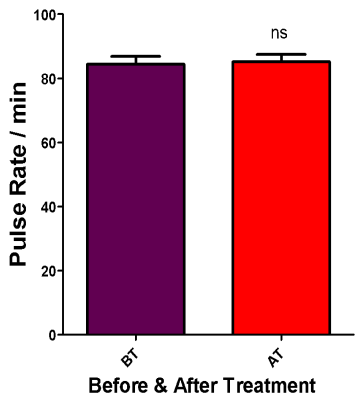
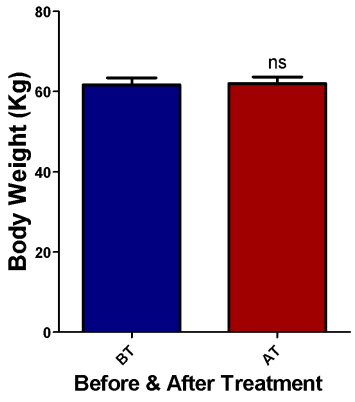


Figure. 8



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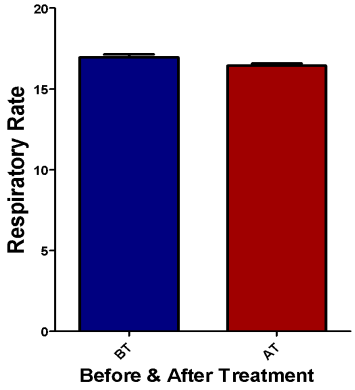

Figure. 10

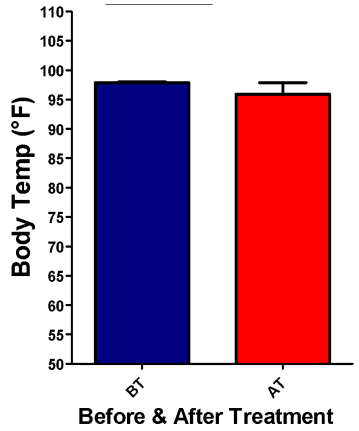

Figure No. 11

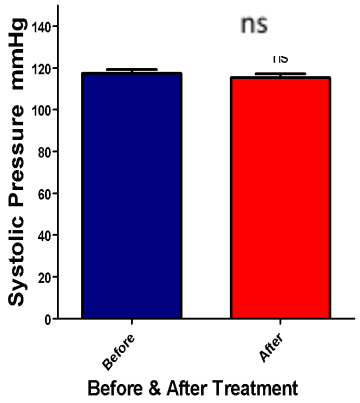

Figure No. 12

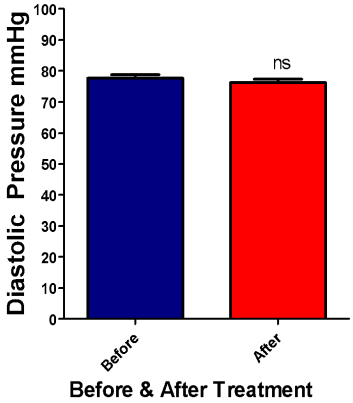

Figure No. 13

a) Pulse rate
b) Blood pressure
c) Body weight
d) Respiratory rate
e) Body temperature

1] The Adverse effect parameters of Kuka Cough Syrup were evaluated based on before & after treatment days (0^{th} Day & 14^{th} Day) on pulse rate.

Treatment with Kuka Cough Syrup for 07 days resulted in no significant change in pulse rate in human subject (n=46) from before & after the treatment 84.0± 8.7 & 85.2±8.0 (mean ± SD, P=0.4340; t=0.7894). This result indicates that Kuka Cough Syrup doses not change the pulse rate in human subject after treatment. **(Figure 8)**

2] The Adverse effect parameters of Kuka Cough Syrup were evaluated based on before & after treatment days (0^{th} Day & 14^{th} Day) on Body weight.

Treatment with Kuka Cough Syrup for 07 days resulted in no significant change or un-change in body weight in human subject (n=49 & 46) from before & after the treatment 61.74 ± 1.619 to 61.98 ± 1.677 (mean ± SEM, P=0.9169; t=0.1046 Unpair). This result indicates that Kuka Cough Syrup does not change the body weight in the human subject after treatment. **(Figure 9)**

3] The Adverse effect parameters of Kuka Cough Syrup were evaluated based on before & after treatment days (0^{th} Day & 14^{th} Day) on respiratory rate.

Treatment with Kuka Cough Syrup for 07 days resulted in significant decrease in respiratory rate in human subjects (n=46) from before & after the treatment 17.0 ±1.4 & 16.4±1.0 (mean ± SD, P=0.0204; t=2.404). This result indicates that Kuka Cough Syrup minor reduction in the Respiratory rate in human subjects after treatment. **(Figure 10)**

4] The Adverse effect parameters of Kuka Cough Syrup were evaluated based on before & after treatment days (0th Day & 14th Day) on Body temperature.
Treatment with Kuka Cough Syrup for 07 days resulted in no significant change in Body temperature in human subject (n=49 & 46) from before & after the treatment 97.9±0.9 to 95.3± 13.2 (mean ± SD, P=0.3287; t=0.9875). This result indicates that Kuka Cough Syrup does not change the body temperature in the human subject after treatment. **(Figure 11)**

5] The Adverse effect parameters of Kuka Cough Syrup were evaluated based on before & after treatment days (0th Day & 14th Day) on Systolic & Diastolic Blood Pressure. Treatment with Kuka Cough Syrup for 07 days resulted in no significant change in Systolic & diastolic blood pressure in human subject (n=46) from before & after the treatment (P=0.1759; t=1.375 for Systolic BP & P=0.1452; t=1.483 for Diastolic BP). This result indicate that Kuka Cough Syrup doses not change Systolic & diastolic blood pressure in human subject after treatment.**(Figure 12, 13)**

DISCUSSION

Kuka Cough Syrup is a polyherbal Ayurvedic formulation which contains herbs that have been proven effective in acute cough and throat irritation.

From the data obtained, it can be noted that subjects has had relief in the Daytime Coughing from 12.8% subjects with frequent coughing at the start of the trial to 50% subjects reporting cough for one or two short periods while 43.5% reported no cough at the follow up. On the Night-time Coughing 38.3% subjects had cough on waking to 17.4% at the follow up of the trial. For Changes in Throat Irritation 13.0% subjects reported between
76%-100% decrease in throat irritation on the first da and by follow-up 76.1% subjects reported 76%-100% decrease in throat irritation which is noteworthy. The Time to Relief at the start of the trial13.0% subjects reported relief within 0-15 minutes and on follow up 71.7% reported relief within 0-15 minutes. The Duration to Relief scale 2.2% of subjects reported relief up to 3 hours and 6.5% subjects reported relief up to 4 hours and by follow up 52.2% subjects reported relief up to 3 hours and 28.3% subjects reported relief up to 4 hours. On the Global Assessment Scale 23.9% subjects reported excellent efficacy at the start of the trial and by follow up 56.5% subjects reported excellent efficacy.

Treatment with Kuka Cough Syrup for 07 days to 46 human subjects resulted in an increase in verbal category descriptive (VCD) scale scores for Day time and Night Time Cough Scale and in Throat Irritation under Primary Endpoints analysis. Under Secondary Endpoints Analysis Treatment with Kuka Cough Syrup for 07 days results significant increase in time to relief within 16-30 min from cough & in Duration to relief up to 3hr without any Drowsiness with Very good efficacy under Global Assessment Scale. Kuka Cough Syrup doesn't cause any change in pulse rate, Body weight, body temperature, systolic & diastolic blood pressure in human subjects analysed before & after the treatment.

Treatment with Kuka Cough Syrup there is a minor decrease in the respiratory rate in the Human subject when analysed before & after the treatment, which is a good indication of respiratory improvement.
Tulsi (*Ocimum sanctum*), Vasaka (*Adhatoda vasica*), Kulanjana (*Alpinia galangal*), Yastimadhu (*Glycyrrhiza glabra*), Pippali (*Piper longum*) and Sat Pudina (*Mentha piperata*) ingredients used and their valuable properties discussed below with special reference to cough and sore throat.

Tulsi (*Ocimum sanctum*) have various pharmacological activities such as anti-inflammatory, antipyretic, analgesic, anti-asthmatic distillation of the leaves yields oil of the plant which is known to possess antibacterial, antioxidant, and anti-inflammatory properties[18]. It has the property to mobilize mucus and remove cough from the lungs and nasal passage hence it is widely used in many herbal preparations; it is also used to cure sore throat[19].
Vasa (*Adhatoda vasica*) have an expectorant (used in bronchial, asthmatic and pulmonary affections), antispasmodic, febrifuge, also as bronchodilator and expectorant. It is a bitter bronchodilator, respiratory stimulant, Vasicinone exhibited smooth muscle-relaxant properties of airways[20].
Yastimadhu (*Glycyrrhiza glabra*) main action is

anti-allergic, demulcent, expectorant, anti-inflammatory, Used in bronchitis, dry cough, respiratory infections, catarrh, tuberculosis; genitourinary diseases. One of its main uses is in catarrh of the upper respiratory tract and gastric, duodenal ulcers[21].

Pippali (*Piper longum*) mainly used for diseases of the respiratory tract (cough, bronchitis, asthma); as sedative (in insomnia and epilepsy);as general tonic and haematinic (in anaemia, chronic fevers)[22].

Sat Pudina (*Mentha piperata*) has properties like antiseptic, antiviral and used in many mixtures of indigestion cough and cold remedies and also for the respiratory tract inflammation of the oral mucosa. The essential oil has both antibacterial and antifungal properties[23].

As a result of these findings, the above-mentioned preparation may be strongly recommendable, alongside conventional medications, to adults and children who are experiencing acute cough and sore throat symptoms.

CONCLUSION

The present report shows that the subjects taking Kuka Cough Syrup showed improvement in cough and sore throat symptoms. There were no adverse effects either reported or observed during the clinical study.

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