CLINICAL STUDY OF ANTI-HYPERLIPIDAEMIC ACTIVITY OF *VACHA* (ACORUS CALAMUS LINN) W.S.R TO STHAULYA

Anoop Kumar Singh[1], B Ravishankar[2], P P Sharma[3], T N pandaya[4]

[1]MD (Ayu) IPGT & R.A, Associate Professor (P.G. Dept of Agad Tantra), Uttarakhand Ayurved University, Rishikul Campus, Haridwar (Uttarakhand), India
[2] Ex. Head Pharmacology Lab, [3] Head Dept of Dravyaguna & Ex Dean,[4] Prof Dept of Dravyaguna; I.P.G.T. & RA., Jamnagar, India

ABSTRACT

Vacha churna is implicated for use in all *Santarpanjanya Vyadhis* or diseases due to overnutrition in different Ayurvedic classics. Acharya Charak has mentioned under *Lekhaniya Mahakashaya.* It is easily available and cheap so it is the need of study Hyperlipidaemia does not bear a direct reference in the *Brihattrayi* though it can be studied under the broad umbrella of *Sthaulya*. Obesity is an increasing problem in the developed world and has substantial health effect. In clinical trial was organized with randomized, standard control and Single blind method. In this study, 33 patients suffering from Hyperlipidaemia *(Sthaulya)* were selected but 24 patients were completed from O.P.D. and I.P.D of the I.P.G.T & R.A. Hospital, G.A.U., and Jamnagar. These patients were divided into two groups with the help of an arbitrary prepared random table and drugs were given as follows: In Group – A *Vacha Churna* (Test Drug) was given to 14 patients in the dose of 500mg B.D. with water after meal for 30 days. In Group – B *Musta Churna* (Controlled drug) was administered to 10 patients in the dose of 3 gm B.D. with water after meal for 30 days. The Test Drug Group (*Vacha Churna*) Give Batter improvement Than Controlled Group *(Musta Churna)*.

Keywords: Anti-Hyperlipidaemic Activity, *Vacha* (Acorus *calamus* Linn.), *Sthaulya*.

INTRODUCTION

The industrialization, stress during the work, dietary habits, lack of exercise and excessive use of various fatty varieties among the daily diet e.g. fast food, freeze fruits, increased amount of soft drinks and beverages, canned foods results into the disturbance of Agni or digestion, metabolism and ultimately leads to clinical entity known as Hyperlipidaemia.

Today, the general public is well aware that having too much cholesterol in their blood is also a major risk for developing CHD. CHD is the number one killer among the diseases and it accounts for 37% of adult deaths in the US every year[1].

Hyperlipidaemia is a condition in which the levels of lipoproteins i.e. cholesterol, triglycerides or both are raised in plasma. Hyperlipidaemia leads to coronary artery disease, myocardial infarction and cerebrovascular accidents. Acharya Charaka has quoted *Sthaulya* under the eight varieties of impediments which are designated as *Ashta-Nindita Purusha, Ati-sthaulya* comprises one of them.[2]Acharya Charaka also included *Ashta-Nindita* under *Santarpanajanita Vyadhi*.[3] He listed eight symptoms of *Sthaulya Purusha* i.e.

Ayuhrasa (decrease of life span), *Javoparodha* (decrease in enthusiasm and activity), *Alpa-vyavayita* (difficulty in sexual act), *Daurbalya* (debility), *Daurgandhy* (unpleasant smell from the body), *Swedabadh* (Excessive sweating), *Ati-risha* (Polydipsia), *Atikshudha* (Polyphagia)[4]. In *Sthaulya*, increased *Meda, Agni* and *Vayu*, produce complications like *Prameha-Pidika*, and *Bhagandara* etc. The incidence of Diabetes mellitus, hypertension, angina pectoris, and myocardial infarction etc. are higher among hyperlipidaemic individuals.

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Acharya Charaka also lists this problem under *Santarpanajanita Vyadhi*[3] He listed eight defects underlying- *Sthaulya Purusha*, *Ayuhrasa*, *Javoparodha*, *Alpa-vyavayita*, *Daurbalya*, *Daurgandhya*, *Swedabadha*, Ati-*trisha*, Ati-*kshudha*[4]. In *Sthaulya,* increased *Meda*, *Agni* and *Vayu*, produce complications like *Prameha-Pidika*, and *Bhagandara* etc. The incidence of Diabetes mellitus, hypertension, angina pectoris, and myocardial infarction etc. are higher among hyperlipidaemic individuals.

AIMS AND OBJECTIVES:-

- To evaluate Anti-Hyperlipidaemic Activity of the drug *Vacha* (Acorus *calamus* Linn.) on *Sthaulaya*.

GROUPING:

The patients were selected randomly and divided into two groups.

	Group –A (TEST DRUG)	Group-B (CONTROLLED DRUG)
Drug	: *Vacha Churna*.	*Musta Churna*
Dose	: 500 mg BID[5] (*Bhojanottara*)	3 gm BID (*Bhojanottara*)
Route of administration	: Oral	Oral
Duration	: 30 days	30 days
Anupana	: water	water

OBJECTIVE CRITERIA:

The patients who are having age of 16 to 70 years were being taken for the study. Assessment of patients follows –

- Body Mass Index (BMI)
- Body circumference.
- Skin fold thickness.

PATHOLOGICAL INVESTIGATIONS:

Following investigations will be carried out before and after treatment.

- Hematological investigations - Hb%, TLC, DLC, ESR.
- Urine analysis –Routine and Microscopic.
- Biochemical examinations - PPBS, FBS, S. cholesterol, S. triglycerides, S. HDL.

INCLUSION CRITERIA:

- The patient having age between 16 to 70years.
- The patients having raised lipid profile on laboratory investigations.
- *Chalsphikudarastana, Swedadhikya, Atiskhudha, KshudraSwasa, Angagaurava Anga Chalatva, Atipipasa, Avyavaya*
- B.M.I. – 25 To 39.9 [6]

EXCLUSION CRITERIA:

- The patient having hypothyroidism, Diabetes, cardiovascular disease, severe hypertension and *Garbhini*,
- The patient having B.M.I. >40 were also be excluded.
- Any systemic illness.
- Patients below the age of 16 and above 70 years were excluded.

➢ Severe complicated cases.

OBSERVATION-

Total 33 patients of Hyperlipidaemia were studied in the present study. Maximum patients in the age group of 26-35 years (21.21%)

➢ In this series maximum numbers of patients were female (90.91%), Hindu (69.7 %), having education up to High school level (30.30%), from Middle class (48.48%), Occupation 72.73 % were housewives and Married (87.88%).

➢ *Dashavidha Pariksha* biostatistics revealed that maximum number of the patient was *having Kapha-Pitta Deha Prakriti* (21.21%), *Tamas Manasa Prakriti* (51.52%), *Madhyama Sara* (63.64%) *Madhyama Samhanana* (63.64%),

➢ In *Pramana*, 36.36% patients belonged to *Madhyama Pramana* and *Avara Pramana* each. Maximum 31.67% patients were having weight in the range of 71-80kg; maximum 39.39% patients were having BMI between to 30-34.9 Kg/m^{2,} and *Madhyama Aahar Shakti* (63.64 %).

➢ Elaborated dietetic history disclosed that maximum number (54.55%) patients of this series were taking *Niramisha* (Vegetarian) diet, *Adhyashan..* (51.52%), *Madhura Rasa* (75.76%) dominant diet, maximum 60.61 % patient were having *Madhyama Koshtha* .

➢ Review of the personal history showed that in present series maximum number of the patients were no doing exercise (51.52%), Maximum patients i.e. 69.70 % patients were doing Standing type of work , Maximum 48.48% patients were doing 1-3 hours' work in day , Maximum patients i.e 90.91% patients were taking tea, Having sound sleep (78.79%) and Maximum 72.73% patients were sleeping for 7-9 hrs/in Night Time, Maximum 39.39% patients were sleeping for3-4 hours/in Day Time,. maximum 72.73% patients No taking any type of addiction , maximum 42.42% were of Jovial Make up , maximum 36.36%   were after Marriage. 75.76% had positive family history of Hyperlipidaemia. *Guruahara* in 72.73% patients, *Madhurahara-Sheeta-Snigdha-Navanna in* 69.7% *patients, Atibhojana* in 66.67%, *Dadhi, Sarpi, Payasa, Iksu-Guda-Vikar* in 60.61%, *Mamsarasasevana* and eggs in 42.42% each patients were the probable *Aharatmaka Nidanas* observed in most of the patients. *Sukahsaiyasevana* in 81.82% patient, *Diwaswapana* in 75.76% patients, *Bhojanottar Nidra sevan* in 57.58%, *Avyayama* in 54.55%, *Avyavaya* in 39.39%, Air condition in 6.06% patients were found as *Viharatmaka Nidana* in majority of the patients. 45.45% patients were in *Manasanivriti*, and *Priyadarasan* in 39.39 % patient, *Achinta* in 36.36% patient *Harsanityatvat* was present in 15.15 % cases were the prominent *Manas Nidanas* obtained in maximum number of the patients. *Beeja Dosha* (genetic /hereditary defect) was obtained in 75.76% patients of this series. Chief complaint observed in patients were maximum 100% patients were having filling of *Bharavriddhi.* 75.76% each patients were having symptom of *Swedadhikaya* and *Angachaltva* 69.70% each patient were having symptom of *Utsahahani*, *Daurbalya* and *Angagaurva*, 60.61% patients having *Nidradhikya* symptom, 54.55% patients having *Vyavaya Kasta*, , 51.52% each having symptom of *Snigdhangata*, 48.48% were reported *Daurgandhya*, 42.42% were reported *Ayase Swasa Kastata* , 39.39% each having *Ati-Kshudha* and *Ati-Pipasa* symptom, 33.33% patients having *Gatra-*

sada. 27.27% patients having *Anga Shaithilya* .

➤ Analysis of the *Doshika* involvement shows that all the patients (100%) had *Kapha Dushti* while *Pitta Dushti* was present in 39.39% and *Vata Dushti* reported in 27.27% patients and Review of *Srotodusti Lakshanas* reveals that all the patients 100% patients were reported *Medovah* ,60.61 were *Swedavah Sroto Dushti*, 51.52% in *Rasavah Sroto*.

RESULT:

Effect on Biochemical Parameters - In *Vacha churna* group, FBS was reduced by 3.5 % and S.Cholesterol was reduced by 3.10% and whereas S.Triglyceride was reduced by 25.62 %, And S.HDL level was decreased by 3.81%. All the results were statistically insignificant (p>0.05). In *Musta churna* group, FBS was Increased by 0.41 % and S.Cholesterol was Increased by 5.95 % and whereas S.Triglyceride was reduced by 9.35 % And S.HDL level was decreased by 3.06 %. All the results were statistically insignificant (p>0.05). Effect on Weight- In *Vacha churna* the mean score of weight was 84.86 kg, which was brought down to 80.5 kg after the treatment with 5.13% of relief showed the statistically highly significant (p<0.001) result. In *Musta churna* group reduction in weight was 3.51 % showed results were statistically highly significant (p<0.001).

Effect on B.M.I- In *Vacha churna* group reduction in B.M.I. was 5.08 % Results were statistically highly significant (p<0.001). In *Musta churna* group reduction in B.M.I was 3.56 %, Results were statistically highly significant (p<0.001).

Effect on Body Circumference- In *Vacha churna* group decrease observed in various body circumferences i.e. Forearm circumference 7.96%, Arm circumference 6.47 %,

Thigh circumferences 5.59 %, Abdomen circumference 4.6 % Leg circumference 4.44 %, Hip circumference 4.16%, Chest circumference 3.69 % was observed. All the results were statistically highly significant (p<0.001). In *Musta churna* group decrease observed in various body circumferences i.e. Arm circumference 5.48 %, Forearm circumference 5.28%, Thigh circumferences 3.32 %, Abdomen circumference 3.22% Leg circumference 3.18%, Hip circumference 2.91%, Chest circumference 2.82 % was observed. All the results were statistically highly significant (p<0.001). Effect on Skin Fold Thickness- In *Vacha churna* group reduction observed in various Skin fold thickness i.e. Biceps 11.26 %, Triceps 11.07 %.Both the results were statistically highly significant (p<0.001). In *Musta Churna* group reduction observed in various Skin fold thickness i.e. Biceps 9.84 %, Triceps 12 %. Both the results were statistically highly significant (p<0.001).

Effect On Symptomatology- In *Vacha churna* group showed relief in *Nidradhikya* 70.59%, in *Daurgandhya* and *Swedadhikaya* 68.18%, *Ayase Swasa Kastata* 66.67%, *Vyavaya Kasta* 65%, *Daurbalya* 61.9%, *Ati Kshudha* 59.26%, *Ati Pipasa* 59.09% , *Chalt Sphik Stana Udara* 57.58 % , *Ati Kshudha, Daurgandhya , Swedadhikaya, Utsahahani, Vyavaya Kasta* were statistically significant (p<0.01)., and *Ayase Swasa Kastat, Ati Pipasa , Daurbalya Nidradhikya* were also statistically significant (p<0.02) while *Chalt Sphik Stana Udara, Snigdhangata, Angagaurava,* were statistically highly significant (p<0.001). In *Musta churna* group showed relief in *Ayase Swasa Kastata* 75%, *Utsahahani* 66.67%, *Snigdhangata* 63.64%, *Nidradhikya* and *Daurbalya* 62.5% each,*Vyavaya Kasta* 61.54% , *Ati Pipasa* and *Ati Kshudha* 55.56% each, *Daurgandhya* and *Swedadhikaya* 45.83% each, *Chalt Sphik Stana Udara*

37.5%. In which *Chalt Sphik Stana Udara, Vyavaya Kasta* were statically highly significant (p<0.001). *Daurgandhya, Daurbalya, Swedadhikaya, Angagaurava, Utsahahani* were statically significant (p<0.01), *Snigdhangata, Nidradhikya*, were also statically significant (p<0.05) While *Ayase Swasa Kastata, Ati Kshudha, Ati Pipasa,* were statistically insignificant (p>0.05).

Effect of *Vacha Churna* on Symptoms of 14 Patients: (Table -1)

Symptoms	N	Mean		Mean Diff.	%	S.D.	S.E.	't'	p
Ayase Swasa Kastata	7	1.5	0.5	1	66.67	1.18	0.31	3.18	<0.02
Chalt Sphik Stana Udara	14	2.36	1	1.36	57.58	0.63	0.17	8.02	<0.001
Ati Kshudha	8	1.93	0.79	1.14	59.26	1.17	0.31	3.66	<0.01
Daurgandhya	8	1.57	0.5	1.07	68.18	1.14	0.30	3.51	<0.01
Ati Pipasa	8	1.57	0.64	0.93	59.09	1.14	0.30	3.04	<0.02
Daurbalya	8	1.5	0.57	0.93	61.90	1.07	0.28	3.24	<0.02
Snigdhangatta	11	1.36	0.57	0.71	52.63	0.47	0.13	5.7	<0.001
Nidradhikya	7	1.21	0.36	0.86	70.59	0.95	0.25	3.38	<0.02
Swedadhikaya	8	1.57	0.5	1.07	68.18	1.14	0.30	3.51	<0.01
Angagaurava	14	2.21	0.86	1.36	61.29	0.5	0.13	10.21	<0.001
Utsahahani	8	1.07	0.43	0.64	60.00	0.63	0.17	3.8	<0.01
Vyavaya Kasta	10	1.43	0.5	0.93	65.00	0.73	0.2	4.76	<0.01

Effect Of *Musta Churna* on Symptoms of 10 Patients: (Table -2)

Symptoms	N	Mean		Mean Diff.	%	S.D.	S.E.	't'	p
Ayase Swasa Kastata	2	0.4	0.1	0.3	75.00	0.67	0.21	1.41	>0.05
Chalt Sphik Stana Udara	10	2.4	1.5	0.9	37.50	0.57	0.18	5.01	<0.001
Ati Kshudha	4	0.9	0.4	0.5	55.56	0.71	0.22	2.24	>0.05
Daurgandhya	9	2.4	1.3	1.1	45.83	0.88	0.28	3.97	<0.01
Ati Pipasa	4	0.9	0.4	0.5	55.56	0.71	0.22	2.24	>0.05
Daurbalya	7	1.6	0.6	1	62.50	0.82	0.26	3.86	<0.01
Snigdhangata	6	1.1	0.4	0.7	63.64	0.67	0.21	3.28	<0.05
Nidradhikya	6	1.6	0.6	1	62.50	0.94	0.30	3.35	<0.05
Swedadhikaya	9	2.4	1.3	1.1	45.83	0.88	0.28	3.97	<0.01
Angagaurava	8	2	1	1	50.00	0.67	0.21	4.74	<0.01

| Utsahahani	8	0.9	0.3	0.6	66.67	0.52	0.16	3.67	<0.01
Vyavaya Kasta	8	1.3	0.5	0.8	61.54	0.42	0.13	6	<0.001

↓ - Decrease

Comparative Effect Between Controlled & Test Drug*: (*Unpaired t Test): The Test Drug Group (*Vacha Churna*) Give Batter Relief Than Controlled Group (*Musta Churna)* Except *Chalt Sphik Stana Udara, Ati Kshudha, Swedadhikaya.*

Overall Effect of Therapies: Total 14 patients of *Vacha Churna* were completed the full course. Out of 14 patients, and 11 patients gained moderate improvement (78.57%), 2 patients markedly improved (14.29%) ,1 patients gained mild improvement (7.14%). Total 10 patients of *Musta Churna* were completed the full course. Out of 10 patients, and 7 patients gained moderate improvement (70%), 1 patients markedly improved (10%), 1 patients gained mild improvement (10%) While 1 patient unchanged (10%)

Chart - 1:
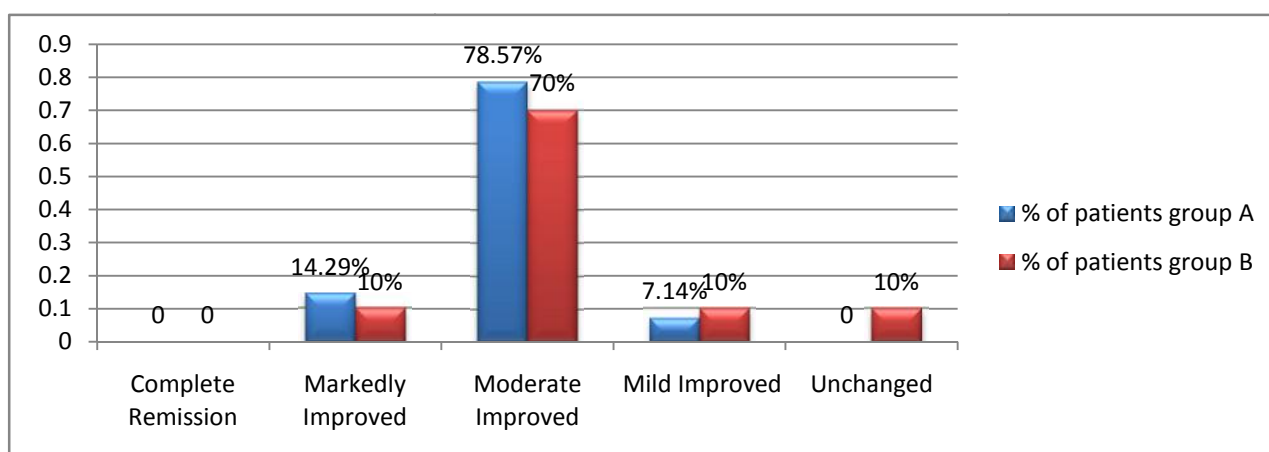
DISCUSSION

Age-According to Ayurveda, in *Madhyama Kala* all *Dhatus* reach to *Paripurnata* (their optimum level). It is also highlighted by The Lipid Research Clinics survey that total cholesterol increases with age in both sexes up to middle age and decline moderately in the elderly. Young group occurrence was the most, which shows over eating, less activity or after marriage consciousness about slim body. Sluggish activity, settlement and sedentary life style cause *Sthaulya* in middle age.

Sex-In every region the prevalence of Obesity is higher among women than men. The reason behind this observation might be the feminine factors like pregnancy, post operating condition, use of oral contraceptives, menopause etc. were predominant factors, which makes female an obese.

Socio-economic Status- Here middle and upper middle class develops *Sthaulya* becomes less awareness of weight gain ,they tend to over eat readily accessible food supply, fast food services, constant exposure to high caloric food, relative physical inactivity. Persons from Middle class are health aware but cannot spend much more money for their health so they always prefer the hospitals where medicine is provided free or at low cost.

Marital Status- Maximum patients 87.88% were Married and 12.12 % were Unmarried Since the disease affected more the middle age persons, which is the age when

the generally a person remain married. So, in this study maximum patients were recorded as Married. Moreover, Married female found obese in comparison to Unmarried, owing to hormonal imbalance occurring after marriage, in pregnancy.

Sharira and Manasa Prakriti - More prevalence of Hyperlipidaemia in patients having *Kapha* predominant *Prakriti* pointed towards involvement of *Kapha Dosha* in pathophysiology of *Medoroga*. Properties attributed to *Kapha* and *Meda* are almost similar. People having *Kapha* predominant *Prakriti* have stout physique, so they are more prone to *Medoroga*. *Bhavaprakasha* has considered increased *Tamoguna* and declined *Satvaguna* for occurrence of *Medoroga*[7],

Aahar Shakti - *Aahar Shakti* of patients is more which leads to *Bharavriddhi*. *Agni* can be measured by *Aahar Shakti* and in *Medoroga*, mostly *Teekshnagni* is found which causes desire to eat frequently and digests the food more frequently. A number of neurotransmitters afferent and efferent signals play main role in energy intake and its metabolism. Disturbed S.Leptin concentration, increased level of insulin and decreased sympathetic activity causes excessive hunger in obese patients.

Dominant Rasa - *Madhura-Amla-Lavana Rasas* are *Kapha* aggravating factors and *Tikta Rasa* aggravates *Vata*, both the *Kapha* and *Vata* vitiation play an important role in *Medoroga*. According to modern point of view, *Madhura, Amla, Lavana Rasa* dominant diet is always high calorie value and excessive indulgence in high calorie diet is well-established cause of *Sthaulya*.

Exercise - Studies have shown that inactive persons have low HDL. Also more energy consuming and less energy expenditure results in increase energy input which leads to disturbance in lipid metabolism and can cause hyperlipidaemia[8]

Probable Mode of Action of *Vacha Churna* on *Sthaulya*:

In *Vacha Churna* have *Katu* & *Tikta Rasa, Laghu, Ruksha* & *Tiksna Guna, Ushna Virya* and *Katu Vipaka, Vatakaphashamaka, Karshana, Lekhaniya, Amapachana, Dhatushoshana* & *Pramathi* properties, which normalize the state of *Agni*. Doing the function of *Stroto-Vibandhanasana* and acts against *Kapha*, *Kleda* and *Meda* by enhancing *Rasa,Meda, Medodhatvagni*, and provided good results in all signs and symptoms. Thus, regulated *Jatharagni*, checks the excessive growth and accumulation of *Medodhatu* and thereby causing *Lakshana Upshamana* of disease *Sthaulya*. The rasa of *Vacha* is mentioned in our classics as *Katu* & *Tikta* which is *Kaphagna* in nature. Due to its *Usna virya* it also acts as *Vataghan.* Since *Vata* and *Kapha dosha* are involved in the *samprapti* of *Sthaulya*, *Vacha churna* by its *katu, tikta rasa* can be used in *samprapti vighatana* of *Sthaulya* (Anti Hyperlipidemic Activity). *Meda & Kleda* are the chief culprits in *Sthaulya*. *Katu Rasa* performs *Medokledopashoshana* action. *Ushna Virya* also helps in *Kleda* and *Meda vilayana* action. By the dint of its *Laghu, Ruksha, Ushna, Tikshna gunas* it causes *medodhatvagni deepan* at the same time it removes *avaran* of *meda* on *vata dosha* hence bring *jatharagni* to its normalcy. *Katu Rasa - Ushna Virya* encounters *Dhatvagnimandya* & potentiates the weakened *Dhatvagni* and help in *Ama-pachana* thereby alleviates *Aparipakwa* and *Ama Dhatu*. Due to *Pramathi* & *Lekhan* property by which it disintegrated the *kleda*, meda, *lasika, sweda* & *vasa* and eliminates the *mala, kapha* & *pitta* from the *Srotas* & Due to *katu Rasa*, all the involved channels are dilated i.e. "*Srotansi Vivrunoti*" action. *Katu Rasa* and *Ushna Virya* check over *Medovaha* and *Mamsavaha Srotodushti*. Which

leads to Anti Hyperlipidemic Activity (*Sthaulya*)?

CONCLUSION

Both the drugs have significant effect on *Medodushti Lakshanas* and in reduction of objective parameters like weight, BMI, body circumferences and skin fold thickness etc but *Vacha churna* is better than *Musta churna* except *Chalt Sphik Stana Udara*, *Ati Kshudha*, *Swedadhikaya*. Both the drugs are free from any major side effects.

Suggestions for Further Research Works-
- The duration of the therapy should be minimum upto 2-3 months.
- The *Vacha Churna* had given good result but it is unpalatable for patient due to bitter test. So we should be used in different form like *Vati*, Capsule etc.

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CORRESPONDING AUTOR

Dr. Anoop Kumar Singh
Associate Professor (P.G. Dept of Agad - Tantra) , Uttarakhand Ayurved University, Rishikul Campus, Haridwar (Uttarakhand), India
Email: Singh.dranoop164gmail.com

Source of Support: Nil
Conflict Of Interest: None Declared