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Research Article

A PHARMACEUTICAL STUDY OF HINGULIYA MANIKYARASA PREPARED BY CONVENTIONAL AND MODIFIED METHODS

Inamdar Mahesh Prabhakar[1]*, Singh Satyendrakumar Rajendra Prasad[2]

[1]M.D. Rasashastra, P.D.E.A's, College of Ayurved and Research Center, Nigdi, Pradhikaran, Pune, Maharashtra, India

[2]M.D. Ayurved, P.D.E.A's, College of Ayurved and Research Center, Nigdi, Pradhikaran, Pune, Maharashtra, India

***Correspondence**

Dr. Inamdar Mahesh Prabhakar
M.D. Rasashastra, P.D.E.A's, College of Ayurved and Research Center, Nigdi, Pradhikaran, Pune, Maharashtra, India

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ABSTRACT

Ayurvedic pharmaceutics is mainly divided into two parts – Rasashashtra and Bhaishajya kalpana in which Rasashastra deals with the preparation of medicines mainly with the help of Mercury, minerals, metals and other herbs. Standardization and quality control of Ayurvedic medicine is very much needed. The aim of the present research work was to Study pharmaceutical aspect of preparation of Hinguliya Manikyarasa by textual method given in Rasatarangini and Modified methods used in this study, in which the duration of heating was reduced to 48 hours and 24 hours. For Pharmaceutical study the method used was the observations regarding time, temperature, cardinal stages, finished product and consumption of fuel and temperature range for Hinguliya Manikyarasa were studied. The Results obtained were, as the value of average temperature for Mrudu Agni, Madhyamagni and Tivragni goes on increasing from 72 h samples to 48 h samples and from 48 h samples to 24 h samples of Hinguliya Manikyarasa. The percentage of output of finished product was not affected even though Hinguliya Manikyarasa was prepared by reducing the duration of heating. The percentage of finished product was about 37 – 38 % of initial kajjali taken. All the samples of H.M. prepared by textual as well as modified methods also followed the criteria of standard regarding the organoleptic parameters.

Keywords: Hinguliya Manikyarasa, Kupipakwa Rasayana, Rasatarangini, Valukayantra, Kramagni

INTRODUCTION

The Science of Indian medicine is intended to give a person healthy and long life so that he can pursue the aims of life, namely – Dharma, Artha, Kama and Moksha uninterruptedly. Acharya Charaka preaches Trisutra Ayurveda which consists of science of Causes (Hetu), Symptoms (Linga) and Medication (Aushadha)[1]. The Drug and pharmaceutical preparations comes under third category. Charakacharya provides systematic definitions and practical factors relating to drug preparations. Medicinal preparation is defined as a process performs to modify the natural properties of substances with radical modification of drug properties. Introduction of Rasachikitsa is one of the important stepping stone in the development of Ayurvedic Science. Rasashastra deals with the preparation of medicines mainly with the help of Mercury, minerals, metals and other herbs. There are four types of Rasoushadhis described in Rasashastra- Kharaliya Rasayana, Parpati Rasayana, Kupipakwa Rasayana and Pottali Rasayana[2]. Out of these Kupipakwa Rasayana is one of the important groups of formulations which are supposed to very difficult to prepare and require more duration for preparation. It also requires more laborious efforts and more consumption of fuel. So in this modern era it is the need of the hour to modify some methodology for preparation of Kupipakwa Rasayana formulations so that the modified methods should minimize the duration, which saves the fuel and requires less efforts to prepare drug and save money as well. As all we know our Ayurvedic Science is expanding globally, Scientists all over the world attracting towards Ayurved, it is our prime duty to develop basic standards at every step of drug preparation. By keeping all these views in mind this study was planned. The drug selected for present study was Hinguliya Manikyarasa – a Kupipakwa Rasayana formulation[3].

Aim

To Study pharmaceutical aspect of preparation of Hinguliya Manikyarasa

Objectives

- To prepare Hinguliya Manikyarasa by textual method and by modified method.
- To establish standards regarding finished product, consumption of fuel and temperature range for Hinguliya Manikyarasa.

MATERIALS AND METHODS

Selection of raw materials

Acceptable variety (Grahya) of Hingula[4] (Cinnabar), Harital[5] (Yellow Orpiment) and Gandhaka[6] (Sulphur) were selected to prepare Hinguliya Manikyarasa. It is important that crude drugs both of vegetable and mineral origin should be subjected to purification process before they are used internally[7]. Hence a detailed practical study was carried out.

The study was conducted under 3 headings

- Purification of ingredients of Hinguliya Manikyarasa.
- Preparation of Hinguliya Manikyarasa kajjali
- Preparation of Hinguliya Manikyarasa by Kupipakwa Rasayana method.

Purification of ingredients of Hinguliya Manikyarasa – Purification of Hingula

Materials

- Unpurified Hingula – 1.50 Kg
- Ardraka swarasa - 720 ml

Apparatus

Mortar with pestle, Spatula, Vessel, Cloth, Measuring cylinder etc

Procedure

Impure Hingula 1.5 Kg weighed correctly and fine powder was made in mortar and pestle. For first bhavana 200 ml juice of Ardraka, the quantity sufficient to immerse the Hingula powder was added. The mixture was subjected for Trituration till the juice was dried up. Trituration was made constantly and cautiously, by the similar process 8 bhavanas were given[8].

Purification of Gandhaka

Materials -

- Impure Gandhaka – 1.50 Kg
- Goghruta - 1.5 Kg
- Godugdha –18 Lits
- Water – 5 Lits

Apparatus

Mortar with pestle, Spatula, Steel Vessels-2, Cloth, Measuring cylinder, Gas stove, holder etc.

Procedure

Powdered Gandhaka was taken in a steel vessel and equal quantity of Goghruta was added in it and slow heating was provided. Milk was taken in another big vessel and a piece of cloth was tied on the mouth of the vessel. When Gandhaka was totally melted in to Goghruta the mixture was slowly poured in to the big vessel containing milk through the cloth. The solid mass of Gandhaka was washed thoroughly in hot water and kept for drying. The same procedure was followed for 3 times[9].

Purification of Harital

Materials

- Impure Harital – 1.50 Kg
- Kushmanda Swarasa – 4.5 lt
- Churnodaka (Lime Water) – 5.5 lt

Apparatus

Mortar with pestle, Spatula, A Steel Vessels, Cloth, Measuring cylinder, Gas stove, holder iron rod, Thread, Knife etc.

Procedure

1.5 Kg. Powder of Harital was kept on a piece of cloth and pottali was prepared. Dolayantra containing Kushmand Swarasa is prepared in which the pottali was so adjusted that it was kept immersed in to the Swarasa. The mandagni was given for 1 Yama i.e. 3 hours. After completion of 3 hours, the pottali was taken out, was washed with water and the powder of Harital was dried. The above same procedure was repeated in dolayantra by using Churnodaka (Lime water)[10].

Preparation of Hinguliya Manikyarasa kajjali

Materials

- Pure Hingula – 500 g
- Pure Harital – 500 g
- Pure Gandhaka – 500 g
- Juice of *Benencasa hispida* – Q.S.

Apparatus

Mortar with pestle, Spatula, A Steel Vessels, Cloth, Measuring cylinder, Gas stove, holder iron rod, Thread, Knife, weighing balance, holder etc.

Procedure

Juice of Palasha was extracted. The flowers of Palasha were dipped in to 8 times water for 2 hours and mild heating was given till ¼ water remained and that was filtered and treated as Juice[11]. Purified Hingula, Harital and Gandhaka were taken in to mortar and pestle sufficient quantity of juice was taken and the mixture was triturated well till it completely dried. Such types of bhavanas were given for 7 days.

Preparation of Hinguliya Manikyarasa by Kupipakwa Rasayana method and Textual method

Materials

Hinguliya Manikyarasa Kajjali – 240 g

Apparatus

Mortar with pestle, Spatula, A Steel Vessels, Cloth, Measuring cylinder, Gas stove, holder iron rod, Thread, Knife, weighing balance, holder, coal soft and hard, cow dung cakes, Valukayantra Bottom Circumference – 68 cm, Diameter – outer – 19 cm/ inner – 16 cm, Top – circumference – 78 cm, Diameter – outer – 30 cm/ inner 22 cm, thickness 1.5 cm, height – 25 cm, Kachakupi, mulatani mitti, Different rods- For hot shalaka i) 100 cm, ii) 58 cm long, For cold shalaka 30 cm, Thermometer i) 600^0C and ii) 360^0C, simple coal furnace- Iron pipe for thermometer- length – 32 cm, diameter- 2.5 cm, air blower, kerosene oil, cloths, match box, rough papers, torch, Copper coin, cork, thread, enamel tray, glass container etc

Procedure

240 g Hinguliya Manikyarasa kajjali was taken and filled in kachakupi. Valukayantra was placed exactly at the centre of the furnace and kupi placed at the centre of the valukayantra. The thermometer was applied through iron pipe and the furnace was set fire. Heat was gradually increased by adding hard and soft coals at regular interval. When the Sulphur fumes ceased at the mouth of the kupi, red hot rod was introduced frequently to ignite the Sulphur and clear the pathway. Cold rod test was performed as per the requirement to observe the status of kajjali and subsequent stages. When the blue flame appeared on the mouth of the bottle the temperature was maintained till the flame remained and when the flame ceased the temperature was gradually increased. When the flame, fumes were completely stopped, Cold rod test was positive, Copper coin test was negative and base of

the bottle was red hot like rising Sun, the mouth of the bottle was corked. The sand layer of about 2-3 inches surrounding the bottle neck was move aside. Gradually increasing Heating Pattern was strictly maintained throughout the practical as 24 h Mild, 24 h Moderate and 24 h severe heating. After self cooling the bottle was removed, the layers of kapadamitti were scrapped and kupi was broken by observing the level of the compound. Hinguliya Manikyarasa was collected from the neck region and powdered. Another 2 more samples of Hinguliya Manikyarasa were prepared by the same methodology. The samples were designated as A1, A2 and A3.

Preparation of Hinguliya Manikyarasa by modified method (Heating was done for 48 h)

Materials
Hinguliya Manikyarasa Kajjali – 240 g

Apparatus
The same apparatus were used.

Procedure
240 g Hinguliya Manikyarasa kajjali was filled in kachakupi which is placed in valukayantra. Heating pattern of kramagni i.e. gradual rise of temperature was maintained. The main theme behind this hypothetical method was to give mandagni (mild heating) for first 16 h, madhyamagni (moderate heating) for next 16 h and tivragni (high heating) for last 16 h. Frequently red hot Shalala was used to ignite the deposited sulpher. To decide the stages and state of the kajjali cold rod test was used. When the base of the bottle was red hot, there were no flame or fumes, cold rod test was positive, copper coin test was negative; the cork was applied. After self cooling the bottle was removed, the layers of clothes with mitti were removed and the bottle was broken. The sublimed compound i.e. Hinguliya Manikyarasa was collected carefully and powdered well and kept in glass bottle. Another 2 more samples of Hinguliya Manikyarasa were prepared by the same methodology. The samples were designated as B1, B2 and B3.

Preparation of Hinguliya Manikyarasa by modified method (Heating was done for 24 h)

Materials
Hinguliya Manikyarasa Kajjali – 240 g

Apparatus
The same apparatus were used.

Procedure
240 g Hinguliya Manikyarasa kajjali was filled in kachakupi which is placed in valukayantra. Heating pattern of kramagni i.e. gradual rise of temperature was maintained. The mandagni (mild heating) was given for first 08 h, madhyamagni (moderate heating) for next 08 h and tivragni (high heating) for last 08 h. frequently red hot Shalala was used. Cold rod test was used to decide the stages and state of the kajjali. The cork was applied after doing all tests. After self cooling the bottle was removed, the layers of clothes with mitti were removed and the bottle was broken. The sublimed compound i.e. Hinguliya Manikyarasa was collected carefully and powdered well and kept in glass bottle. Another 2 more samples of Hinguliya Manikyarasa were prepared by the same methodology. The samples were designated as C1, C2 and C3.

OBSERVATION AND RESULTS

Table 1: Average temperature of Mrudu, Madhyama and Tivra Agni for Hinguliya Manikyarasa samples A1, A2 and A3

Agni	A1 (^{0}C)	A2 (^{0}C)	A3 (^{0}C)	Average (^{0}C)
Mrudu	132.23	142.76	144.15	139.71
Madhyam	303.66	297.66	306.24	302.55
Tivra	499.83	510.16	514	507.99

Table 2: Average temperature of Mrudu, Madhyama and Tivra Agni for Hinguliya Manikyarasa samples B1, B2 and B3

Agni	B1 (^{0}C)	B2 (^{0}C)	B3 (^{0}C)	Average (^{0}C)
Mrudu	152	141.55	150.44	147.99
Madhyam	316.25	331.75	335.25	327.75
Tivra	497.25	524	504.25	508.50

Table 3: Average temperature of Mrudu, Madhyama and Tivra Agni for Hinguliya Manikyarasa samples C1, C2 and C3

Agni	C1 (^{0}C)	C2 (^{0}C)	C3 (^{0}C)	Average (^{0}C)
Mrudu	181.20	181.20	158	173.60
Madhyam	332.50	334.50	317.50	328.16
Tivra	505	520	512	512.33

Table 4: Average temperature of Mrudu, Madhyama and Tivra Agni for Hinguliya Manikyarasa samples A, B, and C

Type of Agni	A	B	C
Mrudu	139.71	147.99	173.60
Madhyama	302.55	327.75	328.16
Tivra	507.99	508.50	512.33

Table 5: Average time and temperature recorded during 10 cardinal stages for all samples of Hinguliya Manikyarasa

S. No.	Cardinal stages	A Time (H)	A Temp. (^{0}C)	B Time (H)	B Temp. (^{0}C)	C Time (H)	C Temp. (^{0}C)
1	Initial Stage	00	42.66	00	42	00	43.33
2	Fumes started	02	66.33	1.5	79.33	1.66	118.66
3	Yellow fumes	6.6	116	10	181.33	04	200
4	Profuse fumes	40.66	339.33	26	339.33	13.33	345.33
5	Blue flame	54.83	452	33.66	416.66	18.33	446.66
6	Flame stopped	61.16	527.33	39.66	484	22.33	528
7	Red hot base	62.66	551.33	40.66	512	22.83	545.33
8	Corking	63.66	552	41.33	522	23.33	588
9	Completion	65.33	557.33	45.66	574	23.83	588
10	Svangashita	94.33	44	68.66	42	44.66	44.66

Table 6: Average fuel used for all samples of Hinguliya Manikyarasa

S. No.	Hinguliya Manikyarasa	Soft coal (Kg)	Hard coal (Kg)	Total fuel (Kg)
1	A	22.83	64.13	86.96
2	B	10.33	44.76	55.09
3	C	3.50	33.26	36.76

Table 7: Quantity of H.M. kajjali taken, the yield, the residue for all samples of Hinguliya Manikyarasa

H.M. Samples	Wt. of H.M. kajjali	Preparation time + Self cooling	Wt. of upper part (g)	Wt. of side part (g)	Wt. of Residue (g)
A1	240	66+28	88	04	40
A2	240	64+28	90	4.5	36
A3	240	66+31	82	04	29
B1	240	44+24	88.5	1.5	38
B2	240	47+25	78	1.0	47
B3	240	46+20	104	07	27
C1	240	23+21	78.5	1.5	38
C2	240	23+23	83	1.0	52
C3	240	23+21	109	2.0	35

Table 8: Average of the quantity of H.M. kajjali taken, the yield, the residue for all samples of Hinguliya Manikyarasa

H.M. Samples	Wt. of H.M. kajjali	Preparation time + Self cooling	Wt. of upper part (g)	Wt. of side part (g)	Wt. of Residue (g)
A	240	65.33+29	86.66	4.16	35
B	240	45.66+23	90.16	3.16	37.77
C	240	23+21.66	90.16	1.5	41.66

Table 9: Total Yield and the Residue in percentage for all samples of Hinguliya Manikyarasa

Hinguliya Manikyarasa Sample	Yield in percentage	Residue in percentage
A1	37.84	16.66
A2	39.37	15
A3	35.83	12.08
B1	37.50	15.83
B2	32.91	19.58
B3	46.25	11.25
C1	33.33	15.83
C2	35.0	21.66
C3	46.25	14.58

Table 10: Average percentage of Yield and the Residue for all samples of Hinguliya Manikyarasa

Hinguliya Manikyarasa Sample	Yield in percentage	Residue in percentage
A	37.68	15.97
B	38.88	15.13
C	38.19	17.35

Table 11: Organoleptic parameters for all samples of Hinguliya Manikyarasa

Organoleptic parameter	Hinguliya Manikyarasa
Appearance	Sublimed crystal having one face adhered to kupi shining, smooth and other is rough, rhombohedral or conconical crystal type shape
Color	The ruby red or crimson red
Tactility	Heavy, hard, cool and smooth
Sound	No specific sound, brittle and forms crystals in longitudinal shape
Taste	Tasteless
Smell	Odorless but slight Sulphuric smell may be observed

Table 12: Average value of Yield, average duration of preparation and average fuel consumed for all samples of Hinguliya Manikyarasa

S. No.	Sample of Hinguliya Manikyarasa	Yield	Duration of preparation	Fuel consumed
1	72 h	90.82	94.33	86.96
2	48 h	93.32	68.66	55.09
3	24 h	91.66	44.66	43.76

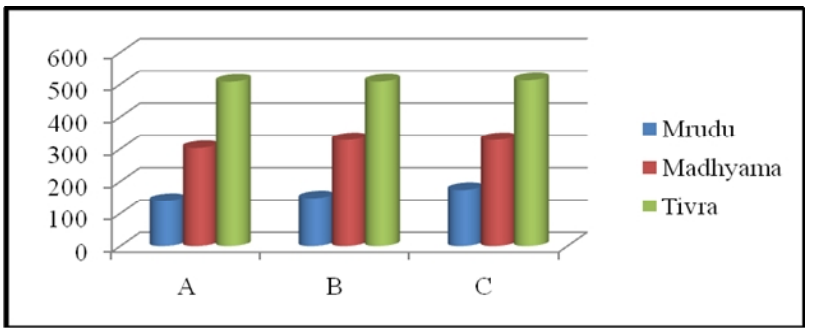

Figure 1: Average temperature of Mrudu, Madhyama and Tivra Agni for Hinguliya Manikyarasa samples A, B, and C

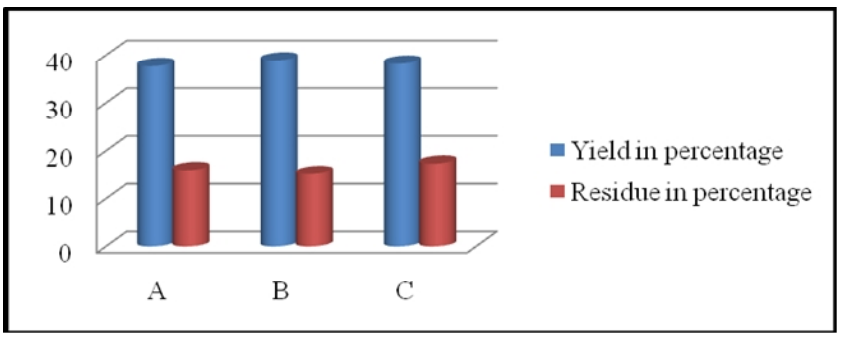

Figure 2: Average percentage of Yield and the Residue for all samples of Hinguliya Manikyarasa

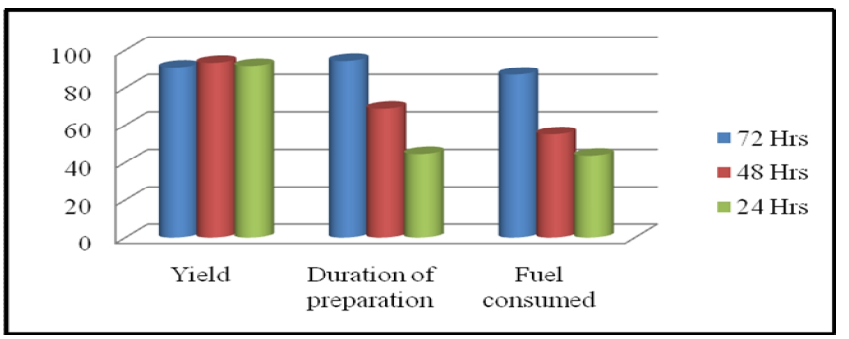

Figure 3: Average value of Yield, average duration of preparation and average fuel consumed for all samples of Hinguliya Manikyarasa

DISCUSSION

The raw material i.e. mainly the ingredients of Hinguliya Manikyarasa used was having 99 % purity and their identification was also made according to classical reference. The herbal drugs used were also identified and confirmed pharmacognostically. The purification of Hingula, Haritala and Gandhaka was carried out according to classical references. Hinguliya Manikyarasa kajjali was prepared by giving bhavana of Palasha pushpa swarasa. 80 g wt. loss was observed. Hinguliya Manikyarasa was prepared in 3 sets of practicals. Set (A) the duration of heating for kupipakwa rasayana was 72 h i.e. classical reference was followed. Set (B) the modified method was used and the heating period used was 48 h and Set (C) the duration of heating was limited to 24 h. The temperature recorded is presented in Table 1, 2 and 3 respectively. Table 4 gives the average temperature recorded during the preparation of Hinguliya Manikyarasa in 72 h of heating. It was observed that the average temperature for Mrudu Agni was 139.71^{0}C, for Madhyamagni was 302.55^{0}C and that for Tivragni was 507.99^{0}C, the average temperature recorded during the preparation of Hinguliya Manikyarasa in 48 h of heating which shows the average temperature for Mrudu, Madhya, Tivragni as 147.99^{0}C, 327.75^{0}C and 508.50^{0}C respectively. The average temperature recorded during the preparation of Hinguliya Manikyarasa in 24 h of heating for Mrudu Agni was 173.60^{0}C, for Madhyamagni was 328.16^{0}C and that for Tivragni was 512.33^{o}C. So it clearly indicates that the value of average temperature for Mrudu Agni, Madhyamagni and Tivragni goes on increasing from 72 h sample to 48 h sample and from 48 h sample to 24 h sample i.e. C > B > A. This indicates that as the duration of heating was decreased the temperature range within the three heating pattern was increased so higher average temperature was being noted in

every stage of sample C. When duration of heating variates the temperature range also variates and according to that heating should be provided. So the temperature range and the average temperature equated with heating pattern should not be fixed similar to all samples but it may be variates according to the duration of heating and when the duration of heating will be less the temperature range will be high. Table 5 gives an idea about the average time required and average temperature attained during cardinal stages of preparation of Hinguliya Manikyarasa by conventional and modified methods. These findings should be considered as the standard parameters during the preparation of Hinguliya Manikyarasa. These findings may be useful while preparing Hinguliya Manikyarasa in muffle furnace. According to the stages the temperature can set in the muffle furnace. Table 6 gives the data of average fuel consumption. On the basis of that it may be concluded that in the preparation of Hinguliya Manikyarasa in 48 h and 24 h methods less fuel was consumed and the compound was prepared in less time. Table 7 gives the data regarding the quantity of material taken, the yield and the residue for all samples of Hinguliya Manikyarasa. From Table 8, 9 and 10 it was observed that for 72 h H.M. sample the yield was 37.68 % and residue was 15.97 %, for 48 h H.M. sample the yield was 38.88 % and residue was 15.13 % and for 24 h H.M. sample the yield was 38.19 % and residue was 17.35 %. It indicates that Hinguliya Manikyarasa even though prepared by reducing the duration of heating the percentage of output of finished product was not affected. The percentage of finished product was about 37 – 38 % of initial kajjali taken. So the methods in which duration of heating were 48 h and 24 h proved equally as good as the method of 72 h of heating duration. From Table 11 shows it was observed that all the samples of H.M. prepared by textual as well as modified methods also followed the criteria of standard regarding the organoleptic parameters. So it was confirmed that all the prepared samples were of Hinguliya Manikyarasa and can be used according to textual reference. From Table 12 it is observed that the modified methods i.e. preparation of Hinguliya Manikyarasa in 48 h and in 24 h of heating are more time saving and fuel saving than H. M. prepared in 72 h of heating with providing equal amount of finished product i.e. drug.

CONCLUSION

As already discussed the samples of Hinguliya Manikyarasa prepared by modified methods also follows the criteria of Organoleptic parameters, So by these modified methods Hinguliya Manikyarasa can be prepared along with the conventional method. On the basis of the data it can be concluded that the modified methods i.e. preparation of Hinguliya Manikyarasa by 48 h of heating and by 24 h of heating are time saving, fuel saving, requires less efforts and more economical than the Hinguliya Manikyarasa prepared by 72 h of heating. Now it is important to study the therapeutic activity of these samples that whether these are equipotent or not. For this purpose further study is required.

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