

Phytochemical & Nutritional Evaluation of Hemakirana Panak - An Explorative Study

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ABSTRACT

Introduction: *Grishma ritu* has the dominance of *Vayu* and *Agni mahabhuta*, due to this, the season will have hot and dry weather. This absorbs the moistness from all living beings. During this season, human beings will experience poor strength. It is very clear that, the poor strength and health hazards in *Grishma ritu* is mainly happening because of severe dehydration, electrolytes loss, inadequate nutrition and exhaustion. The indication of Panaka, tender coconut water etc, serves as a best instant source of water and electrolytes, most of these liquids are good source of sodium, potassium and glucose, which immediately provides required energy for body.

Objective of the study is to analyse "*Hemakirana Panak*".

Material and Methods: Authentication and Quality Control analysis were performed. Percentage of moisture, ash and carbohydrate, protein and fat was determined according to the method described.

Result: *Hemakirana Panak* exhibited a yellowish colour. The pH value indicating acidic and was 4.60. Specific gravity was 1.002. Non-reducing sugars and reducing sugars were absent. Carbohydrates 14.8gm and proteins 0.12gm were present. Calcium 30.2mg, Iron 3.05mg, Potassium 16.8 mg, Sodium 30.2mg were present as micro-nutrients. Total energy value of the prepared drink is 59.9 kcal. Sensory evaluation of the *Hemakirana Panak* was assessed in healthy individuals for the evaluation of its quality and it is generally well accepted by most healthy volunteers.

Conclusion: *Hemakirana Panak* analysis supports thermo-regulation aspects by virtue of its appropriate presence of electrolytes. This analytical study indicates that electrolyte drink i.e., *Hemakirana Panak* is more effective in maintaining physiological balance, while water is most effective in alleviating subjective thirst.

Keywords: Hemakirana Panak, Beverages, Thirst, Electrolytes, Hydration

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INTRODUCTION

Ayurveda has been developed on the firm grounds of prevention of the health of the healthy and treating the diseases under *Dinacharya* (daily regimen), *Ritucharya* (the seasonal regimen), *Sadvritta* (codes and conducts of living). One among such regimen is *Ritucharya*, which plays an important role in acclimatizing the seasonal enforcement easily without altering body homeostasis. With the change in season, the difference in the environment is undeniable.

Grishma Ritu is last among *Adana kala* & the sunrays become more powerful, and the wind becomes very dry, which dries up the *Sneha Guna* of *Bhoomi* as well as *Shareera*. It dries up the *jaleeya tatva* in the body, so one should consume more *drava-yukta ahara*.⁽¹⁾ Strength of the individual reduces,⁽²⁾ develops *klama*, *daha* ⁽³⁾ and *aruchi* as the main features of climatic effects on human body. Bala of the person will be significantly less in this *Ritu*. *Sheeta*

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guna ahara sevana helps combat the extreme heat. India, being a tropical country, experiences a very strong summer season or *Grishma Ritu* from Mid-May to Mid-July in different regions of the country⁽⁴⁾. There are numerous deaths reported every year due to heat waves across the country. Various possibilities, like sunstroke in summer, can be controlled by following the *Grishma Ritucharya*. To prevent the *lakshanas* of *Grishma Ritu*, different regimens have been explained like *Paneeeya*.⁽⁵⁾ India generally receives a good strength of insolation or sunlight during the

summer season and most part of the country experiences a moderate to severe summer. During the *Grishma Ritu* the human body undergoes a large range of thermo-regulation mechanism. These characteristics have been critical to the survival and advancement of the human species. Keeping all these facts in the mind, analysis of prepared "*Hemakirana Panak*" was undertaken.

Materials & Methods:

Ingredients & Rasapanchaka of "*Hemakirana Panak*" (5,6,7,8,9)

Table.1: Rasa-panchaka of Hemakirana Panak

Drugs	Latin name	Rasa	Guna	Veerya	Vipaka	Dosha karma	Therapeutic actions
<i>Sharkara</i>	<i>Saccharum officinarum</i> . Linn	<i>Madhura</i>	<i>Sheet</i> <i>Snigdha</i> <i>Mridu</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Vata-Pitta</i> <i>shamana</i>	<i>Balya, Trishna</i> <i>Nigrahan, Tarpana</i> <i>Daha, Trishna, Kshaya,</i> <i>shosha</i>
<i>Narikela Jala</i>	<i>Cocos nucifera</i> . Linn	<i>Madhura</i>	<i>Snigdha</i> <i>Guru</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Vata-Pitta</i> <i>shamana</i>	<i>Pushti kara, Dahapras</i> <i>hman, Raktapitta hara,</i> <i>Hikka Nighrana</i>
<i>Bijapura Rasa</i>	<i>Citrus medica</i> . Linn	<i>Madhura</i>	<i>Snigdha</i> <i>Laghu</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Vata-Pitta</i> <i>shamana</i>	<i>Deepana, Pachana,</i> <i>Rochana, Hridya,</i> <i>Trishna Nigharan,</i> <i>Mutral</i>

Methodology:

1. Collection and Authentication of ingredients of "*Hemakirana Panak*":

- Raw materials required for the preparation of *Hemakirana Panaka* was procured from the GMP certified KLE Shri.B.M.Kankanawadi Ayurveda Pharmacy, Khasbhag Belagavi (*Sharkara*) and *Narikela Jala*, *Bijapura phala* from Local vendor.

Table.2 showing ingredients and proportion of Hemakirana Panak:

Ingredients	Quantity
<i>Sharkara</i>	6g
<i>Narikela Jala</i>	65ml
<i>Bijapura Rasa</i>	25ml

- The "*Hemakirana Panak*" was prepared in the FSSAI registered "*Pathyahara Unit*" of the hospital section of KLE Shri.B.M.Kankanawadi Ayurveda hospital by following standard operating procedures (SoP).

Standard Operative Procedure for the preparation of "*Hemakirana Panak*":

To prepare *Hemakirana Panaka*, the following ingredients are used:

- Sugar (*Sarkara*) – in powder form (*churna*)
- Coconut (*Narikela*) – water (*jala*)
- Citron (*Bijapura*) – juice (*rasa*)
- All three ingredients were taken in appropriate proportions.
- All ingredients were mixed thoroughly
- Obtained liquid was filtered through a clean cloth and prepared the *Hemakirana Panaka*.

Dosage: 2 *pala* (96 ml)

Images showing final developed product of *Hemakirana Panaka*.

Figure no :- 1 *Bijapura Fruit (Citrus medica. Linn)* Figure no :- 2 *Narikela Fruit (Cocos nucifera. Linn)*



Figure no :- 3 *Sharkara Churna* (*Saccharum officinarum*. Linn)



Figure no :- 4 *Hemakirana Panaka*



II. Analytical Parameters of *Hemakirana Panaka*:

Organoleptic Evaluation:

Hemakirana Panaka was evaluated for its organoleptic characteristics, including *varna* (colour), *gandha* (odour), and *ruchi* (taste), which were analysed and recorded.

Physicochemical Investigations:

Physicochemical tests were conducted on *Hemakirana Panaka* to determine total solids, specific gravity, suspended solids, ash value and pH value.

Phytochemical Investigations:

Phytochemical tests were performed to identify various functional groups, including total dissolved solids, lead, arsenic and cadmium.^(10,11)

Reagents and Chemicals:

All reagents and chemicals used in the study were of analytical grade.

Observation & Results of Analytical study:

1. Organoleptic evaluation of *Hemakirana Panaka*:

Hemakirana Panaka in liquid form was evaluated for its organoleptic characteristics, including *varna* (colour), *gandha* (odour), and *ruchi* (taste), which were analysed and recorded.

Table.no.3 showing organoleptic characteristics of *Hemakirana Panaka*

Tests	Results
Form	Liquid
Colour	Yellowish
Taste	Sweet and sour
Odour	Fragrant

2. Physicochemical Investigations of *Hemakirana Panaka*:

Physicochemical tests were conducted on *Hemakirana Panaka* to determine total solids, specific gravity and pH value.

Table.no.4 showing Physio-chemical characteristics of *Hemakirana Panaka*

Tests	Results
pH	4.60
Ash Value	0.012
Specific gravity	1.022

3. Phytochemical Investigations of *Hemakirana Panaka*:

Phytochemical tests were performed to identify various functional groups, including total dissolved solids, lead, arsenic and cadmium.

Table.no.5 showing Phytochemical characteristics of *Hemakirana Panaka*

Tests	Result
Total dissolved solids	3200
Lead	BDL
Arsenic	BDL
Cadmium	BDL

*BDL - Below Detection Limit

4. Nutritional Analysis of *Hemakirana Panaka*/100 ml:

Table.no.6 showing Nutritional Analysis of *Hemakirana Panaka*/100 ml

Sl.no	Parameter	Unit	Observed Value
1	Carbohydrates	gm	14.8
2	Fat	gm	Nil
3	Protein	gm	0.12
4	Total Energy	gm	59.9
5	Sodium	mg	30.2
6	Potassium	mg	16.8
7	Iron	mg	3.05
8	Calcium	mg	30.2

Medicinal plant matters normally carry bacteria and moulds often originating in soil in high numbers. In the present formulation, the microbial count was within permissible limits⁽¹²⁾, which indicates the proper hygiene norms followed during the preparation of formulation and packing.

Discussion:

Hemakirana Panaka is a liquid preparation intended for internal use and is described in *Kshemakutuhala*. The ash value indicates the inorganic substances present in the formulation, which was 0.012%. The presence of proteins, amino acids and carbohydrates was discovered by qualitative phytochemical analysis, indicating possible health advantages.

Food processing i.e., *ahara-samskara* significantly influences the content and quality of carbohydrates in terms of sugar added during the preparation. Carbohydrate content was 14.8gm/100gm, with sugar content identified as 6.90gm/100gm. Protein content was 0.12gm/100gm, attributed to coconut water, which contains low protein only about 0.5 gm per one cup. Fat content was totally absent. Calcium content was 30.2mg/100gm, important for maintaining the strength of the bone and connective tissue. Iron helps make red blood cells. They carry oxygen. If iron is low, body works harder to move oxygen. Then, body may

respond by keeping extra fluid, causing unexpected thirst. Good calcium levels help mouth make saliva, which cures that dry-mouth feeling. Studies on human subjects have shown that calcium (Ca) can inhibit iron (Fe) absorption⁽¹³⁾. Potassium content was 16.8mg/100gm were present in the tested formulation. Sodium content was 30.2mg/100gm, important for maintaining the electrolytes balance in the system. Sodium and potassium work together to balance water in the body. Sodium pulls water into the blood to raise volume, while potassium keeps water inside the cells. Sodium triggers brain's thirst signal, ensuring to drink enough. Together, they stop water from leaving the body too quickly. Both minerals move electrical signals that make the muscles flex. Drinks with a mix of water, sodium and potassium help the body hold on to the fluid better than plain water. Hydration depends on a delicate balance between sodium and potassium. Too much of one and too little of the other can disrupt the body's internal environment.

Total calories (energy) produced were 59.9 kcal due to the carbohydrate content which is considered the Recommended Daily Allowances (RDA) of the developed formulation. Overall, *Hemakirana Panaka* is a good source of macro, micro and mineral composition, meeting electrolyte requirements for the physiological system and aligning with prior research.

While microorganisms such as mould, bacteria and yeast proliferate in environments with high water activity. The microbiological load of prepared *Hemakirana Panaka* in liquid form fell within allowable bounds, demonstrating appropriate raw material handling and fulfilling processing parameters that produced a high level of hygienic quality proving *Hemakirana Panaka* is safe to consume.

By giving essential information on ingredients, nutritional value and size of serving, food labels provide as an educational link between consumer and food products, empowering them to make more informed and health-conscious decisions. As consumers become more conscious of sustainability, nutrition and health, food labelling becomes more crucial in encouraging responsible eating and a better-informed food business.

Nutritional values of *Hemakirana Panaka* in liquid form showed better results in micronutrient values due to preserving them in their natural states. Micronutrients such as calcium and potassium are sensitive to heat. In its liquid form, *Hemakirana Panaka* offers additional benefits such as improved palatability, ease of preparation, instant use and the presence of nutrients like carbohydrates and proteins.

Thirst is primarily induced by factors such as physiological conditions or subjective behaviours, which, in turn, trigger the desire to rehydrate⁽¹⁴⁾. Thirst is primarily regulated by the hypothalamus in the brain and the kidneys. When fluid intake is insufficient, or dehydration becomes excessive, it excites the neural nuclei of the thirst centre, triggering the sensation of thirst and stimulating subjective fluid intake behaviour. When dehydration reaches 1% to 2% of body weight, the thirst drive prompts drinking. Due to the crucial role of electrolytes in maintaining cellular function and hydration, their status can reflect the body's hydration status. Therefore, changes in electrolyte levels can serve as an important physiological indicator for assessing hydration status⁽¹⁵⁾. Electrolyte drinks have beneficial effects on electrolyte balance and physical performance, helping to moderately delay fatigue and maintain the body's electrolyte balance. Electrolyte drinks containing electrolytes not only replenish fluids but also help sustain electrolyte balance. Coconut water is a primitive tropical beverage whose demand and popularity in the market is elevating continuously. It has been characterized as a sports beverage. It has low matter content comprising mainly of sugars and minerals.

Conclusion:

The present study demonstrates that the *Hemakirana Panaka* preparation showed very favourable results in analysis. The demand for Panak preparations has increased significantly. The results from this analytical study can serve as a reference for establishing pharmacopeia standards for *Hemakirana Panaka*. *Hemakirana Panak* is a traditional Ayurvedic cooling drink originating from the ancient text *Kshemakutuhalam*. It blends coconut water, citrus juice, and candied sugar. This refreshing beverage soothes the body and restores energy, making it perfect for hot days or mild dehydration. It replaces lost fluids and

salts. The sensation of thirst plays an important role in the consumption of water or other fluids to rehydrate the body in order to keep bodily functions working properly.

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