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PERIODIC ANALYTICAL STUDY OF *PUNARNAVASTAKA KWATHA* WITH AND WITHOUT ADDED PRESERVATIVES WSR TO SHELF LIFE, ALKALOIDS, AND PHYTOCHEMICAL CONSTITUENTS

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ABSTRACT

Excellent medicine is essential for disease prevention, treatment, and health maintenance. The process through which a drug or its combination is transformed into a useful medicinal form is known as *aushadha kalpana* (medical preparation) and it includes *Panchavidha Kashaya Kalpana*. Among all these fundamental treatments, *kwatha kalpana* is frequently utilized by Ayurvedic doctors; as a result, various kwathas are produced by pharmaceutical companies for profit. Preservatives are added to increase shelf life due to *Kwatha's* are more susceptible to microbial contamination and also helps to prevent microbial degradation and change during storage. Nowadays, sodium benzoate, methyl paraben, and propyl paraben are the stabilizing agents that are most frequently used in *Kwatha Kalpana*. According to *Ayurvedic* literature, the shelf life of *Kwatha Kalpana* is *Sadhyosevana*, which is due to the degradation of alkaloids and phytochemicals over time. **Aim-** To know the scientific evidence for mentioning *Sadhyosevana* for *Kwatha Kalpana*. **Material and Methods**- 2 samples will be taken for the study. Sample 1: - *Punarnavastaka Kwatha* prepared as per classical reference. Sample 2: - *Punarnavastaka Kwatha* collected from GMP Certified Pharmacy. **Assessment-** All the samples will be analyzed by Analytical and pharmaceutical tests to see the outcomes of chemical changes and stability to the time (at 0 hours, 1 hour, 3hour & 24 hours).

Keywords: *Kwatha Kalpana*, Periodic Analysis, Shelf life, Alkaloids, Phytochemical Constitutes

INTRODUCTION: -

Ayurveda Science is based on *Trisutras* (*Hetu, Linga,* and *Aushadha*). Among these, *Ashadha* (Medicine) is the most important. *Bhaishajya Kalpana* is an *ayurvedic* branch that primarily focuses on the preparation of medicinal formulations. Superior-quality medications are attainable if the basic principles of *Bhaishajya Kalpana* are followed. The *Panchavidha kashaya kalpana* (basic five dosage forms) concept is an essential fundamental principle of drug formulation. It includes- *Swarasa, Kalka, Kwatha, Hima, Phanta*. Among all of these, *Kwatha kalpana* is more frequently used by ayurvedic doctors.**[1]**.

Kwatha is a medicinal preparation in which a coarsely powdered medicinal substance is boiled sixteen times in water until the residual part of the liquid is reduced to one-eighth of the total matter and filtered **[2]**.

Kashayas are extensively used as bhavana dravya in many drug purifications. In many cases, *Kashayas* are referred to as *anupana*. *Kwatha, Sheetha,* and *phanta kashayas* were quickly absorbed, and the start of action was found to be rapid. These *kashayas* were made from solitary drugs or a combination of drugs. As a result, *kwatha kalpana* is becoming more important in therapeutic practice **[3]**.

Synonyms: - *Srita, Kashaya, Kwatha* and *Niryuha.*

The amount of water can be four, eight, or sixteen times the amount of drug. The quantity of water used varies depending on the hardness of the drug used, such as *Mrudu, Madhyam,* or *Kathina Dravya* **[4]**.

Prakshepa Dravya is introduced for *Kwatha's* taste and therapeutic efficacy.

- If *Madhu* is to be introduced, the appropriate dosages are 1/4th for disorders of the *Kaphaja dosha*, 1/8th for *Pittaj* disorders, and 1/16th for *Vataj* disorders **[5]**.
- Depending on the *vata, pitta,* or *kapha* type of the disease, *Sita* should be added to the *Kwatha* in either a 1/4, 1/8, or 1/16th portion **[6]**.
- One *Shana* (3gm) should be added to *Jiraka, Guggulu, Kshara, Lavana, Shilajatu, Hingu,* and *Trikatu*, but not to *Kshir, Ghrita, Guda, Taila, Mutra, Kalka, Churna, Kalka,* etc. **[7]**

The term *"Saviryata Avadhi"* refers to the maximum amount of time that a product can be kept and still be deemed safe and useful. The concept of *Saviryta Avadhi* (shelf-life) of *Ayurvedic* dosage forms was included in early *Ayurvedic* classics such as *Charaka Samhita*, but descriptions appeared in the 13th century

AD in texts such as *Vangasena Samhita*, *Sharangadhara Samhita,* and *Yogaratnakara*. *Saviryta avadhi* refers to the period during which the *Virya* of the drug persists more than a certain level if it is stored in the specified condition. *Kashayas* are made in aqueous media, which reduces the product's stability. *Kwatha* is steady for up to one Prahara (3 hrs) **[8]**. The notion of Virya as explained in ancient Ayurvedic literary works is very clear, and it denotes the primary property that is solely responsible for all of the drug's therapeutic actions. The drug may lose some of its potency after that period, but it will not be entirely lost.

AIM: -

Periodic Analysis of *Punarnavastaka Kwatha* with prepared preservative and without prepared preservative.

OBJECTIVES: -

1. To Prepare *Punarnavastaka Kwatha* as per *Sharangdhar Samhita*.
2. *Punarnavastaka Kwatha* collected from GMP Certified Pharmacy.
3. To test the analytical study.

HYPOTHESIS: -

NULL HYPOTHESIS:

1. H_0: There will be no analytical changes without added preservatives with time intervals.
2. H_0: There will be no analytical changes with added preservatives at time intervals.

ALTERNATE HYPOTHESIS:

1. H_1: There will be analytical changes with time intervals.

MATERIAL AND METHODS: -

It is divided into three broad headings-

1. Conceptual Study
2. Pharmaceutical Study
3. Methodology
4. Analytical study

Conceptual Study

- Drug used in the preparation are as mentioned in the chart below **(Table 1)**:-

***Punarnavastaka Kwatha* [9]**

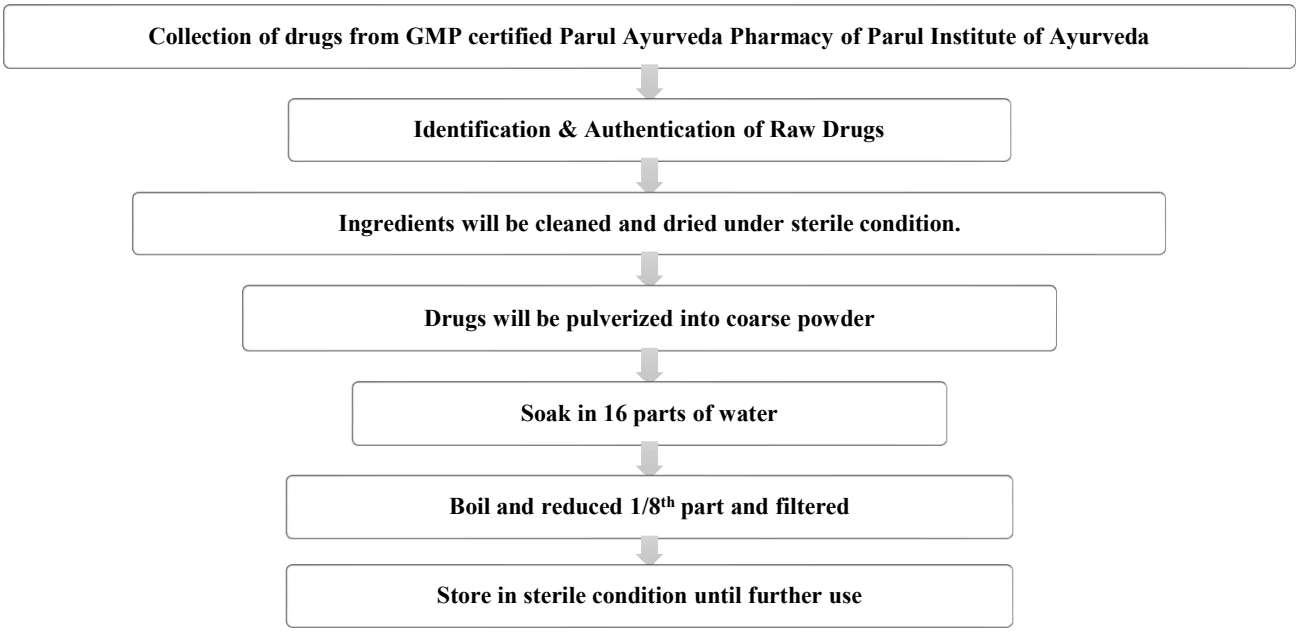
Table 1: Drug used in the preparation

S. No.	Ingredient name	Quantity	Part used	Latin name
1.	*Punarnava*	1part	(Pl.)	*Boerhavia diffusa*
2.	*Abhaya*	1part	(P.)	*Terminalia chebula*
3.	*Nimba*	1part	(St. Bk.)	*Azadirachta indica*
4.	*Devadaru*	1part	(Ht. Wd.)	*Cedrus deodara*
5.	*Katuki*	1part	(Rz.)	*Picrorhiza kurrooa*
6.	*Patola*	1part	(Lf.)	*Trichosanthes dioica*
7.	*Guduchi*	1part	(St.)	*Tinospora cordifolia*
8.	*Sunthi*	1part	(Rz.)	*Zingiber officinale*

PHARMACEUTICAL STUDY

Collection of Raw Materials - All the raw drugs will be collected from GMP certified Pharmacy of Parul Institute of Ayurveda.

Preparation of *Punarnavastaka Kwatha* [10]



Methodology

2 samples will be taken for the study

Sample 1: - *Punarnavastaka Kwatha* prepared as per classical reference.

Sample 2: - *Punarnavastaka Kwatha* collected from GMP Certified Pharmacy.

ANALYTICAL STUDY [11]: -

Organoleptic Characters

Table 2: Organoleptic Characters

Parameter	Sample 1(Initially)	Sample 2
Color	Reddish brown	Dark Brown
Consistency	Thin Liquid	Liquid
Taste	*Tikta, Kashaya*	*Tikta*
Odor	Characteristics	Characteristics

Physicochemical Characters

Sample A- Intially without added preservatives.

Sample B- After 1 hour without added preservatives.

Sample C- After 3 hours without added preservatives.

Sample D- After 24 hours without added preservatives.

Sample E- Initally with added preservatives.

Table 3: Physicochemical Characters

Parameters	Sample 1(without added)				Sample 2(with added)
	Initially (A)	At 1 hr (B)	At 3 hr (C)	At 24 hr (D)	(E)
pH	5.1	5.3	5.6	5.8	5.5
Total Solid Content	4.66%	4.69%	4.87%	5.11%	5.05%
Viscosity	2.8983	2.9001	2.9100	3.0011	4.8982
Specific Gravity	0.9758	0.9760	0.9873	0.9932	0.9713
Ash Value	0.5670%	0.5710%	0.6210%	0.8721%	0.9701%

Table 4: TLC documentation of *Punarnavaadhi kwatha*

Constitutents	Test	Sample A	Sample B	Sample C	Sample D	Sample E
Alkaloids	Hagers Test	+	+	+	+	+
Tannin	Gelatin Test	+	+	+	-	+
Phenolic	Ferric Chloride test	+	+	+	+	+
Saponin	Foam test	+	+	+	+	+
Flavonoid	Shinoda test	+	+	+	-	+

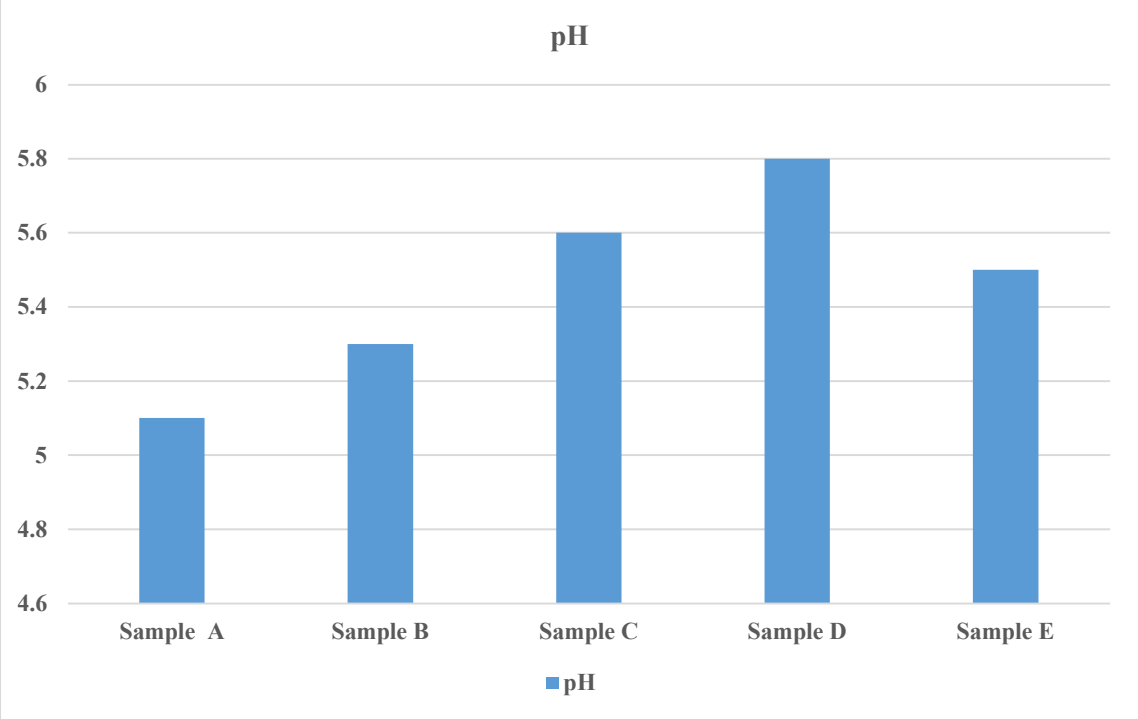


Figure 1: Physicochemical Characters (pH)

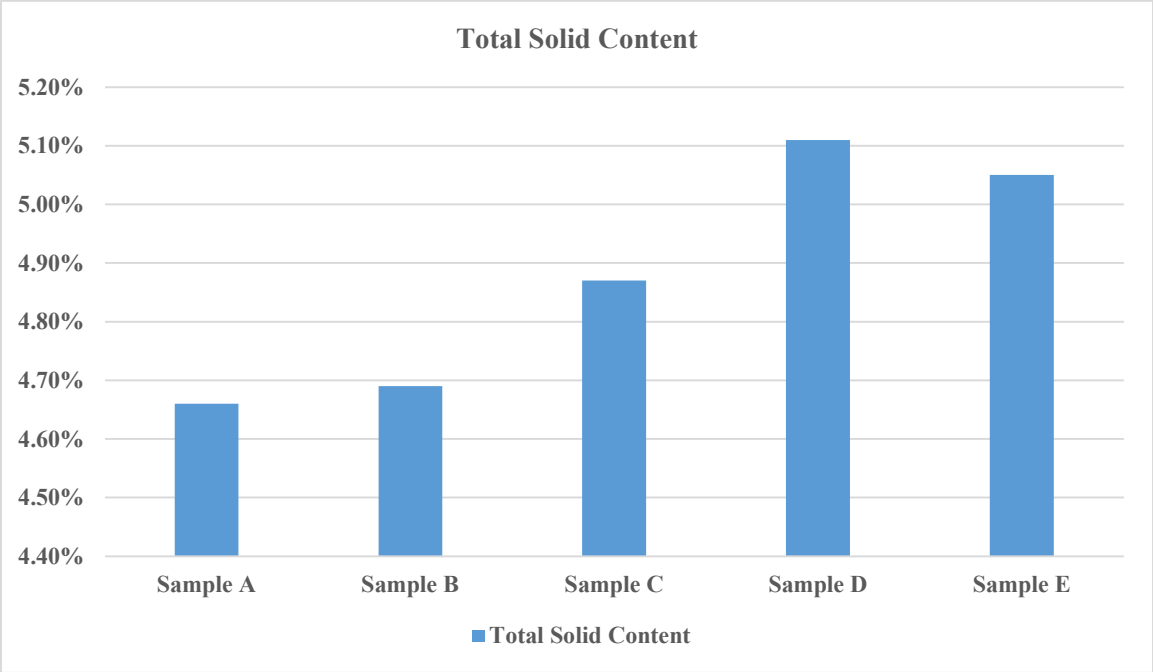


Figure 2: Physicochemical Characters (Total Solid Content)

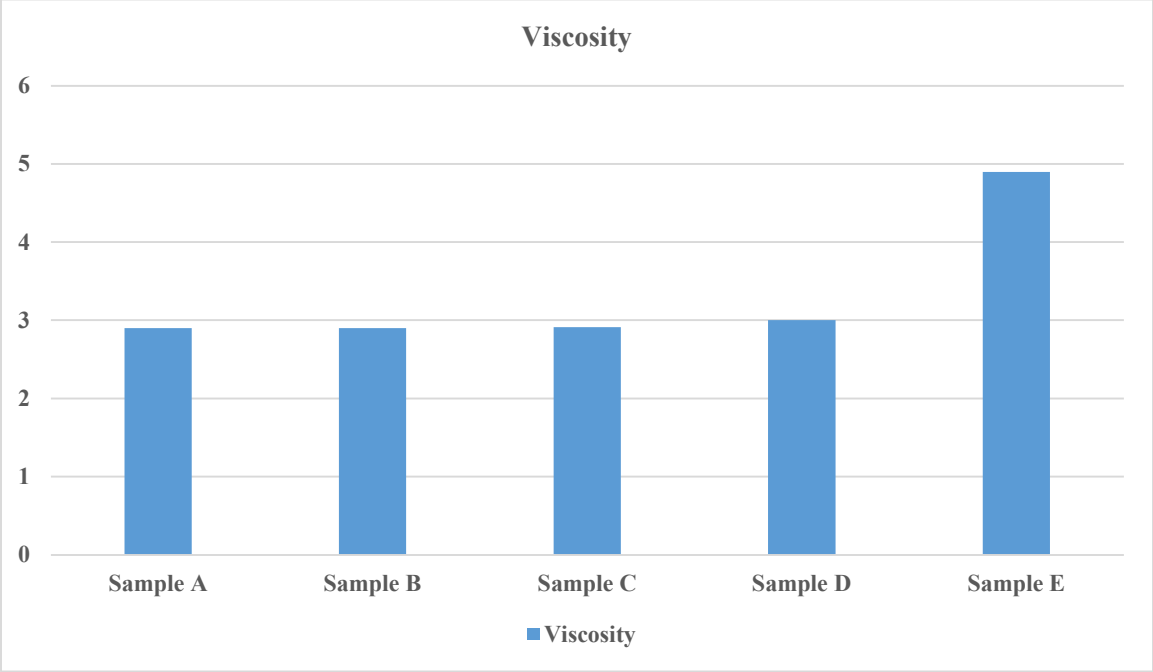


Figure 3: Physicochemical Characters (Viscosity)

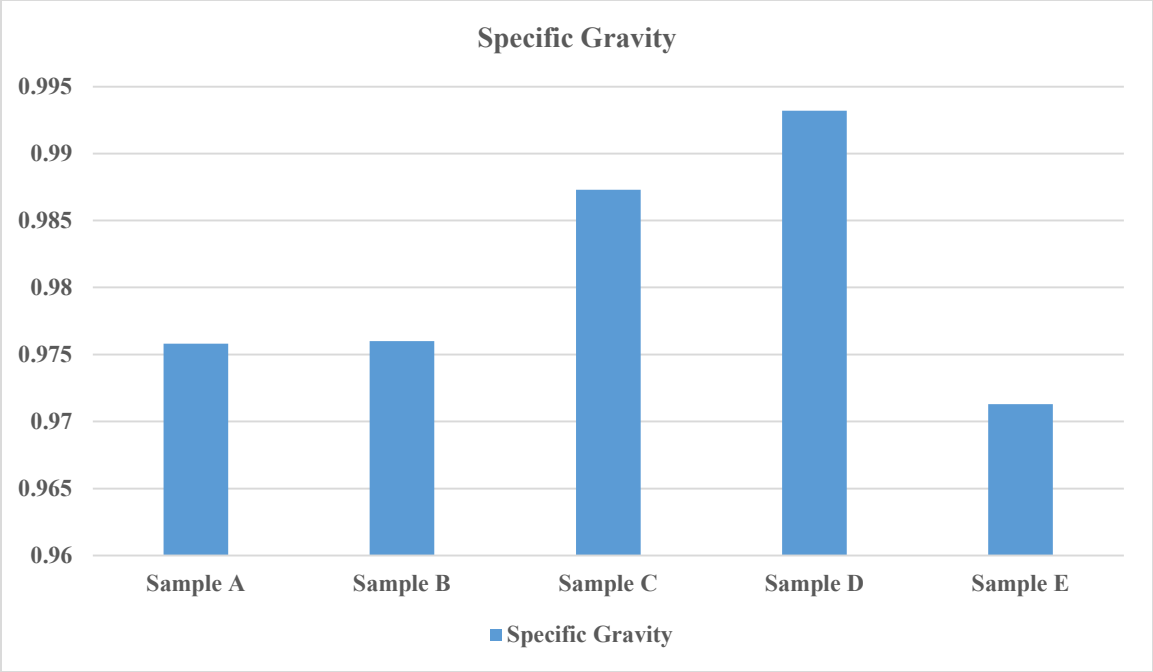


Figure 4: Physicochemical Characters (Specific Gravity)

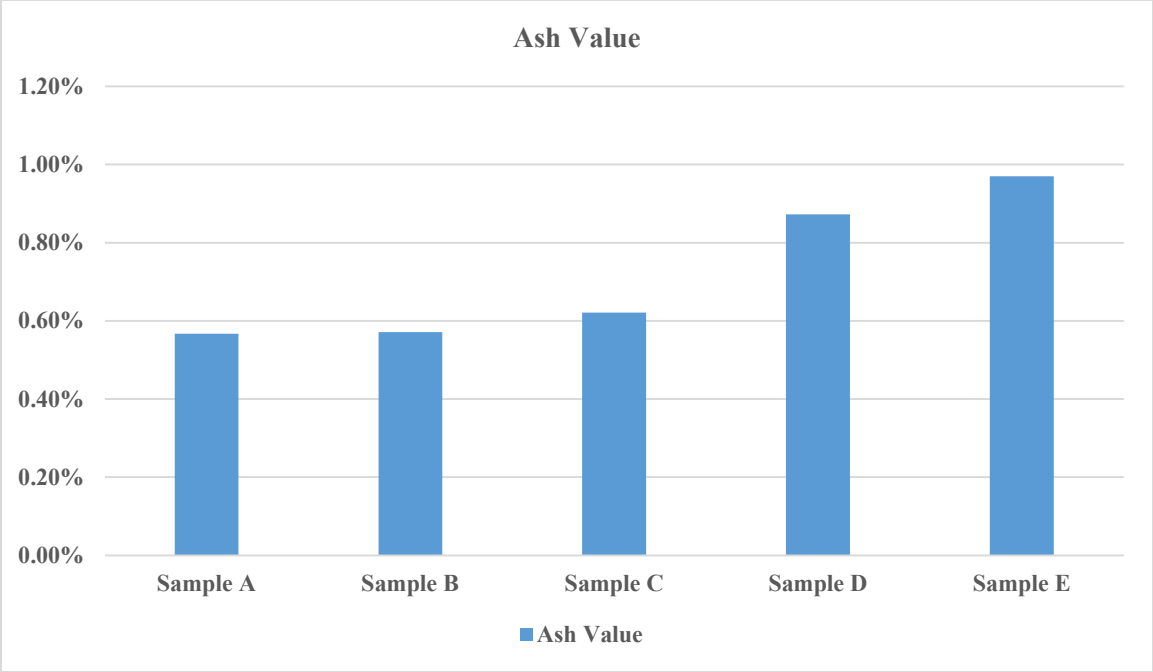


Figure 5: Physicochemical Characters (Ash Value)

DISCUSSION: -

- The term *"Saviryataavadhi"* is used in Ayurvedic literature to refer to the period during which the Virya (potency) of any drug remains unaffected by environmental or

microbial deterioration and phytochemical constituents; however, in the modern system, the term "Shelf life" is used to refer to periodic during which an API (Active Pharmaceutical Ingredient) or FPP (Finished Pharmaceutical Product) is expected to remain within the approved stability specification, provided **[12]**.

- From phanta to swarasa, the potency of *panchavidha kashaya* increases. *Kwatha, Sheetha*, and *phanta kashaya* were quickly absorbed, and the commencement of the action was speedy. These kashaya were made from a single medication or a combination of substances. As a result, *kwatha kalpana* is increasingly important in therapeutic practice.
- The majority of therapeutic preparations recorded in ancient sources are in the form of *kashaya*, which is used in daily practice. *Kashayas* are commonly employed as *bhavana dravya* in the purification of several drugs. In several cases, *Kashayas* are indicated as *anupana.*
- Nutraceuticals are now having a big impact on the pharmaceutical industry, either to stabilise products more or to eliminate chemical preservatives **[13, 14]**.
- According to the findings of this study, there were several alterations in organoleptic character as well as physicochemical assessments. Because of the inclusion of preservatives, the color of kwatha changed in organoleptic features. The scent of *kwatha* after 24 hours was nasty, and the rest of the criteria remained the same.
- There were some variations in the results of physico-chemical characters. TLC examination revealed that some phytochemical elements had been destroyed at various time intervals. Tannins and flavonoids was no longer present after 24 hours. The examination of kwatha demonstrates the significance of the *saviryataavadhi* concept in ayurvedic dose form.

CONCLUSION: -

Kashayas are made in aqueous media, which reduces the product's stability. *Kwatha* can be steady for one *Prahara* (3 hours). To get the desired efficacy, freshly produced *Kwatha* should be utilised. Following appropriate criteria, it is necessary to rebuild some more scientifically sound and fruitful methods for determining the shelf life of Ayurvedic dosage

forms. These methods should use newly created and specified packaging and storage conditions. Additionally, it is necessary to do such a study in-depthly on each and every individual formulation separately because each formulation has a unique composition and each element has a unique stability period that may ultimately have an impact on the formulation.

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