

**EVALUATION OF WHEAT VARIETY NIAW-1994 (PHULE SAMADHAN) FOR YAVADI  
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**ABSTRACT**

Yavadi Pralepa is a classical Ayurvedic topical formulation described in *Chakradutta* and traditionally indicated in Apakva Vidradhi. It consists of Yava (barley), Godhuma (wheat), and Mudga (green gram) in equal proportions.<sup>[1]</sup> Selection of an appropriate wheat variety may influence the pharmaceutical characteristics and consistency of the prepared Pralepa. The present study was undertaken to evaluate the pharmaceutical suitability of NIAW-1994 (Phule Samadhan) wheat as the Godhuma component of Yavadi Pralepa. NIAW-1994 (Phule Samadhan), a bread wheat (*Triticum aestivum* L.) variety developed through pedigree selection from the cross NIAW 34 × PBW 435, was evaluated for morphological, physical, proximate, sugar, starch, and gluten characteristics.<sup>[2][3]</sup> The wheat exhibited amber-coloured, ovate, hard grains with wide germ width, dark phenol reaction, and short brush hairs. The 1000-grain weight was 45.80 g, hectolitre weight was 74.52 kg/hl, and grain hardness index was 10.17 kg/gm. Proximate analysis showed moisture 12.14%, crude protein 11.63%, crude fat 2.45%, crude fibre 1.20%, ash 1.93%, and carbohydrates 70.65%. The total sugar content was 2.72%, while starch content was 67.93%. Wet and dry gluten contents were reported as 29.73% and 11.22%, respectively.<sup>[3][4]</sup> For preparation of Yavadi Pralepa, equal quantities of Yava, Phule Samadhan wheat, and Mudga were powdered, mixed with five times water, and cooked by the double-boiler method for five minutes. The prepared formulation demonstrated satisfactory binding, uniformity, and paste consistency. The starch and gluten characteristics of Phule Samadhan may contribute to the observed pharmaceutical properties of the Pralepa. The findings indicate that NIAW-1994 (Phule Samadhan) is a pharmaceutically suitable wheat variety for use as the Godhuma component of Yavadi Pralepa. Further physicochemical, stability, pharmacological, and clinical studies are required to establish the therapeutic efficacy of the formulation.

**KEYWORDS:** Yavadi Pralepa; Phule Samadhan; NIAW-1994; Godhuma; Ayurveda; Apakva Vidradhi; wheat evaluation; Ayurvedic formulation; pharmaceutical evaluation; starch; gluten.**INTRODUCTION**

Ayurveda describes various external dosage forms for the management of disorders affecting the skin and underlying tissues. Among these, *Pralepa* is an important topical dosage form in which medicinal substances are converted into a paste and applied externally over the affected area. The pharmaceutical properties of the ingredients, including their physical characteristics, water absorption, starch content, protein composition, and binding properties, may influence the quality of the final preparation.

Yavadi Pralepa is described in *Chakradutta* and is traditionally indicated in **Apakva Vidradhi**. It consists of three principal ingredients—**Yava (barley), Godhuma (wheat), and Mudga (green gram)**—taken in equal proportions.<sup>[1]</sup> The pharmaceutical properties of each ingredient contribute to the overall characteristics of the formulation.

Godhuma is an important cereal described in Ayurvedic literature and is widely used as a dietary and pharmaceutical substance. Modern wheat varieties exhibit variation in grain hardness, nutritional

composition, starch concentration, and gluten content.<sup>[3][4]</sup> Such differences can affect the behaviour of wheat during powdering, hydration, heating, and paste formation.

NIAW-1994, popularly known as **Phule Samadhan**, is a bread wheat variety belonging to *Triticum aestivum* L. It was developed through the pedigree selection method from the cross **NIAW 34 × PBW 435** and is registered under National ID **IC 599737**.<sup>[2]</sup> The variety possesses distinct morphological and quality characteristics and is therefore of interest for pharmaceutical evaluation.

The selection and standardization of a specific variety of an ingredient may improve reproducibility in Ayurvedic pharmaceutical preparations. However, the suitability of Phule Samadhan wheat as the Godhuma component of Yavadi Pralepa has not been adequately documented from a pharmaceutical perspective.

Therefore, the present study was undertaken to evaluate the morphological, physical, nutritional, starch, and gluten characteristics of NIAW-1994 (Phule Samadhan) and assess its suitability for preparation of Yavadi Pralepa.

## MATERIALS AND METHODS

### Aim

To evaluate the suitability of NIAW-1994 (Phule Samadhan) wheat variety for the preparation of Yavadi Pralepa.

### Objective

To evaluate the morphological, physical, proximate, sugar, starch, and gluten characteristics of NIAW-1994 (Phule Samadhan) and assess its pharmaceutical contribution to Yavadi Pralepa.

### Selection and Identification of Wheat

NIAW-1994 (Phule Samadhan) wheat was selected as the source of Godhuma for the present study. It is a bread wheat variety of *Triticum aestivum* L., developed through pedigree selection from the cross NIAW 34 × PBW 435.<sup>[2]</sup>

The selected wheat was evaluated using morphological, physical, nutritional, starch, and gluten parameters.

### Morphological Evaluation

The morphological characteristics of NIAW-1994 were documented with respect to seed colour, seed shape, grain hardness, germ width, phenol reaction, and brush hair length.<sup>[2][3]</sup>

**Table 1: Morphological Characteristics of NIAW-1994.**

| Parameter      | Observation |
|----------------|-------------|
| Seed colour    | Amber       |
| Seed shape     | Ovate       |
| Grain hardness | Hard        |

|                   |       |
|-------------------|-------|
| Germ width        | Wide  |
| Phenol reaction   | Dark  |
| Brush hair length | Short |

### Physical Evaluation

The physical characteristics were assessed in terms of 1000-grain weight, hectolitre weight, yellow berry incidence, and grain hardness index.<sup>[2][3]</sup>

**Table 2: Physical Characteristics of NIAW-1994.**

| Parameter              | Value       |
|------------------------|-------------|
| 1000-grain weight      | 45.80 g     |
| Hectolitre weight      | 74.52 kg/hl |
| Yellow berry incidence | 4.00%       |
| Grain hardness index   | 10.17 kg/gm |

### Proximate Composition

The wheat was evaluated for moisture, crude protein, crude fat, crude fibre, ash, and carbohydrate content.<sup>[3][4]</sup>

**Table 3: Proximate Composition of NIAW-1994.**

| Parameter     | Content (%) |
|---------------|-------------|
| Moisture      | 12.14       |
| Crude protein | 11.63       |
| Crude fat     | 2.45        |
| Crude fibre   | 1.20        |
| Ash           | 1.93        |
| Carbohydrates | 70.65       |

### Sugar Profile

The sugar profile was evaluated in terms of reducing, non-reducing, and total sugars.<sup>[3][4]</sup>

**Table 4: Sugar Profile of NIAW-1994.**

| Parameter          | Content (%) |
|--------------------|-------------|
| Reducing sugar     | 1.07        |
| Non-reducing sugar | 1.65        |
| Total sugar        | 2.72        |

### Starch Content

The starch content of NIAW-1994 wheat was recorded as **67.93%**.<sup>[3][4]</sup>

### Gluten Content

The wet gluten content of Phule Samadhan wheat was **29.73%**, whereas the dry gluten content was **11.22%**.<sup>[3][4]</sup>

### Preparation of Yavadi Pralepa

Yava, Godhuma (NIAW-1994/Phule Samadhan), and Mudga were taken in equal proportions.<sup>[1]</sup> Each ingredient was powdered separately and subsequently mixed uniformly.

Five times the quantity of water was added to the powdered mixture. The mixture was cooked using the **double-boiler method for five minutes** under controlled heating. The preparation was continuously observed until

a suitable thin and uniform paste consistency was obtained.

The prepared paste was evaluated for its pharmaceutical characteristics, including uniformity, binding, consistency, and stability.

## RESULTS AND DISCUSSION

### Results

NIAW-1994 (Phule Samadhan) exhibited characteristic morphological features, including amber-coloured, ovate, hard grains, wide germ width, dark phenol reaction, and short brush hairs.<sup>[2][3]</sup>

The physical evaluation revealed a 1000-grain weight of 45.80 g and hectolitre weight of 74.52 kg/hl. Yellow berry incidence was 4.00%, while the grain hardness index was 10.17 kg/gm.<sup>[2][3]</sup>

The proximate analysis demonstrated moisture content of 12.14%, crude protein 11.63%, crude fat 2.45%, crude fibre 1.20%, ash 1.93%, and carbohydrate content 70.65%.<sup>[3][4]</sup>

The reducing sugar content was 1.07%, non-reducing sugar content was 1.65%, and total sugar content was 2.72%. The starch content was 67.93%.<sup>[3][4]</sup>

The wet gluten content was 29.73%, and dry gluten content was 11.22%.<sup>[3][4]</sup>

During the pharmaceutical preparation, equal quantities of Yava, Phule Samadhan wheat, and Mudga were successfully converted into a paste using five times water and five minutes of controlled heating by the double-boiler method. The resulting Yavadi Pralepa demonstrated satisfactory uniformity, binding, and consistency.

### DISCUSSION

The pharmaceutical suitability of an ingredient depends not only on its identity but also on its physical and physicochemical characteristics. In the present study, NIAW-1994 (Phule Samadhan) was evaluated to determine whether its characteristics were appropriate for use as the Godhuma component of Yavadi Pralepa.

The variety showed hard grains with a grain hardness index of 10.17 kg/gm. Grain hardness is an important physical characteristic of wheat and may influence milling behaviour and particle formation.<sup>[2][3]</sup> The observed characteristics indicate good physical quality of the selected wheat.

The proximate composition demonstrated a carbohydrate content of 70.65%. The starch content was 67.93%, indicating that starch constituted a major component of the wheat.<sup>[3][4]</sup> Starch has considerable pharmaceutical relevance in paste preparations because hydration followed by heating can result in swelling and

gelatinization of starch granules. This may contribute to increased viscosity and improved consistency of the preparation.

The protein content of Phule Samadhan was 11.63%.<sup>[3][4]</sup> Wheat proteins include gluten-forming proteins, principally gliadin and glutenin. Gliadin is associated with viscosity and extensibility, whereas glutenin contributes to elasticity and structural strength. The interaction of these proteins with starch and water influences the rheological properties of hydrated wheat preparations.<sup>[3][4]</sup>

The wet and dry gluten contents of Phule Samadhan were 29.73% and 11.22%, respectively.<sup>[3][4]</sup> The relatively substantial gluten content may contribute to cohesion and binding after hydration. In the present formulation, this characteristic may have assisted in producing a uniform and cohesive Pralepa.

However, it is important to distinguish pharmaceutical properties from therapeutic effects. The protein and gluten content observed in the present study may explain physical properties such as binding and consistency, but these findings alone cannot establish wound-healing, regenerative, anti-inflammatory, or other therapeutic effects.

The preparation of Yavadi Pralepa involved equal proportions of Yava, Godhuma, and Mudga with five times water and controlled heating using the double-boiler method. This procedure resulted in a thin and uniform paste. Controlled heating may facilitate hydration and gelatinization of starch while promoting uniformity of the preparation.

The present study also highlights the importance of varietal selection in Ayurvedic pharmaceutical standardization. Although classical literature specifies Godhuma as an ingredient, different modern wheat cultivars can exhibit variation in grain characteristics, starch content, protein composition, and gluten properties.<sup>[2][3][4]</sup> Recording the specific wheat variety can therefore improve reproducibility and standardization of the pharmaceutical preparation.

Overall, the findings indicate that NIAW-1994 (Phule Samadhan) possesses favourable characteristics for use as the Godhuma component of Yavadi Pralepa. Nevertheless, the present study primarily establishes **pharmaceutical suitability** and does not independently demonstrate clinical efficacy of Yavadi Pralepa in Apakva Vidradhi.

### CONCLUSION

NIAW-1994 (Phule Samadhan) demonstrated favourable morphological, physical, nutritional, starch, and gluten characteristics for use as the Godhuma component of Yavadi Pralepa.

The wheat variety showed 67.93% starch, 11.63% protein, 29.73% wet gluten, and 11.22% dry gluten. These characteristics, particularly its starch and gluten content, may contribute to hydration, binding, and paste consistency during preparation.

The Yavadi Pralepa prepared using equal proportions of Yava, Phule Samadhan wheat, and Mudga with five times water and controlled heating showed satisfactory pharmaceutical characteristics, particularly uniformity and consistency.

Thus, **NIAW-1994 (Phule Samadhan) can be considered a pharmaceutically suitable wheat variety for preparation of Yavadi Pralepa.** Further physicochemical, stability, microbiological, pharmacological, and clinical studies are recommended to establish the complete pharmaceutical and therapeutic profile of the formulation.

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