



## A CLINICAL STUDY ON THE EFFICACY OF WHEAT GRASS JUICE IN PRAMEHA

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## ABSTRACT

It is a clinical study conducted on patients of Prameha (Madumeha) nearest resembling condition with diabetes mellitus, a rich man's disease. Present study was planned with an aim and objectives. To evaluate the hypoglycemic effect of Wheat grass juice, the role of Nisha-Amalaki in the management of Madhumeha and to compare the effects of both of above modalities to ascertain which is better. Materials and methods of the study were planned on 3 groups. 1<sup>st</sup> group was administered with Wheat grass juice, 2<sup>nd</sup> group with Nisha amalaki and 3<sup>rd</sup> group is combined modality. Result & Discussion of the study revealed that Wheat grass juice showed good result in relieving the subjective criteria's viz. Kshudhahikyata, Daurbalya and Pipasadhikyata and objective criteria's FBS when compared to Nisha Amalaki group after 1 month, where as Nisha Amalaki group showed good improvement in these after two month accept in criteria's like Pipasadhikyata and Kshudhahikyata. But the Combined group showed much significant improvement in the relieving of the symptoms (Subjective and objective) in both the months.

**Key words:** Prameha, Nisha Amalaki, Wheat Grass Juice.

## INTRODUCTION

Diabetes mellitus has emerged as an important public health problem globally. It has become an endemic disease affecting people irrespective of their age, sex, socio-economic status. It is a metabolic disorder characterized by hyperglycemia with cardinal features of Polyuria, Polydipsia and Polyphagia. In India at present approximately about 32 million people are suffering from diabetes and the future affliction is projected to 80 million by the year 2030<sup>1,2,3</sup>. In Ayurveda, Diabetes Mellitus is known to be a 'Rich man's disease' which can be understood by etiological factors of Prameha<sup>4</sup> mentioned as enjoying the pleasures of life with reduced or no physical activity and sedentary life. Madhumeha is type of Vataja Prameha<sup>5</sup> & it is the nearest resembling condition with Diabetes Mellitus. Few researches are done and analyzed the efficacy of various Dravya's mentioned in Ayurvedic classics in Madhumeha. Here an attempt is made to analyze the effect of Dravya "Godhuma Patra Svarasa/ Wheat grass juice" which is used by many traditional practitioners. As though there is no direct reference of use of Godhuma Patra Svarasa but Godhuma has been told as Pathya<sup>6</sup> in Prameha keeping this in mind, use of Wheat grass juice<sup>7</sup> can be traced out and to confirm its efficacy in the management of Madhumeha or Diabetes Mellitus this study is carried out. The efficacy of the Wheat grass juice is compared with the Nisha Amalaki<sup>8</sup> drug which is already proved.

## Aims And Objectives

1. To evaluate the hypoglycemic effect of Wheat grass juice in Prameha
2. To evaluate the role of Nisha-Amalaki in the management of Madhumeha
3. Compare the effect of both modalities and to ascertain which is better.

## MATERIALS AND METHODS

## Selection Of Patients

Patients attending the OPD and IPD of S.D.M. college of Ayurveda and Hospital, Hassan were selected irrespective of age, sex, religion, occupation, marital status etc. and were

randomly divided in three groups considering the inclusion criteria for the study.

## Inclusion Criteria

Mild to moderate cases of diabetes mellitus having fasting blood sugar within range of 121 mg/dl to 220 mg/dl and post prandial blood sugar within range of 181 mg/dl to 280 mg/dl were selected.

Patients above the age group of 25 years and below 70 years of age were selected

Patients within 5 years of diagnosis for diabetes mellitus were selected for the study.

## Exclusion Criteria

Severe form i.e. patients having fasting blood sugar above 221 mg/dl and post prandial blood sugar above 281 were excluded.

Patients with uncontrolled blood sugars were excluded.

Patients with other systemic disorders and complications of diabetes mellitus were excluded from the study.

## Diagnostic Criteria

Diagnosed cases of diabetes mellitus within 5 years of detection were selected for the study. Mild to moderate diabetic cases were selected based on the following standard reference chart for classification along with the clinical signs and symptoms mentioned in the classics.

**FBS** 70 to 120 mg/dl normal  
121 to 170 mg/dl mild  
171 to 220 mg/dl moderate  
221 and above severe

**PPBS** 120 to 180 mg/dl normal  
181 to 230 mg/dl mild  
231 to 280 mg/dl moderate  
281 and above severe

As per classification of S.N Khosle at al. Nagarjuna

## Research Design

The selected patients will be randomly divided in to the three groups. Each group consisting of 10 Patients

**Group A:** Swarasa matra is 1 Pala (50ml) as per the classics. In the present study the dosage of Wheat grass juice is also decided principally based on the above.

10 Patients were administered wheat grass juice in the dosage of 1 Pala (50ml) twice a day before food.

**Group B:** 10 patients were administered with Nisha Amalaki two tablets 500mg twice a day before food.

**Group C:** 10 Patients were administered Wheat grass juice 1 Pala (50ml) with Nisha-Amalaki, 2 tablets 500 mg twice a day before food.

Diet and exercise will be similar for both groups

**Duration of Treatment:** Two months.

## ASSESSMENT CRITERIA (Table 1)

### RESULTS

#### Effects of the Therapies on the Patients of Madhumeha Group A (Wheat Grass juice)

**Effect of Wheat Grass Juice on the Patients of Madhumeha (NIDDM):** As mentioned above 10 patients were treated with wheat grass juice administered in the dose of 50 ml twice a day before food for two months.

Table 1

| SL.No | Subjective Parameter                                                         | Assessment                                                |
|-------|------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1     | Assessment of <b>Kshuddhaadhikyata</b> <sup>9,10</sup><br>(excessive hunger) | Grade 0- Normal timely manifestation /can control hunger  |
|       |                                                                              | Grade 1- Slightly increased/Can control hunger up to 1 hr |
|       |                                                                              | Grade 2- Excessive hunger / cannot withstand              |
|       |                                                                              | Grade 3- Feels hungry even after consuming food           |
| 2     | Assessment of <b>Pippasadhikyata</b> <sup>9,10</sup><br>(excessive thirst)   | Grade 0 Normal thirst up to 1.5 liters per day            |
|       |                                                                              | Grade 1- Feels thirsty up to 2 liters per day             |
|       |                                                                              | Grade 2- Feels very thirsty 3 liters per day              |
|       |                                                                              | Grade 3- Always thirsty more than 3 liters per day        |
| 3     | Assessment of <b>Prabhuta mutrata</b> <sup>9,10</sup><br>(Poly uria)         | Grade 0 Frequency of Micturation at night 0-1             |
|       |                                                                              | Grade 1- Frequency of Micturation at night 2-3            |
|       |                                                                              | Grade 2- Frequency of Micturation at night 4-5            |
|       |                                                                              | Grade 3- Frequency of Micturation at night more than 5    |
| 4     | Assessment of <b>Daurbalya</b> <sup>9,10</sup>                               | Grade 0 No weakness                                       |
|       |                                                                              | Grade 1- Feels tiredness after strenuous work             |
|       |                                                                              | Grade 2- Feels frequent tiredness even after mild work    |
|       |                                                                              | Grade 3- Always associated with tiredness                 |

Table 2 - Effect of Wheat grass juice group in 1<sup>st</sup> month

| Signs & Symptoms | Mean BT | Mean AT | MD   | % Change of | SD (±) | SE (±) | t*   | p      |
|------------------|---------|---------|------|-------------|--------|--------|------|--------|
| Prabhuta mutrata | 3.8     | 2.5     | 1.3  | 34.21       | 0.67   | 0.21   | 6.19 | <0.001 |
| Pipasadhikyata   | 3.2     | 1.9     | 1.3  | 40.7        | 0.82   | 0.26   | 5    | <0.001 |
| Kshudhadhikyata  | 1.8     | 1.2     | 0.6  | 33.4        | 0.68   | 0.22   | 5.45 | <0.001 |
| Karapada Daha    | 3.4     | 2.3     | 1.1  | 32.4        | 0.73   | 0.23   | 4.7  | <0.001 |
| Daurbalya        | 1.6     | 0.7     | 0.9  | 56.25       | 0.98   | 0.32   | 2.81 | <0.02  |
| F.B.S            | 162.7   | 149.6   | 13.1 | 7.06        | 8.25   | 2.66   | 4.32 | <0.001 |
| P.P.B.S          | 212.5   | 190.5   | 22.1 | 10.45       | 8.60   | 2.77   | 7.9  | <0.001 |

Table 3 -Effect of Wheat grass juice group in 2<sup>nd</sup> month

| Signs & Symptoms | Mean BT | Mean AT | MD   | % Change of | SD (±) | SE (±) | t*    | p      |
|------------------|---------|---------|------|-------------|--------|--------|-------|--------|
| Prabhuta mutrata | 3.8     | 1.2     | 2.6  | 68.48       | 0.51   | 0.16   | 16.25 | <0.001 |
| Pipasadhikyata   | 3.2     | 1.7     | 1.5  | 46.8        | 0.87   | 0.28   | 7.5   | <0.001 |
| Kshudhadhikyata  | 1.8     | 0.7     | 1.3  | 72.3        | 0.70   | 0.22   | 5.90  | <0.001 |
| Karapada Daha    | 3.4     | 1.5     | 1.9  | 55.9        | 1.05   | 0.34   | 7.05  | <0.001 |
| Daurbalya        | 1.6     | 0.6     | 1.0  | 62.5        | 1.05   | 0.34   | 2.99  | <0.01  |
| F.B.S            | 162.7   | 146.6   | 16.2 | 9.95        | 8.39   | 2.70   | 6     | <0.001 |
| P.P.B.S          | 212.6   | 187.3   | 25.3 | 11.90       | 11.73  | 3.78   | 6.69  | <0.001 |

#### Group B Nisha Amalaki

**Effect of Nisha-Amalaki tablets on the Patients of Madhumeha (NIDDM):** As mentioned above 10 patients were treated with Nisha-Amalaki tablets administered in the dose of 2 tablets twice a day for two months. The effects of this therapy on the various parameters were as follow:

Table 4 - Effect of Nisha Amalaki group in 1<sup>st</sup> month

| Signs & Symptoms | Mean BT | Mean AT | MD   | % Change of | SD (±) | SE (±) | t    | P      |
|------------------|---------|---------|------|-------------|--------|--------|------|--------|
| Prabhuta mutrata | 3.9     | 2.3     | 1.6  | 41.02       | 0.51   | 0.166  | 9.6  | <0.001 |
| Pipasadhikyata   | 2.1     | 1.3     | 0.8  | 38.09       | 0.78   | 0.25   | 3.2  | <0.01  |
| Kshudhadhikyata  | 1.7     | 1.2     | 0.7  | 41.17       | 0.67   | 0.21   | 3.33 | <0.001 |
| Karapada Daha    | 3.3     | 2.1     | 1.2  | 36.36       | 0.78   | 0.25   | 4.8  | <0.001 |
| Daurbalya        | 1.0     | 0.5     | 0.5  | 50.50       | 0.52   | 0.17   | 2.94 | <0.01  |
| F.B.S            | 177.0   | 168.2   | 15.4 | 8.70        | 4.90   | 1.58   | 9.74 | <0.001 |
| P.P.B.S          | 220.8   | 199.3   | 21.5 | 9.73        | 13.59  | 4.38   | 4.90 | <0.001 |

Table 5 - Effect of Nisha Amalaki group in 2<sup>nd</sup> month

| Signs & Symptoms | Mean BT | Mean AT | MD   | % Change of | SD (±) | SE (±) | t     | P      |
|------------------|---------|---------|------|-------------|--------|--------|-------|--------|
| Prabhuta mutrata | 3.9     | 1.8     | 2.1  | 53.84       | 0.56   | 0.18   | 11.66 | <0.001 |
| Pipasadhikyata   | 2.1     | 0.8     | 1.3  | 61.90       | 0.99   | 0.32   | 4.06  | <0.001 |
| Kshudhadhikyata  | 1.7     | 0.7     | 1.0  | 42.85       | 0.47   | 0.15   | 6.66  | <0.001 |
| Karapada Daha    | 3.3     | 1.3     | 2.0  | 60.60       | 0.83   | 0.28   | 7.1   | <0.001 |
| Daurbalya        | 1.0     | 0.2     | 0.8  | 80          | 0.42   | 0.13   | 6.15  | <0.001 |
| F.B.S            | 177.0   | 154.7   | 27.9 | 15.76       | 12.93  | 4.17   | 6.69  | <0.001 |
| P.P.B.S          | 220.8   | 191.3   | 29.5 | 13.36       | 17.21  | 5.55   | 5.31  | <0.001 |

**GROUP C (COMBINED)****Effect of Combined treatment (Wheat grass juice and Nisha-Amalaki tablets) on the Patients of Madhumeha (NIDDM):**

As mentioned above 10 patients were treated with Wheat grass juice in the dose of 50 ml and Nisha-Amalaki tablets two tablets twice a day for two months.

**Table 6 - Effect of Combined group in 1<sup>st</sup> month**

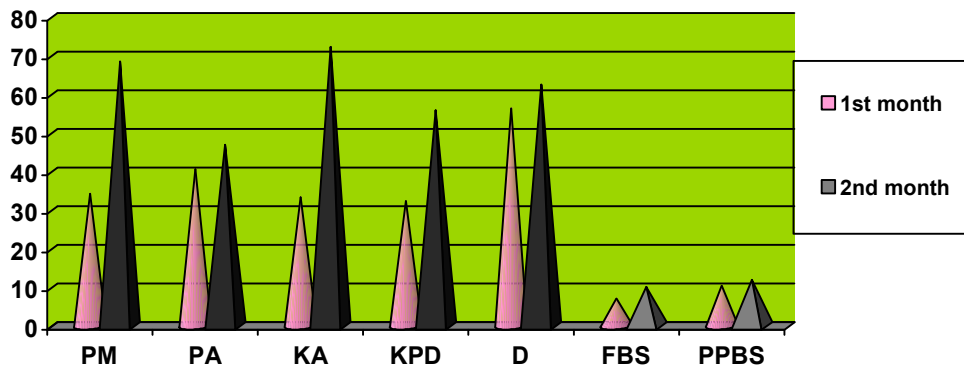
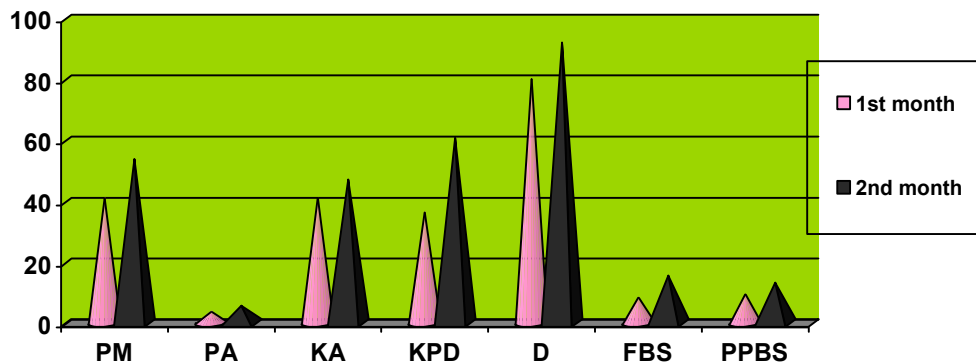
| Signs & Symptoms | Mean BT | Mean AT | MD   | % of Change | SD (±) | SE (±) | t    | P      |
|------------------|---------|---------|------|-------------|--------|--------|------|--------|
| Prabhuta mutrata | 3.8     | 1.7     | 2.1  | 55.6        | 0.73   | 0.23   | 9.13 | <0.001 |
| Pipasadhikyata   | 2.7     | 1.0     | 1.7  | 62.96       | 0.88   | 0.28   | 6.07 | <0.001 |
| Kshudhadhikyata  | 1.3     | 0.6     | 0.7  | 53.84       | 1.14   | 0.37   | 2.97 | <0.01  |
| Karapada Daha    | 2.5     | 1.1     | 1.6  | 64          | 0.95   | 0.30   | 5.3  | <0.001 |
| Daurbalya        | 2.5     | 0.2     | 2.3  | 92          | 0.94   | 0.30   | 7.6  | <0.001 |
| F.B.S            | 178.2   | 152.5   | 25.7 | 14.42       | 13.58  | 4.38   | 5.56 | <0.001 |
| P.P.B.S          | 254.1   | 215.3   | 38.3 | 15.26       | 21.32  | 6.88   | 5.63 | <0.001 |

**Table 7 - Effect of Combined group in 2<sup>nd</sup> month**

| Signs & Symptoms | Mean BT | Mean AT | MD   | % of Change | SD (±) | SE (±) | t     | P      |
|------------------|---------|---------|------|-------------|--------|--------|-------|--------|
| Prabhuta mutrata | 3.8     | 0.7     | 3.1  | 81.57       | 0.87   | 0.28   | 11.07 | <0.001 |
| Pipasadhikyata   | 2.7     | 1.0     | 1.7  | 62.9        | 0.88   | 0.28   | 6.07  | <0.001 |
| Kshudhadhikyata  | 1.3     | 0.2     | 1.1  | 84.61       | 0.99   | 0.32   | 2.19  | <0.05  |
| Karapada Daha    | 2.5     | 0.8     | 1.7  | 68          | 1.18   | 0.38   | 4.47  | <0.001 |
| Daurbalya        | 2.5     | 0.1     | 2.2  | 96          | 0.96   | 0.31   | 7.74  | <0.001 |
| F.B.S            | 178.2   | 143.8   | 34.4 | 19.36       | 20.50  | 6.61   | 5.20  | <0.001 |
| P.P.B.S          | 254.1   | 193.4   | 50.7 | 19.95       | 33.19  | 10.70  | 4.73  | <0.001 |

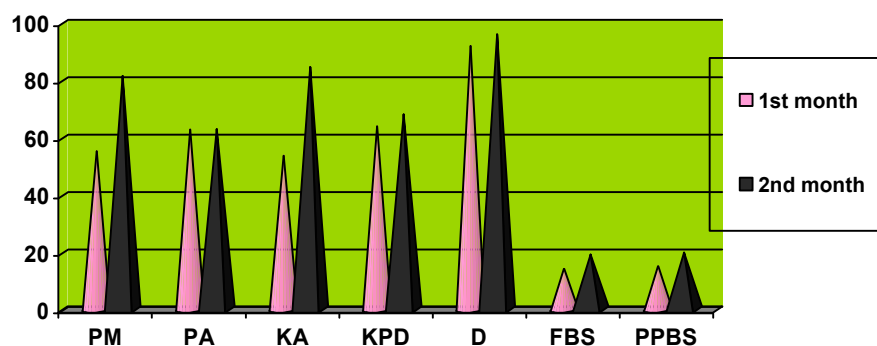
**Table 8 - Effect of the over all treatment**

| Parameters       | GA                    |                       | GB                    |                       | GC                    |                       |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                  | 1 <sup>st</sup> month | 2 <sup>nd</sup> month | 1 <sup>st</sup> month | 2 <sup>nd</sup> month | 1 <sup>st</sup> month | 2 <sup>nd</sup> month |
| Prabhuta mutrata | 34.3 %                | 68.5 %                | 41.1 %                | 53.9 %                | 55.3 %                | 81.6 %                |
| Pipasadhikyata   | 40.7 %                | 46.7 %                | 04 %                  | 06 %                  | 62.96 %               | 62.96 %               |
| Kshudhadhikyata  | 33.4 %                | 72.3 %                | 41.2 %                | 47.1 %                | 53.9 %                | 84.7 %                |
| Karapada Daha    | 32.4 %                | 55.9 %                | 36.4 %                | 60.7 %                | 64 %                  | 68 %                  |
| Daurbalya        | 56.3 %                | 62.5 %                | 50.6 %                | 80 %                  | 92 %                  | 96 %                  |
| FBS              | 7.1 %                 | 9.9 %                 | 08.6 %                | 15.7 %                | 14.4 %                | 19.3 %                |
| PPBS             | 10.4 %                | 11.9 %                | 09.8 %                | 13.4 %                | 15.3 %                | 19.9 %                |

**Graph 1 - Percentage of improvement in Wheat grass juice group****Graph 2 - Percentage of improvement in Nisha-Amalaki group**

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Graph 3 - Percentage of improvement in combined group



#### Statistical values of ANOVA test for variations after 1<sup>st</sup> month

##### On Prabhuta Mutrata

F value of variation of treatment at degree of freedom (2, 29) is 2.786, is less than the table value at 0.05, it shows that treatment is not having significant difference between the groups on the Lakshana Prabhuta Mutrata after first month.

##### On Pipasadhikyata

F value of variation of treatment at degree of freedom (2, 29) is 2.878, is less than the table value at 0.05, it shows that treatment is not having significant difference between the groups on the Lakshana of Pipasadhikyata after first month.

##### On Kshuahadhikyata

F value of variation of treatment at degree of freedom (2, 29) is 3.115, is less than the table value at 0.05, it shows that treatment is not having significant difference between the groups on the Lakshana of Kshudhadhikyata after first month.

##### On Karapada Daha

F value of variation of treatment at degree of freedom (2, 29) is 4.195, is less than the table value at 0.05, it shows that treatment is not having significant difference between the groups on the Lakshana of Karapada Daha after first month.

##### On Daurbalya

F value of variation of treatment at degree of freedom (2, 29) is 2.786, is less than the table value at 0.05, it shows that treatment is not having significant difference between the groups on the Lakshana of Daurbalya after first month.

##### On FBS

F value of variation of treatment at degree of freedom (2, 29) is 2.048 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana of FBS after first month.

##### On PPBS

F value of variation of treatment at degree of freedom (2, 29) is 3.582 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana of PPBS after first month.

#### Statistical values of ANOVA test for variations after 2<sup>nd</sup> month

##### On Prabhuta Mutrata

F value of variation of treatment at degree of freedom (2, 29) is 8.273 more than the table value at 0.05; it shows that treatment is having significant difference between the groups on the e Lakshana Prabhuta Mutrata after second month.

##### On Pipasadhikyata

F value of variation of treatment at degree of freedom (2, 29) is 0.197 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana Pipasadhikyata after second month.

##### On Kshudhadhikyata

F value of variation of treatment at degree of freedom (2, 29) is 3.135 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana Kshudhadhikyata after second month.

##### On Karapada Daha

F value of variation of treatment at degree of freedom (2, 29) is 1.000 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana Karapada Daha after second month.

##### On Daurbalya

F value of variation of treatment at degree of freedom (2, 29) is 1.000 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana Daurbalya after second month.

##### On FBS

F value of variation of treatment at degree of freedom (2, 29) is 0.828 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana FBS after second month.

##### On PPBS

F value of variation of treatment at degree of freedom (2, 29) is 0.321 less than the table value at 0.05; it shows that treatment is not having significant difference between the groups on the Lakshana PPBS after second month.

#### DISCUSSION

##### Effect of therapy

##### On Prabhuta mutrata -

After one month of the treatment Wheat grass juice showed **34.2%** improvement in Polyuria, while Nisha Amalaki tablet showed **41.1 %** improvement and combined group showed **55.3 %** improvement.

On the basis of the above results the effect of combine therapy was best amongst the three groups, while Nisha Amalaki stands second in order.

After second month of treatment Wheat grass juice showed **68.5 %** improvement while Nisha Amalaki tablet showed **53.9 %** improvement and combined group showed **81.6 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Wheat grass juice stands second in order.

##### On Pipasadhikyata -

After one month of the treatment Wheat grass juice showed **40.3 %** improvements in Polydypsia (Pippasa adhikata), while Nisha Amalaki tablet showed **04 %** improvement and combined group showed **62.9 %** improvement.

On the basis of the above results the effect of combine therapy was best amongst the three groups, while Wheat grass juice stands second in order.

After second month of treatment Wheat grass juice showed **46.8 %** improvement while Nisha Amalaki tablet showed **06 %** improvement and combined group showed **62.9 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Wheat grass juice stands second in order

#### **On Kshudhadhikyata –**

After one month of the treatment Wheat grass juice showed **33.4 %** improvements in Kshudhadhikyata (increased appetite), while Nisha Amalaki tablet showed **41.2 %** improvement and combined group showed **53.9 %** improvement.

On the basis of the above results the effect of combine therapy stands was best amongst the three groups, while Wheat grass juice second in order.

After second month of treatment Wheat grass juice showed **72.3 %** improvement while Nisha Amalaki tablet showed **47.1 % improvement** and combined group showed **84.7 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Wheat grass juice stands second in order.

**Phenylalanine** in Wheat Grass juice is amino acids, it is essential in human Nutrition. It is used in elevating the mood as it is closely involved with the nervous system and it acts as appetite suppressant.

**Glutamic acid** in Wheat Grass juice is amino acids. Rightly considered to be nature's brain food by improving mental capacity, helps give a lift from fatigue and also it suppresses the craving for sugar.

The protein contents in the wheat grass juice helps the patients to overcome the emaciation caused by utilization of fats and proteins for energy needs of the body thereby relieving the symptom of **Kshudhadhikyata**

#### **On Karapada Daha-**

After one month of the treatment Wheat grass juice showed **32.4 %** improvements in **Karapada Daha**, while Nisha Amalaki tablet showed **36.4 %** improvement and combined group showed **64 %** improvement.

On the basis of the above results the effect of combine therapy stands was best amongst the three groups, while Nisha Amalaki tablets second in order.

After second month of treatment Wheat grass juice showed **55.9 %** improvement while Nisha Amalaki tablet showed **60.7 %** improvement and combined group showed **68 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Nisha Amalaki tablets stands second in order.

(Vascular and neural diseases are closely related and intertwined. Blood vessels depend on normal nerve function, and nerves depend on adequate blood flow. The first pathological change in the microvasculature is vasoconstriction. As the disease progresses, neuronal dysfunction correlates closely with the development of vascular abnormalities, such as capillary basement membrane thickening and endothelial hyperplasia, which contribute to diminished oxygen tension and hypoxia. Neuronal ischemia is a well-established characteristic of diabetic neuropathy.)

**Tryptopa** in Wheat Grass juice is a amino acid.it is essential for human nutrition also helps in reducing the risk of artery.

**Arginine** in Wheat Grass juice is a amino acid.it is a conditionally essential amino acid. Supports the cardio

vascular system and prevents the cells and arteries dying from the hypoxia.

Methylcobalamin, a special form of Vitamin B12, is being studied now for treatment of neuropathy

**Niacin (Vit B3)** in Wheat Grass juice dialtes the blood vessels and increases the flow of blood to the peripheral capillary system.

**Vit C, Vit E, Superoxide Dismutase (SOD) & Selenium** in Wheat Grass juice is a highly potency anti-oxidant enzyme which prevents the impact of free radicals on the blood vessels which causes diabetic neuropathy

#### **On Daurbalya –**

After one month of the treatment Wheat grass juice showed **56.3 %** improvements in **Daurbalya**, while Nisha Amalaki tablet showed **50.6 %** improvement and combined group showed **92 %** improvement.

On the basis of the above results the effect of combine therapy stands was best amongst the three groups, while Nisha Amalaki tablets second in order.

After second month of treatment Wheat grass juice showed **62.5 %** improvement while Nisha Amalaki tablet showed **80%improvement** and combined group showed **96 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Nisha Amalaki tablets stands second in order.

**Alanine** in Wheat Grass juice is a amino acid, an important source of energy for muscle tissue, brain and the CNS system. Also strengthens the immune system by producing the anti bodies, helps in the metabolism of sugar and organic acids.

**Aspartic acid** in Wheat Grass juice is amino acid. Helps in expulsion of harmful ammonia from the body. When ammonia acts on the circulatory system it is highly toxic and this can in turn shows harmful to CNS system, and also increases resistance to fatigue and increase endurance.

#### **On F.B.S**

After one month of the treatment Wheat grass juice showed **7.1 %** improvements in F.B.S while Nisha Amalaki tablet showed **8.6 %** improvement and combined group showed **14 .3 %** improvements.

On the basis of the above results the effect of combine therapy stands was best amongst the three groups, while Nisha Amalaki tablets second in order.

After second month of treatment Wheat grass juice showed **9.9 %** improvement while Nisha Amalaki tablet showed **15.7 %** improvement and combined group showed **19.4 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Nisha Amalaki tablets stands second in order.

**Biotin** in Wheat Grass juice ,lowers the fasting blood glucose level as a co-factor of enzymes required for fatty acid synthesis, Biotin may increase the utilization of glucose to synthesize fats, biotin has been found to stimulate glucokinase, an enzyme in the liver, resulting in in increased synthesis of glycogen, the storage form of glucose, and also biotin has also been found to stimulate the secretion of insulin in the pancreas these thing helps in the lowering the blood glucose.

#### **On P.P.B.S**

After one month of the treatment Wheat grass juice showed **10.4 %** improvements in P.P.B.S while Nisha Amalaki tablet showed **9.8 %** improvement and combined group showed **15.3 %** improvements.

On the basis of the above results the effect of combine therapy stands was best amongst the three groups, while Wheat grass juice second in order.

After second month of treatment Wheat grass juice showed **11.9 %** improvement while Nisha Amalaki tablet showed **13.4 %** improvement and combined group showed **19.9 %** improvement.

On the basis of the above result the effect of combine therapy was best amongst the three groups, while Nisha Amalaki tablets stands second in order.

The rich fiber content of wheat grass (Godhuma) slows down the carbohydrate digestion and absorption and so improves glycemic control. Wheat grass (Godhuma) has a low glycemic index of 54, which helps in controlling the raise in the post prandial blood glucose levels. The low Glycemic index of the wheat grass juice (Godhuma) i.e. 54 delays the digestion process and slows down the absorption of carbohydrate from intestine thereby helps to maintain the sudden rise in blood glucose levels soon after food intake. As the sudden increase in post prandial blood sugar is controlled the post prandial urine sugar also is thereby controlled.)

**Significant Effects of Wheat Grass Juice:** Wheat grass juice provided significant relief in Prabhuta mutrata (68.5%), Pipasadhikyata (46.7%), Kshudhadhikyata (72.3%), Karapada Daha (72.3%) and Daurbalya (62.5%). It significantly reduced the fasting blood sugar by 9.9 % and postprandial blood sugar by 11.9 %.

**Significant Effects of Nisha Amalaki:** Nisha Amalaki alone provided significant relief in Prabhuta mutrata (53.9%), Pipasadhikyata (0.6%), Kshudhadhikyata (47.1%), Karapada Daha (60.7%) and Daurbalya (80%). It significantly reduced the fasting blood sugar by 15.7 % and postprandial blood sugar by 13.4 %.

**Significant Effect of Combined Therapy:** Combined group provided significant relief in Prabhuta mutrata (81.6%), Pipasadhikyata (62.96%), Kshudhadhikyata (84.7%), Karapada Daha (68%) and Daurbalya (96 %). It significantly reduced the fasting blood sugar by (19.3 %) and postprandial blood sugar by (19.9 %).

## SUMMARY AND CONCLUSION

In this study Wheat grass juice showed good result in relieving the subjective criteria's viz. Kshudhadhikyata, Daurbalya and Pipasadhikyata and objective criteria's FBS when compared to Nisha Amalaki group after 1 month, where as Nisha Amalaki group showed good improvement in these after two month accept in criteria's like Pipasadhikyata and Kshudhadhikyata.

But the Combined group showed much significant improvement in the relieving of the symptoms (Subjective and objective) in both the months.

Hence by this study, it can be claimed that combined group helps in the relieving of the symptoms of Madhumeha (NIDDM).

How ever ANOVA test results claims that there is no much significant difference between the groups in relieving the symptoms of Madhumeha accept the Prabhuta Mutrata Lakshana, it showed the significant difference in the groups.

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