IMPROVEMENT IN NUTRITIONAL AND THERAPEUTIC PROPERTIES OF DAILY MEAL ITEMS THROUGH ADDITION OF OYSTER MUSHROOM

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INTRODUCTION

- Public Nutrition and Health Problems of India
  - low birth weight
  - Underweight
  - Protein Energy Malnutrition
  - Micronutrient Malnutrition
  - Obesity, Diabetes, Heart Disease, etc.
INTRODUCTION

- Oyster Mushroom is known for good protein.
- FAO (1972) – Mushroom Protein – Cereal Based Diet
  - Bano and Rajaratham (1982, 1988)
  - Chang and Miles (1978, 1990)
  - Strmiskova et.al (1991)
  - Vijaya Khadar (2005)
  - Stamets and Chitton (2006)
  - Ranole et.al. (2007)
INTRODUCTION

- Supplementation of protein
- Body Composition
- Blood Profile
- Clinical Signs and Symptoms

- Durkin et.al. (1981)
- Dragan et.al. (1995)
- Hiroshqe et.al. (2001)
- Galbreath (2006)
- Liao et.al. (2007)
- Hoffman (2007)
- Frestedt et.al. (2005)
OBJECTIVES

- To standardize daily meal items with and without oyster mushroom
- To evaluate sensory quality of standardized meal items
- To study nutritional and therapeutic properties of daily meal items
MATERIALS AND METHODS

- Experimental research Design
  - Control - Without Mushroom
  - Experimental - With Mushroom

- Selection of Daily Meal Items
  - 24 Items

- Value Addition
  - Oyster Mushroom (*Pleurotus sajor-caju*)
  - Dry - 10%, Fresh - 50%
MATERIALS AND METHODS

Daily Meal Items

Sandwich

Indian Bread

Tomato Soup

Vegetable Pan Cake (Cutlets)
MATERIALS AND METHODS

Daily Meal Items

- Ladies Finger Fry
- Salad
- Biscuits
- Capsicum Fry
MATERIALS AND METHODS

Daily Meal Items

Indian Jawar Bread
MATERIALS AND METHODS

- **Standardization**
  Ingredients, Proportion, Cooking Method

- **Sensory Evaluation**
  - Appearance + Texture + Taste = **Overall Acceptability**
  - Hedonic Scale **9 Point Scale** like extremely to dislike extremely
  - By a panel of **ten judges**
  - On a **three consecutive days**
  - Mean and Standard Deviation
MATERIALS AND METHODS

Nutritional contribution

- Macronutrients
  - Protein, Fat, Carbohydrate
- Protein quality
  - Essential amino Acids
- Micronutrients
  - Thiamine, Riboflavin, Niacin
  - Potassium, Sodium, Phosphorus
  - Magnesium, Iron, Calcium

Food Value Tables (ICMR 1989) Mushroom Value (Chadha & Sharma 1997)
RESULTS AND DISCUSSION

Sensory Evaluation

Hedonic 9 Point Scale

- Like extremely
- Like very much
- Like moderately
- Like slightly
- Neither like nor dislike
- Dislike slightly
- Dislike moderately
- Dislike very much
- Dislike extremely
RESULTS AND DISCUSSION: Sensory Evaluation

Rating of Judges for Overall Acceptability

<table>
<thead>
<tr>
<th>Level of Acceptability</th>
<th>Control Food</th>
<th>Experimental Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Extremely</td>
<td>06</td>
<td>05</td>
</tr>
<tr>
<td>Like Very Much</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Like Moderately</td>
<td>04</td>
<td>05</td>
</tr>
<tr>
<td>Like Slightly</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>
# Macronutrient Contribution of Mushroom

<table>
<thead>
<tr>
<th>Macronutrient (g)</th>
<th>Dry Mushroom (10g)</th>
<th>Fresh Mushroom (50g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>2.70</td>
<td>1.35</td>
</tr>
<tr>
<td>Fat</td>
<td>0.20</td>
<td>0.10</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>5.00</td>
<td>2.50</td>
</tr>
</tbody>
</table>
RESULTS AND DISCUSSION: Nutritional Contribution

Contribution of Macronutrient meal items through Mushroom Addition

<table>
<thead>
<tr>
<th>Macronutrient (g)</th>
<th>Dry Mushroom (10g)</th>
<th>Fresh Mushroom (50g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>+ 1.06 to 1.66</td>
<td>+ 0.7 to 1.30</td>
</tr>
<tr>
<td>Fat</td>
<td>- 0.02 to 0.17</td>
<td>- 0.05 to 0.07</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>- 1.03 to 3.80</td>
<td>- 0.30 to 4.36</td>
</tr>
</tbody>
</table>
### RESULTS AND DISCUSSION: Nutritional Contribution

Contribution of Essential Amino Acids of meal items through Mushroom Addition

<table>
<thead>
<tr>
<th>Amino Acids (mg)</th>
<th>Dry Mushroom (10g)</th>
<th>Fresh Mushroom (50g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leucine</td>
<td>+ 17 to 135</td>
<td>+ 20 to 140</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>+ 15 to 084</td>
<td>+ 14 to 056</td>
</tr>
<tr>
<td>Valine</td>
<td>+ 16 to 119</td>
<td>+ 02 to 056</td>
</tr>
<tr>
<td>Tryptophan</td>
<td>+ 04 to 025</td>
<td>+ 02 to 048</td>
</tr>
<tr>
<td>Lysine</td>
<td>+ 51 to 125</td>
<td>+ 04 to 062</td>
</tr>
<tr>
<td>Threonine</td>
<td>+ 42 to 091</td>
<td>+ 10 to 243</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>+ 30 to 105</td>
<td>+ 10 to 209</td>
</tr>
<tr>
<td>Methionine</td>
<td>+ 06 to 035</td>
<td>+ 09 to 085</td>
</tr>
</tbody>
</table>
### RESULTS AND DISCUSSION: Nutritional Contribution

Contribution of Micronutrients of meal items through mushroom addition

<table>
<thead>
<tr>
<th>Micronutrients (mg)</th>
<th>Dry Mushroom (10 g)</th>
<th>Fresh Mushroom (50 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiamine</td>
<td>+ 0.10 to + 0.62</td>
<td>+ 0.01 to + 0.80</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>+ 0.20 to + 0.40</td>
<td>+ 0.12 to + 0.76</td>
</tr>
<tr>
<td>Niacin</td>
<td>+ 6.50 to + 15.50</td>
<td>+ 0.91 to + 19.91</td>
</tr>
<tr>
<td>Potassium</td>
<td>+ 121 to + 313</td>
<td>+ 89 to + 426</td>
</tr>
<tr>
<td>Sodium</td>
<td>+ 02 to + 20</td>
<td>+ 01 to - 09</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>+ 20 to + 52</td>
<td>+ 03 to + 218</td>
</tr>
<tr>
<td>Magnesium</td>
<td>+ 05 to + 38</td>
<td>+ 02 to + 32</td>
</tr>
<tr>
<td>Iron</td>
<td>+ 0.07 to + 1.01</td>
<td>+ 0.18 to + 0.68</td>
</tr>
<tr>
<td>Calcium</td>
<td>+ 02 to + 80</td>
<td>+ 24 to + 30</td>
</tr>
</tbody>
</table>
RESULTS AND DISCUSSION: Therapeutic Properties

- Vulnerable – Protein, Vitamins and Minerals
- B-Complex Deficiency – Thiamine, Riboflavin, Niacin
- Weight Control – Low Calorie (low fat and carbohydrate)
- Diabetic – Protein, No Sugar
- Hypertension – Low Sodium, High Potassium
- Convalescence Period – Proteins Vitamins, Minerals

Nutrition
CONCLUSION

- Inclusion of oyster mushroom added studied meal items in daily diet, will improve nutrition and health condition of normal and diseased individuals.
Thank you...

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