**ABSTRACT**

The Orion vehicle is significantly smaller than the Shuttle vehicle and the International Space Station and the mass and volume available for food is limited. Therefore, the food team has been challenged to reduce the mass of the packaged food. This paper discusses the current approach used to reduce mass and volume.

**BACKGROUND**

**AFT System**

Food system optimization will require total system resources be minimized. Weight of food item is one factor in a total system approach. Weight optimization opportunities exist by increasing fat and decreasing water content in food items. Meal replacement options would be an efficient manner of delivering nutrition.

**RESULTS AND DISCUSSION**

**Current Menu Analysis**

<table>
<thead>
<tr>
<th>Weight Contribution by Food Category</th>
<th>100%</th>
<th>96%</th>
<th>92%</th>
<th>88%</th>
<th>84%</th>
<th>80%</th>
<th>76%</th>
<th>72%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nagar</td>
<td>3%</td>
<td>5%</td>
<td>7%</td>
<td>9%</td>
<td>11%</td>
<td>13%</td>
<td>15%</td>
<td>17%</td>
</tr>
<tr>
<td>Protein</td>
<td>5%</td>
<td>8%</td>
<td>11%</td>
<td>14%</td>
<td>17%</td>
<td>20%</td>
<td>23%</td>
<td>26%</td>
</tr>
<tr>
<td>Fat</td>
<td>10%</td>
<td>12%</td>
<td>14%</td>
<td>16%</td>
<td>18%</td>
<td>20%</td>
<td>22%</td>
<td>24%</td>
</tr>
<tr>
<td>Carbs</td>
<td>82%</td>
<td>78%</td>
<td>74%</td>
<td>70%</td>
<td>66%</td>
<td>62%</td>
<td>58%</td>
<td>54%</td>
</tr>
</tbody>
</table>

**Current Menu Analysis**

Increasing fat to permitted daily maximum of 35% of calories decreased weight by 75g per crew member per day.

**CONCLUSIONS**

**Food Weight Reduction with Adjusted Moisture and Fat Content**

Opportunities for weight reduction in the food system exist. Fat content is below their maximum allowable value leaving room for improvement.

Currently available meal replacement options lack nutritional and organoleptic properties. Maintaining crew member acceptability will be the primary challenge in implementing the meal replacement options.

Increasing fat and decreasing moisture content in the current food system could decrease mass by as much as 22%.

**REFERENCES**