Going the Distance: Carboloading for Female Distance Runners

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ABSTRACT

The objective of this project is to use research about the body's chemical reactions in long distance runners to develop a diet that will be enhance their performance. The diet is based on the nutritional needs for female long distance runners in preparation for a race. Extensive research has determined that fatigue in runners is associated with low muscle glycogen and that proper amounts of carbohydrates can be utilized to increase the performance. Studies show consuming a diet composed of 60% complex carbohydrates, 25% healthy fats and 15% proteins at the correct time, with sufficient water, will supply the body with the needed nutrients for peak female distance running performance. The information from research studies provides the guidelines for the optimal diet for female distance runners. My results show the proper diet and portions to obtain 60% complex carbohydrates, 25% healthy fats and 15% proteins. In conclusion, the knowledge about how female long distance runners process carbohydrates, fats and proteins indicates both what foods provide for those needs, and when the foods should be eaten. This diet provides the proper nutrients for the body's peak performance in female distance running.

INTRODUCTION

Would you like to run longer and feel better? Every year many female distance runners complete intense competitions. Their knowledge of nutrition is above average, yet their energy intake may not be sufficient for the needs of their caloric expenditure in order to reach peak performance (1). Factors such as training and hydration status, as well as psychological motivation factors, may influence performance. Athletic performance is determined in part by the energy cost of running and the ability of the metabolic system to provide the rate and amount of energy needed (2).
Among the factors governing the time to cover a specific distance in endurance running are the energy cost that is required and the aerobic power that can be sustained over the distance. It is also likely that the proper amount of carbohydrates and fats during exercise may improve performance and mood (3). My hypothesis is that an optimal diet can be developed for my target group, female distance runners. Brian Bliese, the head Track and Field coach, estimates that over 8% of the female Beloit College population compete in running events every year and an estimated 16% run regularly. Getting the proper nutrition would be very beneficial to both their performance and their mental health (4).

METHODOLOGY

The sources consulted included Nutrition and Physiology Journals and the internet. I began with internet searches on optimal running nutrition, evaluating the validity of the sites before considering information there. Then I found more information to begin my searches in peer-reviewed scientific journals in the library. I continued by using the ND's Caloric Ratio Pyramid (1). It is a color-coded tri-axial graph, with a position marker that simultaneously indicates the percentages of carbohydrates, fats, and protein. Thus, each position within this special graph indicates a different caloric ratio. I used this to determine exact amounts of food to develop an appropriate diet for my target group. I then used a Taylor food scale to measure and demonstrate the diet onto a typical plate for Beloit College Students.

RESULTS

Consuming a diet composed of 60% complex carbohydrates, 25% healthy fats and 15% proteins with sufficient water at the right time will supply the body with the needed nutrients for peak long distance running performance in females(4,6,7).

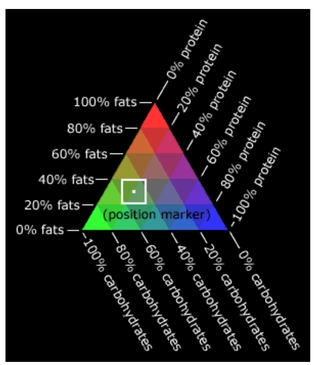
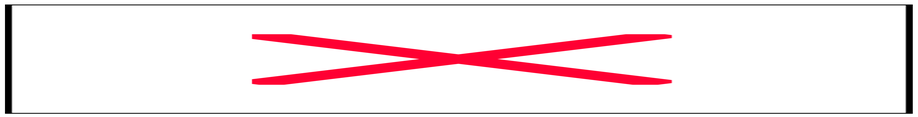


Figure 1: Caloric Ratio Pyramid
This pyramid simultaneously indicates the percentages of carbohydrates, fats, and proteins (1).



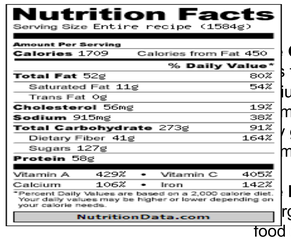


Figure 2: Nutrition Information for the Sample diet for 2 days in advance (1).

Good
s food is low in cholesterol and
ium. It is also a good source of
min K and manganese, and a
good source of vitamin A and
min C (1).

Bad
rge portion of the calories in this
food comes from sugars (1).

Figure 3: Caloric Ratio for the sample diet is 59% 25% and 16% (1).

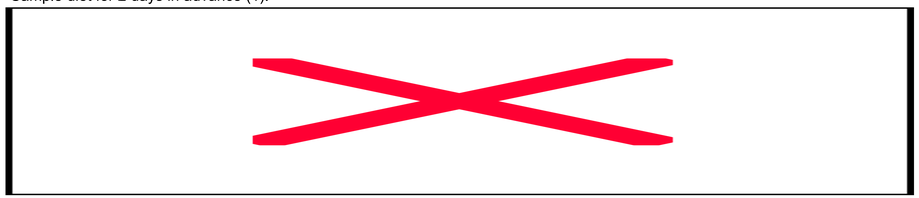


Figure 4: Nutrition Information for the Sample Diet 1 Day in advanced (1).

The Good
This food is low in Cholesterol. It is also a good source of Vitamin A, Vitamin C, Vitamin K and Manganese (1).
The Bad
A large portion of the calories in this food comes from sugars (1).

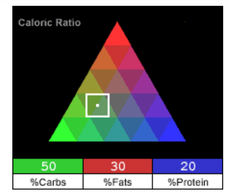


Figure 5: Caloric Ratio for the sample diet is: 57%, 26& and 17% (1).

Figure 6: BREAKFAST

Figure 7: LUNCH

Figure 8: DINNER

Figure 9: SNACKS

DISCUSSION

These diets may be helpful and simple in aiding in distance running performance. However, the diets discussed are only examples, and many others could be constructed. These diets have been constructed for carboloading. However, the selections are chosen because one is likely to find them at the Beloit College Cafeteria. Given the availability of these foods, the graphs below show the benefits of this diet, demonstrating that it may be very useful for healthy female distance runners.

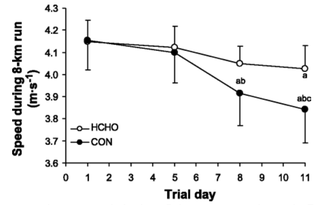


Figure 10: Average running speed during 8-km run on *days 1, 5, 8,* and *11* of both trials. Values are means ± SE. [a]Significantly different from *day 1*; [b]significantly different from *day 5*; [c]significantly different from corresponding day in HCHO trial (6).

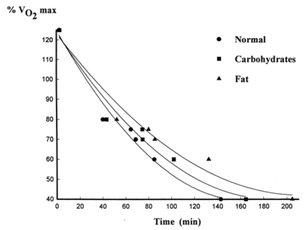


Figure 11: The time to exhaustion (endurance) is plotted for the percentages of o_{2max} at which the subjects exercised. The data are combinations of the data from selected studies cited in Table 1. The circles represent exercise time for subjects eating a "normal endurance runners diet" consisting of high CHO (60%), but too few calories to meet energy expenditures (25% less than expended). The squares represent subjects who ate an isocaloric diet high in CHOs. The triangles represent data for subjects on an isocaloric diet that consisted of 30% to 65% fat and at least 30% CHOs. The lines through the data were fit by the least squares method. The data for the three diets are significantly different from each other (7).

CONCLUSION

Eating a diet composed of 60% complex carbohydrates, 25% healthy fats and 15% protein can increase the target group's performance and overall mood. This is a simple change in lifestyle that has the potential to make a huge difference in athletic performance. This can also be used to aid anyone running long distances for overall performance and a better mood while exercising.

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