Hellenic Complex Systems Laboratory

Enteral Nutrition Design

Technical Report X

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Abstract

Enteral feeding refers to the delivery of nutrition directly into the gastrointestinal tract, thereby providing part or all of a patient's caloric and nutritional requirements. To design an enteral nutrition formula, the respective quantities of up to six selected foods (a meat, a cereal, a vegetable, a fruit and an oil) are calculated. It is desired that their combination comply with user-defined specifications: total required calories (10–3000), fraction of protein calories (0.15–0.40), fraction of carbohydrate calories (0.15–0.40) and maximum total water content of the foods (1–3000 ml). The specifications are set using the sliders. The foods are selected using their respective menus. Each menu includes a "None" option.

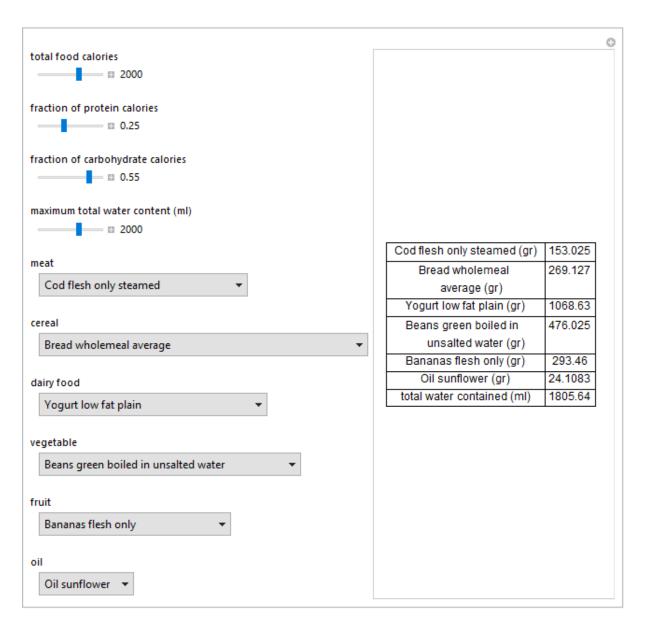


Figure 1: Enteric nutrition formula, including cod flesh only steamed, bread wholemeal average, yogurt low fat plain, beans green boiled in unsalted water, bananas flesh only, and oil sunflower. Total required calories: 2000, required fraction of protein calories: 0.25, required fraction of carbohydrate calories: 0.55, maximum total water content: 2000 ml.

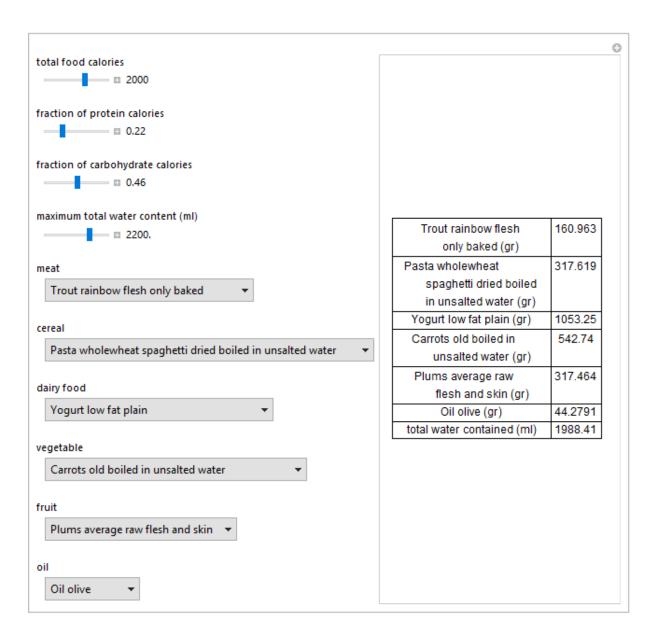


Figure 2: Enteric nutrition formula, including trout rainbow flesh only baked, pasta wholewheat spaghetti dried boiled in unsalted water, yogurt low fat plain, carrots old boiled in unsalted water, plums average raw flesh and skin, and oil olive. Total required calories: 2000, required fraction of protein calories: 0.22, required fraction of carbohydrate calories: 0.46, maximum total water content: 2200 ml.

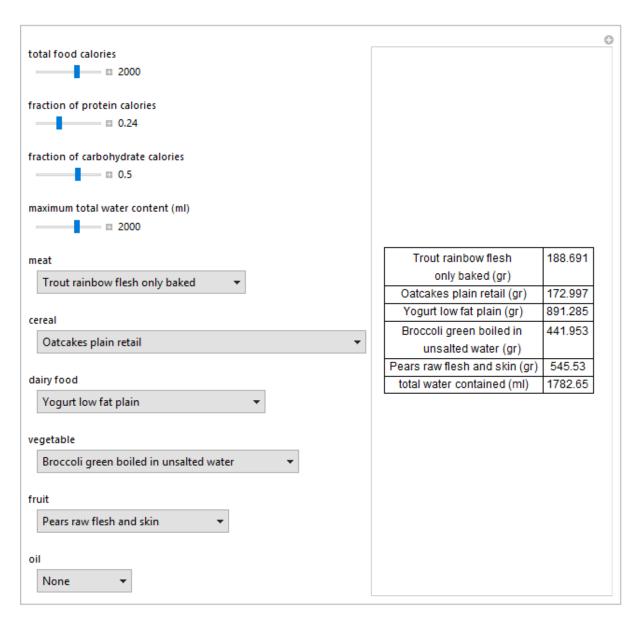


Figure 3: Enteric nutrition formula, including trout rainbow flesh only baked, oatcakes plain retail, yogurt low fat plain, broccoli green boiled in unsalted water, and pears raw flesh and skin. Total required calories: 2000, required fraction of protein calories: 0.24, required fraction of carbohydrate calories: 0.50, maximum total water content: 2000 ml.

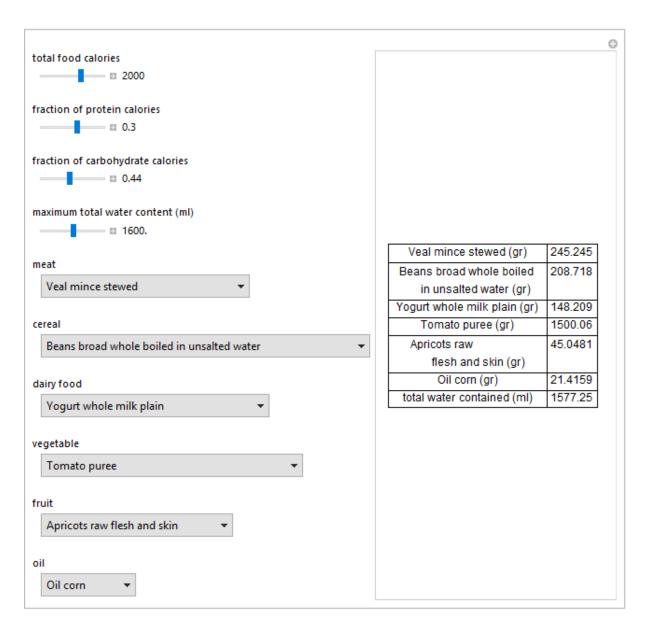


Figure 4: Enteric nutrition formula, including veal mince stewed, beans broad whole boiled in unsalted water, yogurt whole milk plain, tomato puree, apricots raw flesh and skin, and oil corn. Total required calories: 2000, required fraction of protein calories: 0.30, required fraction of carbohydrate calories: 0.44, maximum total water content: 1600 ml.

Details

This Demonstration shows a method for the design of enteral nutrition [1]. It includes the respective data of all the foods of the 2015 version of the Composition of Foods Integrated Dataset (CoFID), published by Public Health England (PHE) [2].

Therefore, the menus of the Manipulate function can be redefined to include any of the foods of the dataset.

The Demonstration is dedicated to the loving memory of George Koutsidis.

References

[1] R. Bankhead, J. Boullata, S. Brantley, M. Corkins, P. Guenter, J. Krenitsky, B. Lyman, N. A. Metheny, C. Mueller, S. Robbins, J. Wessel and the A.S.P.E.N. Board of Directors. A.S.P.E.N. Enteral Nutrition Practice Recommendations. *Journal of Parenteral and Enteral Nutrition*, **33**(2), 2009 pp. 122–167. doi:10.1177/0148607108330314.

[2] P. M. Finglas, M. A. Roe, H. M. Pinchen, R. Berry, S. M. Church, S. K. Dodhia, M. Farron-Wilson and G. Swan, McCance and Widdowson's The Composition of Foods. 7th summary ed., Cambridge, UK: The Royal Society of Chemistry, 2015.

Source Code

The updated Wolfram Mathematica[©] source code is available at: https://www.hcsl.com/Tools/EnteralNutritionalDesign-author.nb

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http://demonstrations.wolfram.com/EnteralNutritionalDesign/

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