

The HEN Post

Consuming Insects Can Contribute to a Sustainable Planet

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Introduction

Insects (bugs)³ are the largest terrestrial biomass living on dry land. As such, entomophagy, the practice of eating insects, makes sense from ecological, nutritional, and economic perspectives.¹ “From deep-fried locusts in Thailand, to hachinoko – or stewed bee larvae – in Japan, and tarantula in Cambodia, various insects are considered delicacies throughout Asia, Africa, and Latin America.”² Worldwide, insects are part of the diets of at least 2 billion people.³

Why Eat Insects and Insect-based Products?

In 2013, the Food and Agriculture Organization of the United Nations (FAO) released a report entitled “*Edible insects - Future prospects for food and feed security*.”³ It discusses the nutritional and environmental benefits of insects as food for people and livestock. The report also includes a cultural background on entomophagy, lists nutritional content, and proposes possible ways to increase the consumption and maximize the potential of edible insects in the future.^{1,3}

Edible insects contain high-quality protein, and are a considerable source of fat; they are also rich in fiber, and contain additional nutrients such as calcium, magnesium, potassium, iron, B vitamins, selenium, and zinc.¹⁻⁴ Furthermore, according to the FAO:

“consuming insects has a number of advantages:”

- “They have a high feed-conversion efficiency (that is, an animal's capacity to convert feed mass into increased body mass, represented as kilogram of feed per kilogram of weight gain).”
- “They can be reared on organic side streams, reducing environmental contamination, while adding value to waste.”
- “They emit relatively few greenhouse gases (GHGs) and relatively little ammonia.”
- “They require significantly less water than cattle rearing.”
- “They pose a low risk of transmitting zoonotic infections” (e.g., H5N1), although more research is needed on this topic.³



Scorpions for sale in China

(Photo Credit: Courtesy of Food and Agriculture Organization of the United Nations³)



Insects for sale in Thailand (Photo Credit: Courtesy of Food and Agriculture Organization of the United Nations³)

Potential Barriers

Barriers to consuming insects and insect-based products include taste, cost, and food safety concerns in addition to cultural and religious barriers.^{1,3,5} Allergic reactions are an example of a food safety concern. People with crustacean shellfish allergies should be aware of the risks of eating insects as they are genetically similar to shellfish.^{1,5}

The Essential List of Edible Insects

The main rules of thumb to ascertain a bug's edibility are in the form of a rhyme invented by David George Gordon in *The Eat-a-Bug Cookbook*.^{1,6} *Red, orange, yellow, forgo this small fellow (e.g., ladybugs, black widow spiders), Black, green or brown, go ahead and toss him down (e.g., crickets, grasshoppers).^{1,6}*

Cooking insects goes a long way toward ensuring their ultimate edibility.^{1,6} Most insects are best frozen before cooking. Some cooks pre-boil them, others don't. Others suggest rinsing them first. The three most common ways to prepare insects are toasting, sautéing, and frying. Toasting most closely approximates what our ancestors did via fires, stone ovens, and sun drying. Insects that are toasted can be ground into nutritious flour. Sautéing tends to work best with the juvenile, soft-shelled insects such as larvae and young crickets.¹

Crickets are in diets throughout the world and are showing up on menus across the U.S.^{5,7}

For those persons wanting to learn more about cooking insects, here is a recipe for Cricket Leather:¹

Ingredients

1 cup chopped apples
½ cup cranberries
½ cup cricket flour^c
Honey, to taste

Equipment

Baking sheet
Oven/dehydrator
Blender/coffee grinder
Sifter
Parchment paper

Cricket Flour

Heat oven to 350 degrees F. Spread frozen crickets^c evenly across a lightly oiled baking sheet. Bake for 5 to 10 minutes until very crispy, rotating crickets with a spatula every few minutes. When they are ready, you should be able to crush one easily between your fingers like puffed rice cereal. Place toasted crickets (or cricket flour) into a blender or coffee grinder, and grind until powdered. Sift out the bigger bits for a smoother result, or keep them in for crunch.

Leather

Put apples, cranberries, cricket flour, and a

little water in blender and then puree. Add honey until it reaches the level of sweetness you desire. Put parchment paper on a backing sheet and then spread out the puree evenly on the paper. Heat oven to 140 degrees F and put on baking sheet. Cook roughly 8 hours, or until it is no longer sticky to the touch. Remove and enjoy!¹

The Role of Dietetics Professionals – How to Become More Involved

Dietetics professionals can learn more and become leaders in this field by working with scientists, chefs, companies, and non-profit organizations already knowledgeable on this topic.¹⁻⁸ Numerous resources are provided at the end of this article including books, films and videos, websites and blogs and a TED Talk.

RESOURCES

BOOKS:

Gordon DG. *The Eat-a-Bug Cookbook: Revised: 40 Ways to Cook Crickets, Grasshoppers, Ants, Water Bugs, Spiders, Centipedes, and Their Kin*. 2nd ed. Berkeley, CA: Ten Speed Press; 2013. <https://www.amazon.ca/Eat-Bug-Cookbook-Revised-Grasshoppers/dp/1607744368>

Lang E. *Eating Insects. Eating Insects as Food. Edible insects and bugs, insect breeding, most popular insects to eat, cooking ideas, restaurants and where to buy insects all covered*. IMB Publishing; 2013. Available at: https://www.amazon.ca/Insects-Insects-Breeding-Popular-Restaurants/dp/1909151629/ref=pd_sim_14_2?_encoding=UTF8&psc=1&refRID=S AK62Y37XZJ1TH9SATHG

Lesnik JJ. *Edible Insects and Human Evolution*. Gainesville, FL: University Press of Florida; 2018. Available at: <https://www.amazon.com/Edible-Insects-Human-Evolution-Lesnik/dp/0813056993>



Chapulines vendors in Mexico

(Photo Credit: Courtesy of Food and Agriculture Organization of the United Nations³)

Mitsuhushi J. *Edible Insects of the World*. Boca Raton, FL: CRC Press, Taylor & Francis Group. Revised edition; 2016. Available at: <https://www.crcpress.com/Edible-Insects-of-the-World/Mitsuhushi/p/book/9781498756570>

van Huis A, van Gorp H, Dicke M. *The Insect Cookbook. Food for a Sustainable Planet. The Insect Cookbook. Food for a Sustainable Planet*. New York, NY: Columbia University Press; 2015. Available at: <https://cup.columbia.edu/book/the-insect-cookbook/9780231166850>

FILMS & VIDEOS:

The Gateway Bug: <http://thegatewaybug.com>



Photo credit: Courtesy of Garden Collage Magazine⁷

Ento: A Sustainable Food Startup With a Twist (Insects!): <https://www.youtube.com/watch?v=19DsHaB70WI>

WEBSITES & BLOGS:

ASPIRE Food Group: <http://www.aspirefg.com>

Bug Muscle: <http://bugmuscle.com>

CHIRPS: <https://chirpschips.com>

Entomological Society of America: <https://www.entsoc.org>

Flying Food: <https://www.flyingfoodproject.com>

Little Herds: <http://www.littleherds.org>

North American Coalition for Insect Agriculture: www.edibleinsectcoalition.org

Royal Entomological Society: <https://www.royensoc.co.uk/meeting/entomophagy>

The Future of Edible Insects: <https://thefutureofedibleinsects.com>

The Future of Edible Insects, U.S. Regulations, Federal, state and local regulations: <https://thefutureofedibleinsects.com/us-regulations>

TED TALK

Marcel Dicke at TED Global 2010 – Why not eat insects?: https://www.ted.com/talks/marcel_dicke_why_not_eat_insects

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1. Martin D. *Edible. An Adventure into the World of Eating Insects and the Last Great Hope to Save the Planet*. New York, NY: Houghton Mifflin Harcourt Publishing; 2014. <http://www.worldcat.org/title/edible-an-adventure-into-the-world-of-eating-insects-and-the-last-great-hope-to-save-the-planet/oclc/862028924> Accessed February 15, 2018.
2. Askew K. The buzz on bugs: Will insect-based foods tip to the mainstream? *Food Navigator*. August 24, 2017. <https://www.foodnavigator.com/Article/2017/08/24/The-buzz-on-bugs-Will-insect-based-foods-tip-to-the-mainstream> Accessed March 1, 2018.
3. van Huis A, Van Isterbeeck J, Klunder H, Mertens E, Halloran A, Muir G, Vantomme P. *Edible insects - Future prospects for food and feed security*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO); 2013. <http://www.fao.org/docrep/018/i3253e/i3253e.pdf> Accessed February 15, 2018.
4. Chu W. Swiss start-up's insect derived food intent on overcoming consumer bugbear. *Food Navigator*. August 16, 2017. <https://www.foodnavigator.com/Article/2017/08/16/Swiss-start-up-s-insect-derived-food-intent-on-overcoming-consumer-bugbear> Accessed March 1, 2018.
5. Cricket-flour protein bars pass the taste test. Consumer Reports' experts munched on snack bars and cookies. *Consumer Reports* [online]. December 10, 2014. <https://www.consumerreports.org/cro/news/2014/12/cricket-flour-protein-bars-pass-the-taste-test/index.htm> Accessed March 1, 2018.
6. Gordon DG. *The Eat-a-Bug Cookbook, Revised: 40 Ways to Cook Crickets, Grasshoppers, Ants, Water Bugs, Spiders, Centipedes, and Their Kin*. 2nd ed. Berkeley, CA: Ten Speed Press; 2013. <https://www.amazon.ca/Eat-Bug-Cookbook-Revised-Grasshoppers/dp/1607744368> Accessed February 15, 2018.

7. Clayton V. How a cricket farm in Austin is putting a dent in world hunger. *Garden Collage Magazine*. March 24, 2017. <https://gardencollage.com/nourish/farm-to-table/cricket-farm-austin-putting-dent-world-hunger> Accessed March 12, 2018.
8. McMillan T. Menu of the future: Insects, weeds, and bleeding veggie burgers. *National Geographic*. March 8, 2018. <https://gegsustainablefood.wordpress.com/2018/03/13/menu-of-the-future-insects-weeds-and-bleeding-veggie-burgers/> Accessed March 9, 2018.

FOOTNOTES

- a. The term “bug” and “insect” will be used interchangeably throughout this article to mean “terrestrial invertebrate.” This can include arthropods, annelids, and gastropods – essentially any terrestrial invertebrate not generally considered edible by Westerners.
- b. For an introduction to the topics of creating and managing pollinator habitat and protecting pollinators, see the following books, The Xerces Society. *Attracting Native Pollinators: Protecting North America's Bees and Butterflies*. North Adams, MA: Storey Publishing; 2011 and The Xerces Society. *100 Plants to Feed the Bees*. North Adams, MA: Storey Publishing; 2016.
- c. This cricket leather is an example of a product that could be made with the organic, dried cricket flour. For more information, see: <https://chirpschips.com>

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