

Technical brief #4: Edible insect gastronomy in Kenya



Insects have been part of indigenous food culture in different parts of Kenya. Newly revived interest in the utilization of insects has raised the question: *how can insects be used as an ingredient in various products and gastronomy?* For many, different insect species are ingredients for which their taste, aromatic, textural and visual characteristics are a significant contribution to building regional cuisine (Halloran et al., 2014). During the International Conference on Legislation and Policy on the Use of Insects as Food and Feed in East Africa in Kisumu, GREEINSECT partner Dr. Monica Ayieko noted that “insects have to be sustainably harvested and farmed, but they also have to feel good in the belly.” With this in mind, this GREEINSECT brief outlines how insects can be integrated into a more holistic culinary framework and how products containing insects can be developed to reflect the diversity of Kenyan culture.

Regional cuisine and food taboos

Food preferences and habits in Kenya run along different boundaries such as rural and urban, socio-cultural/economic, ethnic and geographical (Oniang’o and Komokoti, 1999). While some staple foods like *ugali* (a stiff porridge made from maize flour) and *sukuma wiki* (collard greens) are popular throughout most of the country, condiments and other ingredients rely heavily on local traditions and availability. Food preferences, especially in urban areas, are becoming increasingly influenced by international trends and products, which, in turn, are shifting consumption patterns away from traditional staple foods.

Historically, the consumption of insects is more prevalent in the Lake Victoria region of Kenya. However, in some communities with a previous history of insect consumption, a misunderstanding that consuming edible insects is uncivilized and primitive has developed



Sun-dried termites with dry crisps from the ugali pot (*imudud*) and honey. — Source: Nordic Food Lab

due to change in cultural and social values (Ayieko, 2010). Additionally, most insect species, such as termites (*Macrotermes subhyalinus*), are collected from the wild and are therefore only seasonally available, and supply is limited to local markets.

Traditional cooking and processing of insects

While the consumption of termites, grasshoppers, and lake flies has been documented in Kenya, there has been less attention paid to documenting processing and cooking methods and the integration of insects into everyday food consumption. Many insects like locusts have been traditionally sun-dried and roasted before consumption. Termites can also be consumed raw as they emerge from the mounds, and are enjoyed for their juiciness and fattiness. In some communities, insect species have been utilized as a side dish that is served together with *ugali*.

Insect flavour and texture

When exploring insects from a culinary perspective, it is important to start with specific species and their different growth stages. Insect species have different physiological and physiochemical properties that require different processing/cooking techniques (Evans, 2014; Farina, 2017).

Some insects, like ants, produce pheromones to defend themselves from prey. They are, therefore, more suitable for their aroma and flavour, rather than their texture or protein content.

However, insects such as termites can contain a variety of flavour profiles that can be used in the preparation of more advanced dishes. Utilizing insects as an ingredient can highlight flavours that have not yet been investigated and can create a modern Kenyan cuisine. Building upon conservation techniques such as fermentation, these new flavours can be used in modern dishes to represent new uses of insects as a food source (Nordic Food Lab, 2017).

Example dishes:

Here, we present two dishes created by the Nordic Food Lab to demonstrate how insects can be used in modern gastronomy and be applicable to local Kenyan ingredients. The *Ugali* dish utilizes a fermented grasshopper garum, adding a rich umami flavour. The *Tortilla* dish uses bee larvae, but in a Kenyan context they could be substituted with fried termites.

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What are Garums?

Garum is a kind of fish sauce that was used in the cuisines of the ancient Roman Empire. It is made by fermenting the guts of fish with salt. To create a new product, the Nordic Food Lab used this technique by substituting the fish with insects like grasshoppers and crickets. Fermenting the insects harnesses the protein to create a unique umami flavour. It also creates a familiar taste and eases the psychological barrier of consuming whole insects (Nordic Food Lab, 2017).

Modern Ugali interpretation



Ingredients for the fillings

- 156 g fresh maize kernels, reserve the cob, husk and silk
- 2 g salt
- 90 g maizeflour (cornstarch)
- 40 g water
- Piri chillies, to taste
- 8 g cricket garum
- 2 g lime
- 6 g toasted sesame oil
- Fresh, clean, moist soil, for covering
- Fresh, aromatic leaves and flowers for covering

Ingredients for the finish

- 2 g maize silk (see method)
- Sunflower oil for frying
- 5 g Grasshopper garum
- 0.3 g piri chilli
- 3 g toasted sesame oil

Ugali maize dish, photographed by Chris Tonnesen for “On Eating insects: Essays, Stories and Recipes” Phaidon press, dish by Roberto Flore, Nordic Food Lab

For the filling

Lactoferment the maize kernels by adding 2 per cent salt of the weight of the maize and put in sealed vacuum bag for 10 days in the refrigerator at 5°C. Process the maize into a Thermomix, add the rest of the filling ingredients, except soil, sand, leaves and flowers and mix gently for 3 minutes, or until it is a smooth dough. Let the paste rest in the Thermomix for 30 minutes, and then mold the lactofermented maize around the middle of the reserved cob. Set aside.

Arrange the reserved husk and silk on a dehydrator tray, place in the dehydrator, set at 50°C and dry overnight.

Preheat the oven to 120°C. Fill a deep gastro tray one-third full with clean, moist soil and sand, then top with aromatic leaves and flowers. Wrap the cob with the

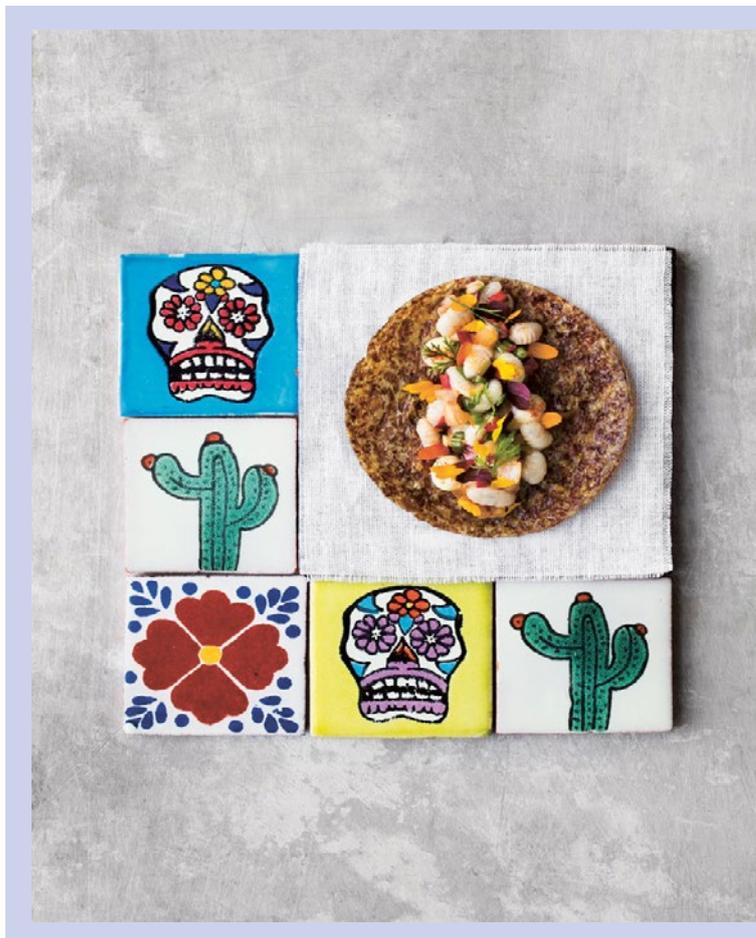
dried husks and place into the soil and sand mixture, to simulate cooking in a traditional underground oven. Cover with more aromatic flowers and leaves, then cover again with soil and sand. Bake in the oven for at least 2 hours.

To finish

Remove the baked cob from the soil, open and cut into 2-cm thick slices around the cob. In a frying pan, fry the dehydrated corn silk in a little sunflower oil. Before serving, mix the grasshopper garum, chili, and sesame oil together, put into a small spray bottle and spray the maize and maize silk with the mixture. Place the baked maize on a plate and arrange the fried maize silk alongside. Serve as a side dish to a vegetable stew or roast chicken.

Chapati with Bee larvae

The dish was originally inspired by a Mexican dish that uses a staple Mexican food called a ‘tortilla’ (a thin, round flatbread made from nixtamalized maize flour or wheat flour). To give it a Kenyan twist, chapatis can be used. To substitute the richness and fatness of the bee larvae, termites could be used in replacement. Garums are generally source of umami; in this case, they could also be replaced by fish sauces. The herbs like wood sorrel, could be substituted with indigenous sour tasting herbs. Pork fat could be replaced by oils or any kind of animal fat.



Original Ingredients for the fillings

- 12 grams pork fat
- 60 grams salad onions
- 20 grams spring (green) onions
- 5 grams garlic, chopped
- 8 grams bee larvae garum
- 60 grams water
- 3 grams salt
- 3 grams lime juice
- 10 grams wood sorrel stalks
- 3 grams smoked mild chilli powder
- 3 grams coriander seeds
- 500 grams filtered water
- 200 grams bee larvae

Ingredients for the finish

- 20 wood sorrel leaves (or other sour tasting green leaves)
- 20 coriander (cilantro) leaves
- 20 marigold flowers (or other edible flowers), petals separated

Bee Larvae Taco, photographed by Chris Tonnesen for “On Eating insects: Essays, Stories and Recipes” Phaidon press. Dish by Roberto Flore, Nordic Food Lab

Original recipe:

For the Filling: Heat the pork fat in a large pan over medium heat, add the onions and chopped garlic and gently sauté until cooked. Increase the heat to high, stir and be careful not to burn or over caramelize the vegetables. Add the garum and tap water and cook for another 2–3 minutes. Season with salt, then put the mixture into a large bowl, add the lime juice and a few wood sorrel stalks, the smoked chili powder and coriander seeds. Cover with clingfilm (plastic wrap) and leave the filling to rest for 1 hour to allow the flavours to mix together.

For the Filling (continued): In a small pan, bring the filtered water to a boil and blanch the larvae for 2 minutes. Drain the larvae and mix gently into the vegetable mixture.

To Finish: Spoon equal portions of the filling down the centre of the tortilla. Top with edible leaves, coriander (cilantro) leaves and marigold petals (or other edible flowers), to taste.

A future of insects in products and gastronomy

Three main topics can be included in the discussion and potential of insects as part of a gastronomic scene in Kenya.

Culinary tourism and high-end gastronomy

The Kenyan tourism sector is a growing sector (4.1 % of the GDP in 2014) and attracts domestic and foreign visitors (WTTC, 2014). An increasing number of tourists are becoming sensitive to authentic experiences in order to learn more about the culture. Food tourism has risen in the last years, branding regional diversity and products (Standard, 2017). Including insects as part of a growing sector of culinary tourism can provide tourists with unique experience based on local and traditional preparation methods and modern approaches on flavours and texture. Insects, in this context, are not a novelty or gimmick, but rather a representation of Kenyan culture and biodiversity.

High quality and sustainable raw material for good taste

Building a successful and sustainable gastronomic sector that includes insects will not only depend on ensuring that insects are produced for convenience and cost-effectiveness but also guaranteeing taste and quality. While storage and processing techniques are important in increasing the shelf life of products, not all methods to preserve insects (e.g. freeze-drying) will be suitable to maintain the structure and flavour.

Currently, access to fresh insects is limited to wild harvest, which can be unsustainable if carried out without taking care of the environment and avoiding the overharvesting of species. Therefore, setting up insect production in the form of farms should also include quality and taste as relevant parameters.

Consumer diversity equals product diversity

Kenya boasts a dynamic spectrum of consumer segments, covering rural and urban areas and various ethnic and social backgrounds. As such, research and development into new products should follow consumer preferences. While some consumers will be more willing to consume products fortified with insect powder (e.g. buns, biscuits or porridge meals), others may prefer whole insects as snacks or as side dishes with a traditional meal. Further, the reasons why consumers may be willing to eat insects and insect products depend on various motivations, and last but not least a pleasant taste, in order to achieve repeated consumption (Alemu et al., 2017).

Conclusion

Cooking with insects and developing an insect gastronomy in Kenya and East Africa builds upon traditions that represent a close relationship between culture and nature. Using modern techniques and inspiration from international gastronomy can help to preserve and broaden the utilization of insects in Kenyan cuisine and promote them as delicacies.

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References

- Alemu, M.H., Olsen, S.B., Vedel, S.E., Kinyuru, J.N., Pambo, K.O. 2017. Can insects increase food security in developing countries? An analysis of Kenyan consumer preferences and demand for cricket flour buns. *Food Security*. doi:10.1007/s12571-017-0676-0
- Ayieko, M.A., Oriamo, V., Nyambuga, I.A. 2010. Processed products of termites and lake flies: improving entomophagy for food security within the Lake Victoria region. *Afr J Food Agric Nutr Dev* 10, 2085–2098. <http://dx.doi.org/10.4314/ajfand.v10i2.53352>
- Evans J. 2013. *Insect Gastronomy*. Cereal Magazine, vol. 3. UK: Taylor Brothers.
- Evans, J., Flore, R., Pedersen, J.A. and Frøst, M.B., 2015. Place-based taste: geography as a starting point for deliciousness. *Flavour Journal* 4: 7. DOI: [10.1186/2044-7248-4-7](https://doi.org/10.1186/2044-7248-4-7)
- Farina, M.F. 2017. How method of killing crickets impact the sensory qualities and physiochemical properties when prepared in a broth. *International Journal of Gastronomy and Food Science*. Vol 8. Pp. 19-23. <https://doi.org/10.1016/j.ijgfs.2017.02.002>
- Halloran, A., Münke, C., Vantomme, P., Reade, B., Evans, J. 2014. Broadening insect gastronomy. *The Routledge Handbook of Sustainable Food and Gastronomy*. Edited by Philip Sloan, Willy Legrand and Clare Hindley. Routledge, New York.
- Nordic Food Lab, Evans, J., Flore, R., Frøst, M.B. 2017. *On Eating Insects - Essays, stories and recipes*, 336 pp. Phaidon, London. <http://nordicfoodlab.org/blog/2017/1/17/on-eating-insects-essays-stories-and-recipes>
- Okech, R.N. 2014. Developing culinary tourism: The Role of Food as Cultural Heritage in Kenya. *Proceedings of the International Conference on Global Business, Economics, Finance and Social Sciences (GB14 Chennai Conference)*, Chennai, India 11-13 July 2014.
- Standard 2017. Sampling Kenya's culinary tourism. Available at: <https://www.standardmedia.co.ke/lifestyle/article/2000066504/sampling-kenya-s-culinary-tourism>
- World Travel and Tourism Council 2015. *Travel and Tourism. Economic Impact 2015. Kenya*. Pp. 24. Available at: <https://www.wttc.org/media/files/reports/economic%20impact%20research/countries%202015/kenya2015.pdf>

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