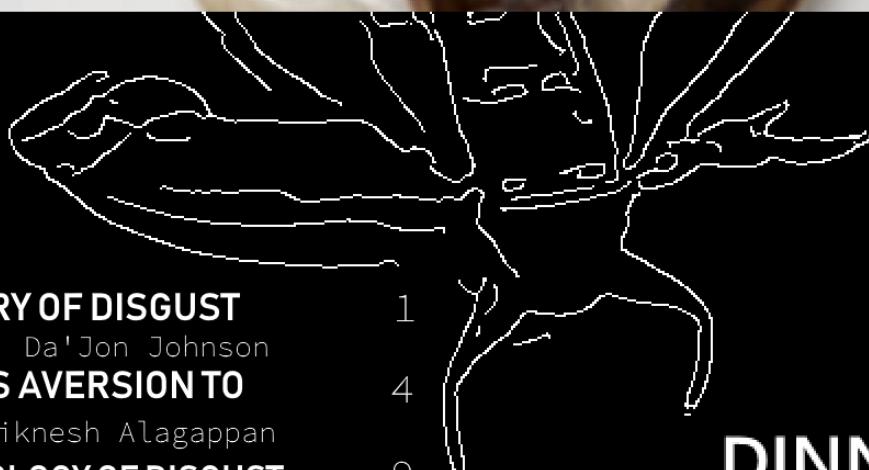


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DINNER IS SERVED.

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The History of Disgust

Da'Jon Johnson

There are many forms of disgust. Our sense of disgust changes over time as our body adapts to the environment surrounding us. Generations ago we may have found certain things like hunting and killing wild animals okay but now we may look away at a dead animal in disgust using our body and expressions to show disapproval. In our current state most of us can deal with prepared food being cooked in front of us but could not hunt an animal like years and years ago. That's our norm that we have evolved to accept. Disgust also can change with age, from sexual evolution and viewpoints and understanding to things like seeing blood and cuts or understanding certain smells.

Can be outwardly shown through facial expression and motion. Nose flaring up and outward when you smell something disgusting, eyes squinting and looking away when you see something that bothers you. Teeth may show sometime if recognized as a threat as

well or you may close off your mouth and raise your hands if it's something you don't want near you or entering your body.

Defense mechanism to protect the body- Your sense of disgust can be shown by not liking something you aren't used to but can also protect you too. Some things that don't smell good or look good may be dangerous for you. You wouldn't eat excrements or certain bugs or foods that may stink and this is partly because they could be a detriment to your health. Geographic location can affect this evolution pattern which will be touched on later.

Plays a role in moral and sexual judgements - Talked about briefly earlier disgust can affect our sexual life and choices, some of these mature with age and other things people may stay uncomfortable with. ex. gay marriage disgusts some people. Some people may not feel comfortable with certain sexual things ex. Kissing is okay, but anything further may not be or even certain positions.

Evolved to be an overly conservative response - people are reluctant to change what is trained can be very hard to change

explaining why when most Americans see people eating bugs and doing things out of their comfort zone it can disgust them. What the body is not used to can be disgusting even though to others it isn't.

Plays a huge role in social and cultural identity (class systems) Throughout time people have found better and better ways to do things, going back to prepared food vs. hunting your own food. Think about America vs. a third world country. Money plays a big factor in what types of systems people have access to and is why third world countries may rely on eating bugs to survive they may not have the technology to access certain resources and crops and natural sources could be their only way to survive.

Related closely to hygiene

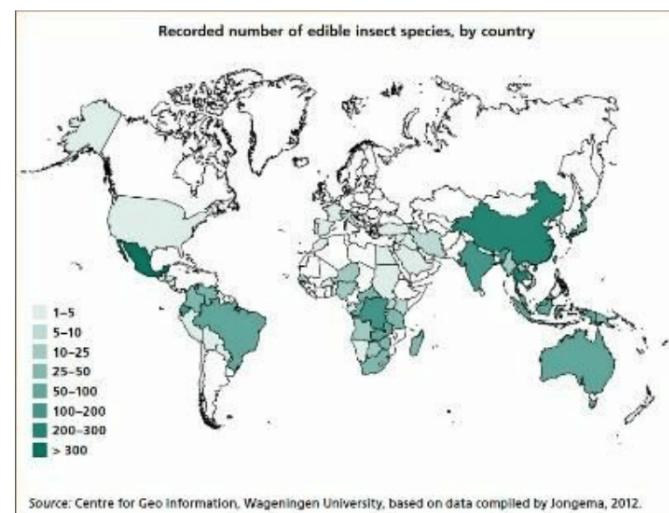
Modern day vs. Past ex. Disgust in today's time can be expressed in things like McDonalds not serving 100% beef burgers or pink slime making chicken nuggets. In the past it could be something as extreme as seeing someone with a deadly disease. Sanitation



changes over the years changed pests like rats and mice from being norms to not even wanting a gnat flying around your household.

Paul Rosin 1980s: "People in these studies were much less likely to want to eat fudge shaped as dog feces rather than discs, or the soup from a brand new bedpan rather than a bowl. (35)"

On this page there are two graphs by the Centre for Geo Information. To the left is a graph which represents bug eating countries versus non bug eating countries this directly correlates to the graph on the right that represents number of edible bugs by geography. As you can see most countries that do eat bugs are in the same places that most bugs are edible. This could be the reason people in certain regions evolved to find bugs disgusting and why we in north America find it hard to eat bugs now. This also



ties back into disgust being a defense mechanism and protecting the body from foods that may be a detriment to one's health.

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WHO EATS BUGS?

COUNTLESS CULTURES AROUND THE WORLD EAT INSECTS AS A DELICACY OR AS A NORMAL PART OF THEIR EVERYDAY DIET. UP TO 80% OF THE WORLD'S NATIONS EAT INSECTS WITH HIGHER CONCENTRATIONS LOCATED IN THE TROPICS



RESEARCH PROVIDED BY: FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. EDIBLE INSECTS: FUTURE PROSPECTS FOR FOOD AND FEED SECURITY. INFOGRAPHIC BY JUSTINKYLE.NET FOR LITTLE HERDS.ORG

The West's Aversion to Bugs

Viknesh Alagappan

If America was located almost anywhere else in the world, we'd already be eating bugs. At what capacity is up for debate, but graphs provided by the Food and Agriculture Organization of the UN and the website abugssalad.org, show a clear relationship between countries that have a presence of edible bugs and countries that eat them (Van Huis et al. 9; "Maybe It

Sounds Weird..."). Now, when visiting these countries it is largely only the rural population that eat them on a regular basis, and in cities they are mostly seen as a delicacy, with a few exceptions, like in Thailand where they are valued for nutrition and in their traditional culture (Fernquest). In cities mocking Western culture usually leads to success, but the idea of using insects in food may be an idea that the West could borrow from the rest of the world.

Why don't we eat bugs?

In the West there is a bit of a cultural deterrent from eating bugs. Biological Anthropologist Dr. Julie Lesnik of Wayne State University described in an interview with SciBugs that "in the tropics, windows are just like windows and they don't have screens, and you learn to live *with* the insects not against them" (Miorelli). In the colder areas of America and Europe, the indoors are heated and bugs inside mean that the house isn't fully sealed from the outside world, which is seen as a problem. Also, Lesnik describes that the European

ancestors of most of the West moved to these areas when they were still glaciated, and “there was no way they were surviving off of eating insects” (Miorelli). Lesnik also says that those same ancestors that went to populate South America likely rediscovered insect eating “because you show up in the tropics, you need food” (Miorelli). This shows that with time and valid cause, insect eating can be picked up again in the West.

Why is an alternative solution needed?

Food waste is becoming a larger and larger problem and it won’t decrease any time soon. The demand for food will only increase in the next few decades, and food waste will along with it. Currently, the Institution of Mechanical Engineers found that about half of the world’s land suitable for food production is being used for it, about 4.9 Gha (gigahectares) of 10 Gha (“Global Food: Waste Not, Want Not.”). This is out of 14.8 Gha of land in the world, the unusable parts are mainly deserts, tundra, or mountains. If we need to scale up on food production and we need more land, we will be infringing on many

more natural ecosystems and closer to half of the world’s land will be left for the rest of the animal kingdom. Another problem is that the increase in demand for meat will vastly increase our food waste unless major breakthroughs in meat production and overhauls in the meat industry happen in the near future. The current system of producing meat is just plain inefficient.

Why Bugs?

Animals take much more resources to raise compared to the same amount of insects that yield the same amount of energy. For example, take one kilogram of each crickets, beef, pork, and chicken. The Food and Agriculture Organization of the United Nations found that the chicken requires 2.5 kg of feed, the pork 5 kg and the beef a whopping 10 kg (Van Huis et al. 60). Crickets only take 1.7 kg of feed to produce 1 kg of ‘live animal weight’ (Van Huis et al. 60). In addition, about 80% of the cricket is edible compared to 55% of pork or chicken and 40% of beef. This means that in the end, crickets are more than twice as efficient as chicken, the next most efficient animal to farm, and almost twelve times more

efficient than beef. This is also only a comparison for resources in vs resources out, we also have to consider that animal farming emits much more greenhouse gases. In addition to that, we also have to consider that insect farming is at its infancy. Cricket farming has much more room for improvement compared to animal farming and there are also many other potential insect options that could potentially be more efficient than crickets.

Even without considering the environmental impact and resources wasted though, insects have great nutritional value that should be considered on their own. They don’t necessarily need the ‘handicap’ of people only eating them for ethical reasons. In the end, the main three things that people should be considering when deciding what to eat are price, nutrition, and taste. Insects size up favorably for these as well.

Nutrition

When compared to 100 grams of chopped beef, 100 grams of crickets win out universally in terms of nutritional value. Naak, a Montréal based company

aiming to 'democratize insect consumption' claim that the crickets offer three times higher protein, much more essential amino acids, and provides a substantial amount of potassium, omega 3, omega 6, and fiber ("Why You Should Eat Insects: Cricket versus Beef."). This source of nutrition means that crickets could be an alternative source of food for those who want to eat healthy and may want to move away from the other forms of protein such as protein powder or protein bars.

Price

When it comes to price, insects currently lose. This will change as the industry grows bigger and bigger and more efficient, but as of now insects aren't fully competitive, and are roughly two times more expensive to other similar content in the US. As demand increases though, prices will be driven down (maybe even lower than meat) and accessibility will increase.

Taste

The last aspect is taste. When it comes to taste, the website bugible.com says that insects can for the most part be described as

'taste-malleable' (Moore). This means that they take the flavor of what they are seasoned with, for example chili powder crickets will taste very different to lemon crickets. With that said, bugible draws parallels between scorpions and ground beef jerky, crickets and mealworms to nuts, and grasshoppers to a peanut-chicken flavor (Moore). When a consumer can get past the fact that they are eating insects, interesting flavors and great nutritional value can be achieved.

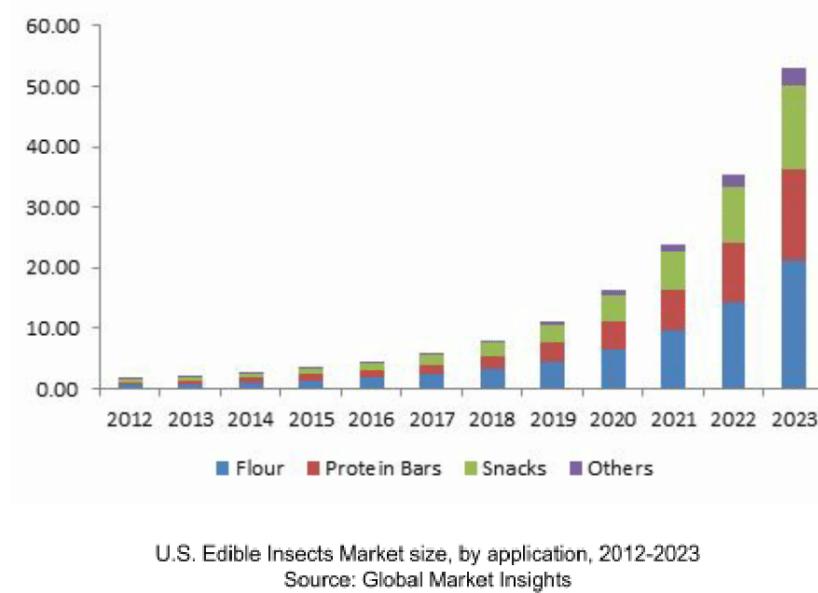
Achieving the end goal

To achieve the end goal of incorporating insects as a more regular part of cuisine, it is critical that there is a step in between eating regular foods and shoving fried crickets down your throat. This step could be what the food industry has done for decades -- masking ingredients. When ingredients are masked, people are much more willing to be adventurous. In fact, comedian Nathan Fielder's TV show featured a poo flavored frozen yogurt in a small frozen yogurt shop and it proved to be successful (*Nathan For You*).



Source: Nathan For You

If people are willing to be adventurous for almost no reason (like for a poo flavor), they will likely be even more incentivized when that sense of adventure has reasoning behind it, like for insects. Playing on people's innate curiosity and getting them to try goods such as cookies, protein bars, or other baked goods that have insects as a masked ingredient will be a very important stepping stone in pushing insects to consumers so that they might be more open to trying insects in other situations where they might not be masked.



Changing consumer perception

Consumer perception of insects is already changing. Recently there has been a huge growth of the vegan movement due to health and ethical concerns. There are many gruesome videos that show how bad the situations can be in animal butchering facilities, and just viewing these has many people reconsidering how much they eat meat. Insect farming is a great alternative to this because people in general care much more about the mistreatment of pigs for example, which are very smart animals, compared to the killing of insects. Insects could be an alternative for prospective vegans to get their protein

from if they aren't fans of tofu.

The growth of the insect market in America reflects this, the market size has grown from under a million to around \$5 million from 2012 to 2018. While we still have a long way to go to match Asia's \$145 million market size, projections from Global Market Insights, a market research company, expect a market size of over \$50 million by 2023 ("Edible Insects Market Size By Product."). This market growth will allow for many more companies like Detroit Ento to start up and will also allow for local stores to carry foods with insects as ingredients as an option. While it may not be beneficial

for all stores to have their reputation associated with using insects in their food, it's very reasonable to expect that some stores will thrive off of it.

Looking to the Future

Insects are becoming a more and more viable food option in the US, slowly trying to transition from a hipster trend into mainstream society. A successful farm local to Detroit, Detroit Ento, has a 3000 square foot facility that produces crickets. Their co-founder, Theo Kozerski stated in an interview with the Detroit Free Press that Detroit is prime territory for an insect farm (Kurlyandchik). Their success as a supplier of ingredients from such an urban facility shows that there is demand for insect ingredients in food already. Their success, and the growing prevalence of insects as ingredients should serve as a green light for any other stores that are intrigued.

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The Psychology of Disgust and Why We Should Overcome it

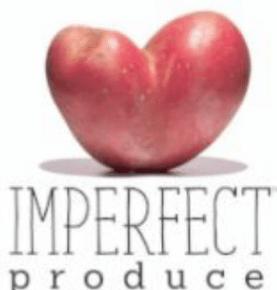
Jake Tracy

Imagine eating a fresh leafy salad, but instead of crunchy croutons, sautéed mealworms. That initial reaction one might experience is a consequence of one's "yuck factor" or capacity for disgust. Disgust is an evolutionary emotion that causes rejection. It keeps us from eating things that might be bad for us like spoiled food. However, I would like to argue that this reaction has started to overstep itself in society and keeps us from living sustainability.

In this first study, scientists used a fart spray to determine how people's moral judgements became more severe. They found that it became more severe as the fart spray intensified. (Wheatley et al.) Even imitations of things that disgust people caused a gut reaction. For example, in Paul Rozin's study, he found that people were more likely to eat chocolate shaped into a disc rather than dog poop

and drink soup from a bowl then a brand-new bed pan (Schnall et al.). Now, the reaction to disgust in these experiments does not have much severity on sustainability but that does not mean the implications of these experiments do not carry over into topics of sustainability.

It has been found that humans tend to lend themselves towards symmetrical produce rather than unsymmetrical and sterilized packaged food, rather than unpackaged, washable, food (Schmidt et al.). This is an issue for farmers who go to sell their produce and large business will not buy it because they know customers will not buy it. In turn, this produces waste of both produce and plastic. Companies like Imperfect Produce are starting to use this to their and the customer's advantage by offering fresh ugly produce delivered to their doors.



This is beautiful too.

By educating the customer, it gives the customer a chance to reappraise the situation. More on that later.

This is also a very similar problem for GMOs. Most people do not know what GMOs are and if or why they should be worried about them. Also, a fun fact for those people is that FDA does not regulate this and already 75-80% of foods in the U.S. already have ingredients that contain some kind of GMO (NBC). I am not saying that playing the processed foods game of not explaining one's ingredients, I am saying that knowing ahead of time is important to making better personal decisions. The studies behind GMOs show that they are safe but they do acknowledge that the technology is new and the testing periods are not long term yet (Jones). There is little knowledge as to the trickle down effects in the ecosystem as well. It looks like GMOs will have a future in food technology, so consumers should pay attention to the literature moving forward.

Many companies exploit the "yuck factor" by demonizing all germs and bacteria; even when we need some germs and bacteria to

live. “Kills 99.9% of germs” is a common expression on many household cleaning products or personal sanitary items. Not only do we need those germs for our body’s natural ecosystem but by using such products we create “superbugs” which become insusceptible to cleaning products and antibiotics (BBC). Our bodies natural processes keep us clean and healthy if we pay attention to what we put in and on our bodies.

Eating Insects is another great idea that has been thwarted off by disgust. First, they are healthier than meat. There are nearly 2,000 kinds of edible insects, many of them packed with protein, calcium, fibre, iron and zinc. A small serving of grasshoppers can contain about the same amount of protein as a similar sized serving of beef, but has far less fat and far fewer calories. Second, raising insects is cheap, or free. Little technology or investment is needed to produce them. Harvesting insects could provide livelihoods to some of the world’s poorest people. Finally, insects are a far more sustainable source of food than livestock. Livestock production accounts for nearly a fifth of all

greenhouse-gas emissions – that’s more than transport. By contrast, insects produce relatively few greenhouse gases, and raising them requires much less land and water. And they’ll eat almost anything (Economist). If we could overcome this social stigma, we would live in a more sustainable time.

As the Food Waste team we actually reached out to some chefs to see what they had to say about personally eating bugs and possibly putting them on the menu.

Cloth diapers are another idea that would greatly benefit society in the long-term but rarely used because of the emotion that they evoke. A typical baby will go through around 4,000 disposable diapers which costs parents approximately \$600 a year. By switching to reusable diapers families can save from \$300 to \$1500 a year. Also, disposable diapers take up to 500 years to decompose (Wirth et al.). At the end of the day, convenience is the biggest factor for parents of infants and that is something they do not see in reusable diapers. That leaves room for companies to educate and sell a more commercially viable product that is also more eco-friendly.

Cost of Diapering

From birth to age 2.5



Source: Mama Natural

Composting is yet another idea that is avoided because of its stigmas. Most people believe that composting or vermicomposting is undoubtedly going to end in a smelly mess of mold and bugs in their kitchens. However, by my own account, I have found to reduce my trash output significantly by using a vermicomposting system in my apartment. Friends, who are not used to the smells of the system (like I), lay claim that they cannot smell the difference unless they open the lid of the bin. These systems are not hard to handle and every household and business could benefit from them, if used correctly.

The “yuck factor” has started to over step itself in society and keeps us from living sustainability. As a solution to this irrational emotional response, I have devolved three ways in which

we might be able to get past these short-term decisions that hurt our long-term goals of living on this planet. The first is to play (the processed food's) game. This means that business with intent towards a sustainable future, using insects as a sort of protein in their product, should just start using the better ingredients (leaving a trail in the ingredient list) and laying out the benefits if they get reprimanded by wary

customers. While this could lead to some bad initial reactions for the trailblazer of this trend, it would certainly pay off in the long-term game. The second solution I offer is "The Reconsider," aka reappraisal, as it is commonly known in psychology. This is for the individual, and it simply involves taking a moment to reconsider why one might have initially thought something was disgusting

and how it might yield different results for one's self; if given a chance. The final solution offered is "The Heart Grabber." This is a marketing tactic for businesses or individuals in which the entity of persuasion, tries to win the individual over using compassion. This is commonly seen in the vegan community with getting people to have sympathy for the animals they kill. So, would you like crickets or croutons with that salad?

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The Role of Insects in Thai Diets

Thomas Branoff

Insects play a large part in many people's diets. Being from western culture, we are not exposed to these various aspects that are growing on the eastern side of the world. Entomophagy is the practice of eating insects. According to a Bangkok post, "insects are not treated as a rustic fare nor a last resort, just another nutritious and gastronomic option."

This is nothing new for the residents of Thailand as this has been apart of their culture for many years. It originally originated in the northeastern part of Thailand which was the poorest part of the country, and they found it very difficult to grow crops and produce. Insects were easy to catch and a pest to produce that was grown. This fare grew as farmers caught the grasshoppers and then sold them to various vendors who would make them into delicious snacks.

The popularity of insects grew as entrepreneurs would collect insects and then travel to large city centers where

they would sell their deep fried critters at the markets.

Globally two million people incorporate insects in their diet and over 1,900 different insect species are consumed. With a growing population and the current deficit that we are running with natural resources there needs to be a global shift and push towards a more sustainable future. Current food production would need to double by 2050 in order to maintain our growing population (Newman).

An important nutrient found in beef is iron and is necessary to maintain a healthy lifestyle. In a study done by Ningbo University in China it was found that crickets have a greater nutritional value than beef. According to Newman, "insects are capable of providing much of the nutrition humanity needs at a lower financial and environmental cost." Eastern culture has caught on to this trend and are more forward thinking when it comes to food supply and waste.

Western culture is going to have to adapt and change there association of disgust with eating insects. Specifically the people of Thailand have had this

forward thinking for a while and that is a reason why entomophagy has been apart of there diet and culture.

According to a Bangkok post, "the culinary heritage has been preserved and developed to accommodate our modern gastronomy and urban lifestyle."

Expanding Entomophagy

A difficult part about incorporating insects into your diet is learning how to cook them correctly. Shown to the right are various dishes with insects incorporated in them. Chef Thitiwat Tantragarn has is going to show us how to cook caterpillars and incorporate them into a meal.

Ingredients needed (Swanson):

- Bamboo Caterpillars
 - Olive oil
 - Paprika
 - Cumin
 - Salt
 - Pepper
 - Scallops
 - Jerusalem artichokes
1. Preheat oven to 350 degrees fahrenheit and cook scallops for 15 minutes.
 2. Set skillet to a medium high heat and add oil.
 3. Mix in bamboo caterpillars when oil gets hot and saute for 7 minutes.



4. Add paprika, cumin, salt, and pepper to the skillet as the caterpillars begin to fry.
5. Plate the artichokes first for visual appeal and as a dip.
6. Next, plate the scallops and garnish with the fried bamboo caterpillars.

Now this completes our first easy and delicious recipe that can be incorporated at home and where the caterpillars can be used as a garnish on many other dishes as well. This tasty treat is filled with nutrition and can easily be incorporated into each of our diets. Tantragarn, our chef, is in search of every edible insect available and has tasted countless insects on his journey trying to develop new recipes. Chef likes to eat insects whenever possible instead of pork,

beef, and chicken because the carbon footprint insects is minuscule compared to meat, they covert feed more efficiently, and are very nutritious not needing much land or water to cultivate.

A notable issue with the supply of insects is the expensive price. The lack of supply has caused insects to be quite expensive as our bamboo caterpillars run around \$15 a pound. Insect farms are going to have to grow much larger and the demand will have to adapt with this change. As insects are commercialized we will see demand and supply grow bringing the equilibrium price of the protein packed bug drop.

Chocolate Chip Cricket Cookies (Norris)

Some of you may not be disgusted by the fact or seeing insects in your food while others may be. A good transition snack into the entomophagous world are cricket cookies.

Ingredients:

- 2 ¼ cups cricket flour
- 1 teaspoon baking soda
- ½ teaspoon salt
- 1 cup butter, softened
- 1 cup sugar
- ½ cup brown sugar
- 1 teaspoon vanilla extract
- 2 eggs
- 1 12-ounce package chocolate chips

1. First preheat the oven to 375 degrees.
2. Combine the flour, baking soda and salt.
3. In a separate bowl combine the butter, sugar and vanilla. Beat in eggs and gradually add the cricket flour mixture and mix until it comes to a thick cream.
4. Add chocolate chips and mix well.
5. Set small balls of dough on to a cookie sheet and bake for 8-10 minutes.



This recipe right here makes a delicious treat for those individuals that are hesitant about adding insects to their diet. For those more adventurous you can add ½ a cup of dry roasted chopped crickets to the mix. This will increase the amount of protein in the cookies while also adding a little crunch! Now it is important to buy cricket flour from a reputable seller when using in this recipe and not just pick the crickets out of your garden as some carry pesticides and insecticides which are harmful when ingested. This flour is extremely nutrient dense, with lots of protein, healthy fats, and fiber. Amazon offers a variety of high quality cricket flower that can be shipped to your door!

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Source: followmefoodie.com

Exploring the novelty of bugs within today's culture

Kevin Tong

Upon entering a supermarket, one would expect the usual: numerous aisles categorized into the common food groups. These aisles are filled with dozens of ingredients that can be used to cook their meals, ranging from pastas and sauces to meats and vegetables. Today, there is a new cooking ingredient on the rise that

many people have not heard of, which are bugs. Yes, you heard it right. Not gummy worms, but the ones that can be found under a garden, or buzzing around their hive on a hot summer day. According to the Food and Agricultural Organization of the United Nations (FAO), many cultures, especially those in the West, are not likely to view bugs as a viable and edible source of protein, but as something that one would eat when prompted by starvation or a mere survival mechanism (FAO 141). In China, bug-eating has not become mainstream within

their food culture yet, but some restaurants saw its potential and took advantage of it (VICE).

The Yunnan bug industry

One of these restaurants can be found in the Yunnan province in China. Joshua Frank, who is the host of VICE International's episode "Inside China's Bug-Eating Industry", travels there to explore why bugs are viewed as an edible delicacy. During Josh's time in Yunnan, he interviews a chef named Li Zengliang. Zengliang runs a restaurant whose menu consists a variety of deep-fried bugs. He explains

that while he prefers not to eat the dishes that he prepares, he states that they have a much higher value than what people usually eat and are surprisingly profitable. Additionally, Zengliang notices that a significant portion of his customers are tourists, which leads to him pondering why they would choose to eat bugs rather than a more appetizing alternative. He explains two reasons: the first one being the nutrition and protein that these bugs provide, and the second one being curiosity. (VICE 13:28-16:35). These reasons that the chef provides support how some businesses in Yunnan utilize the novelty idea of bug-eating to create profit in an environment friendly way.

The wasp whisperer

Within the episode, Frank explores how these bugs are gathered and supplied to restaurants like Zengliang's. The bug gatherers explain their background experience and their process of how they efficiently gather pupae from wasp nests. Before they had the protective wasp suits, as seen in the picture above, they had to torch the wasps



Source: VICE International

in order to kill them and gather the pupae, which can create some potential hazards to the surroundings, as well as affect the future production of the nest's pupae. With the introduction of the protective wasp suits, they are able to safely access the pupae, saving time and increasing profit over the long run (VICE 8:51-10:31). Gathering mealworms from rich soil is relatively easier. Unlike wasps, they are very passive and do not react to sudden movement. Frank demonstrates how easy it was to find a mealworm within a few seconds of digging.

Bug incubation designs

Apart from Yunnan, Frank treks into the Jiangsu province to meet Katharina Unger, who is the co-founder of Livinhive. The intent of Livinhive is to design various tools to efficiently harvest insects, which Unger believes to be a sustainable and alternative food source in the future. One of the designs that Unger demonstrated provides households an opportunity to grow mealworms in their own kitchen (VICE, Part 2 16:33). It features a simple cabinet drawer layout separated into eight containers, with each one representing a week into the incubation process. The bottom container features an isolated area for

pupae to be collected and restarted back to the top container to start the process all over again. The remaining mealworms at the bottom container are then ready to be consumed. The mealworm incubator that Unger designed portrays how a business like Livinhive can expand the availability of edible insects by allowing consumers to grow them fresh within their kitchen. Regardless whether bug-eating in Chinese households becomes more prevalent in the future, it may enlighten other cultures to be more open-minded towards edible insects.

Evolving from novelty to normality

Now, it is clear that some businesses in China uses the novelty that bug-eating provides to benefit society as a whole. By increasing the exposure to tourists and others within these provinces, it allows them to more easily associate bugs as a sustainable food source rather than being treated as a once-in-a-lifetime taste test. While it is much harder to convince individuals who have been taught the negative characteristics that insects possess, a similar feat has been accomplished

before. "Arthropods like lobsters and shrimps [were] once considered poor-man's food in the West, [but] are now expensive delicacies there" (FAO 141). From this finding, it shows how cultural tastes are not static and can evolve over time, at any time. The eventual understanding of nutrition and making these arthropods palatable is the key to how they eventually became widely accepted across the West. The same concept applies to edible insects. The exposure and education are essential to reverse the negative mentality surrounding them (FAO 141-142). It may take an increased effort and many years to break this barrier, but the public had already shown a slight rise in interest with insects during the past decade as more research groups begin to study their benefits (FAO 144). These findings made by the FAO reinforces how Western cultures are willing to accept change like they did with arthropods, as long as it is logical and given enough time.

Wrapping up

As food waste becomes increasingly problematic, it is essential to push the boundaries of culture,

society, and innovation. The first hurdle is to make bug dishes palatable and visually appealing. Li Zengliang personally faces this issue himself, and is the primary reason why bug-eating is not commonly found in many food cultures around the world. The next step is to expose insects to the general public, preferably younger generations, and educate them on their benefits as to why they should choose eating it over alternative sources of protein. Finally, the last obstacle to overcome is to innovate various methods, ideas, and machines to increase the availability of insects within the existing market. By reducing the effort required to harvest insects, it will help disassociate bugs as a novelty food by making it affordable. The challenge to provide today's society with a sustainable food source will be insanely difficult. However, if we push people to approach bug-eating with an open mind, and overcome the three hurdles mentioned above, it will make the process a lot easier. Be on the lookout, perhaps one day there will be a bug aisle opening up at a local supermarket!

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