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NEWS RELEASE

Insects à la carte? - Producing environmentally friendly food while reducing our carbon footprint

Source: Shutterstock.

PRETORIA - Cricket à la king? How about a yellow mealworm burger? Foods that may previously have evoked a 'yuck' response are now firmly on the menu. Research into edible insects by the Department of Zoology and Entomology at the University of Pretoria (UP) is exploring how to rear and harvest this food of the future.

According to Professor Abdullahi Ahmed Yusuf, the Humboldt Ambassador Scientist in South Africa, their work focuses on developing cost-effective rearing techniques, harvesting and handling methods, value addition and legislation in order to ensure the sustainable use of insects.

"We use two commonly used edible insects: the household cricket and the yellow mealworm. The latter is used mostly in animal feed until its recent acceptance for human use by the European Union."

These insects are also easy to rear and have a high reproductive rate.

The study set out to develop alternative and cheaper rearing substrates for the yellow mealworm, which is usually reared on wheat bran.

“Wheat bran is expensive and not readily available, especially for low-income, would-be insect farmers,” he explains. “As such, we evaluated the following six potential substrates: wheat flour, maize flour, Lucerne pellets, dog food, soya flour and oats. Of these, maize and wheat flour were found to be the most cost-effective in comparison to wheat bran.”

The study group went further to see if the same flour could be reused to rear two generations of the yellow mealworm. They were successful, with both wheat and maize flour being the best substrates. Further analysis of the nutritional contents of the insects revealed that they are rich in protein, essential minerals (sodium, magnesium, phosphorus, potassium, copper and zinc) and saturated fatty acids, which are essential for energy, hormone production and signalling processes.

“These nutritional profiles were similar for both generations of insects raised,” Prof Yusuf says. “The finding demonstrates the suitability of local, inexpensive substrates for commercial production of the yellow mealworm, and its use for food and feed.”

Future food

Eating or using insects as animal feed is recommended because of their unique nutritional profile, which compares with or supersedes those of conventional foods. Insects are termed ‘super food’ due to their excellent protein, fatty acid, vitamin and mineral content.

Besides the traditional practice of eating insects, the demand for alternative sources of nutrients for humans and animals has increased, thus having an impact on the need to farm edible insects. Commercial edible insect farms are increasing on the African continent, with the industry projected to be worth US$8 billion by 2030. It is said to replace 60 million tons of traditional feed production and will lead to 200 million tons of recycled crop waste, 60 million tons of organic fertiliser and 15 million jobs.

“In Africa, edible insects are mainly collected from the wild for household consumption and informal trade,” Prof Yusuf says. “Our research at UP has shown that there is a more cost-effective way to rear the most commonly used edible insects on a large scale, which will benefit rural farmers.”

Edible insects could be an inexpensive, environmentally sustainable solution to both malnutrition and land use in Africa.

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>>Watch a short video of Prof Yusuf talking about his research here.

>>This story was originally featured in the Re.Search magazine. Check out Issue 10 of the magazine, which details some of our work, from advancing the field of wound care to understanding supermassive black holes.

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ABOUT THE UNIVERSITY OF PRETORIA

The University of Pretoria (UP) is one of the largest contact and residential universities in South Africa, with its administration offices located on its Hatfield Campus in Pretoria. This 115-year-old institution is also one of the largest producers of research in South Africa.

Spread over seven campuses, it has nine faculties and a business school, the Gordon Institute of Business Science (GIBS). It is the only university in the country with a Faculty of Veterinary Science, which is ranked the best in Africa. UP has 120 academic departments and 92 centres and institutes, accommodating more than 56 000 students and offering about 1 100 study programmes. It has the most academic staff with PhDs (70%), NRF-rated researchers (613).

The 2025 Times Higher Education subject rankings placed UP first in South Africa in the fields of Accounting and Finance; Architecture; Electrical and Electronic Engineering; Law; Sport Science; and Veterinary Science. UP's Faculty of Law has been ranked as the top law school in Africa for a remarkable eighth consecutive year.

Quacquarelli Symonds (QS) ranked the University among the top five in Africa, as part of their 2024 World University Rankings (WUR). UP was the only South African university featured in the 2023 World University Rankings for Innovation (WURI), falling within in the 101-200 range of innovative universities.

For more information, please go to www.up.ac.za