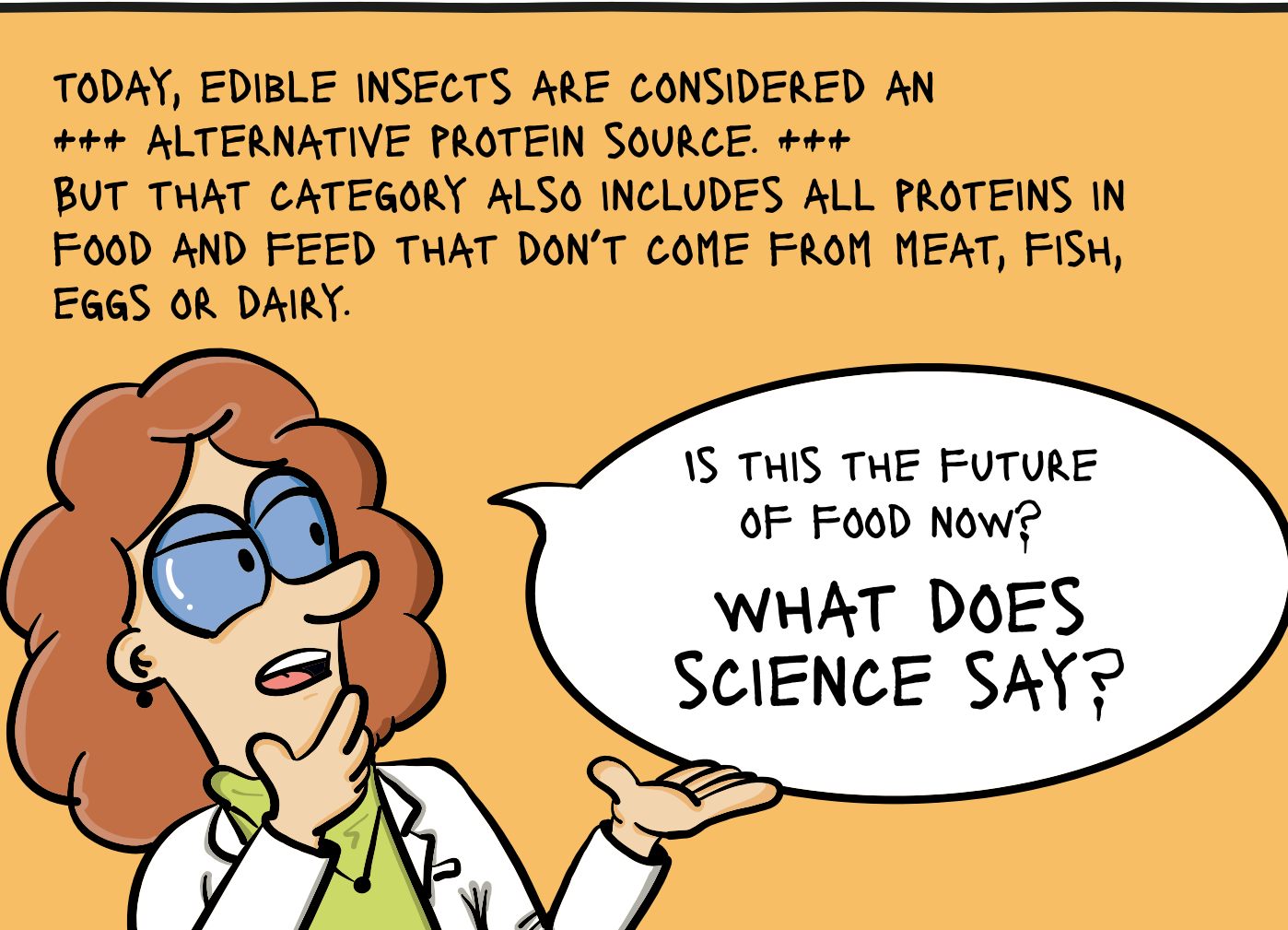
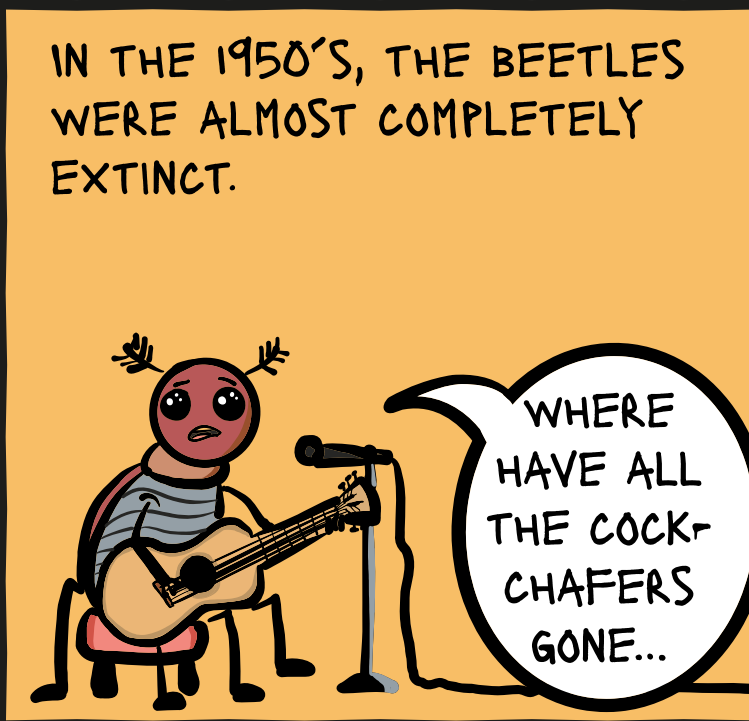
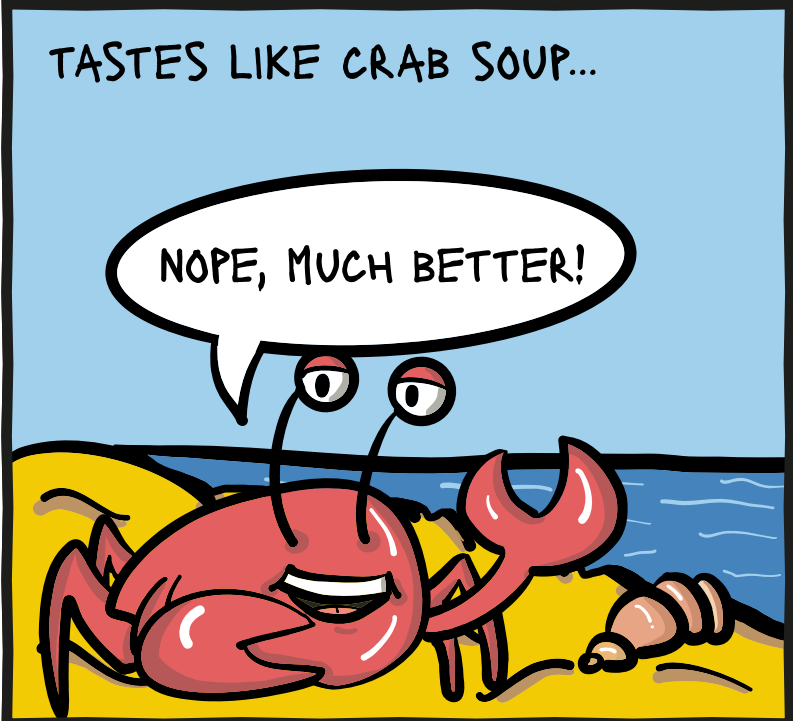
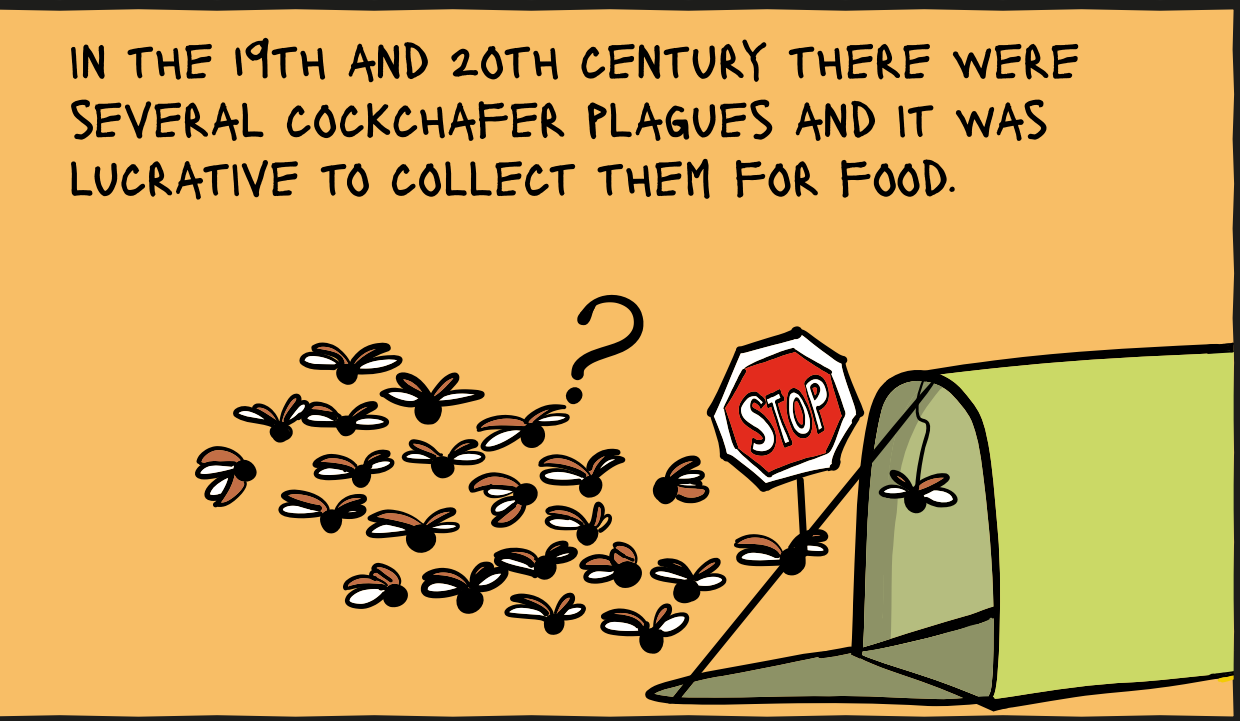
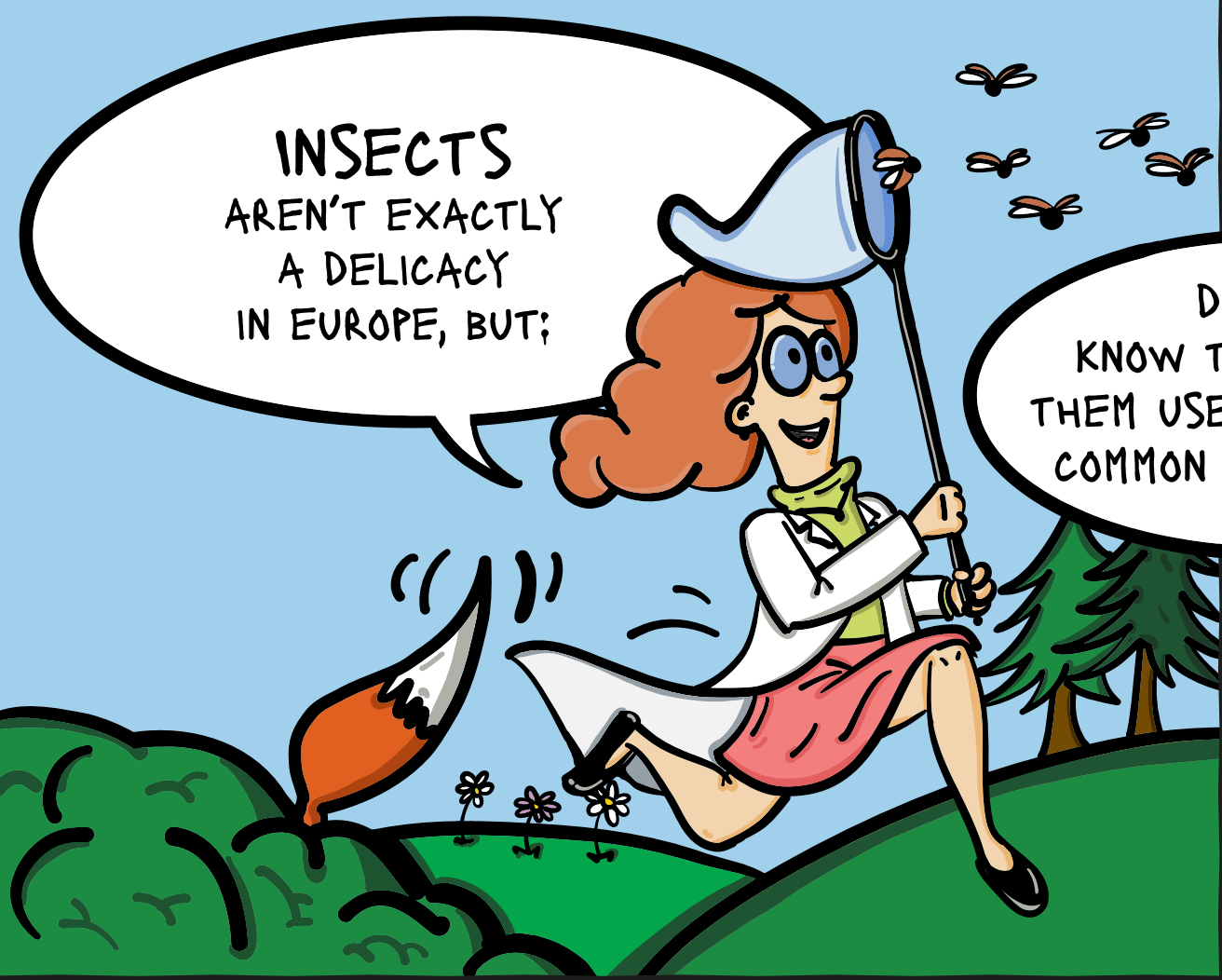


ALTERNATIVE PROTEIN SOURCES



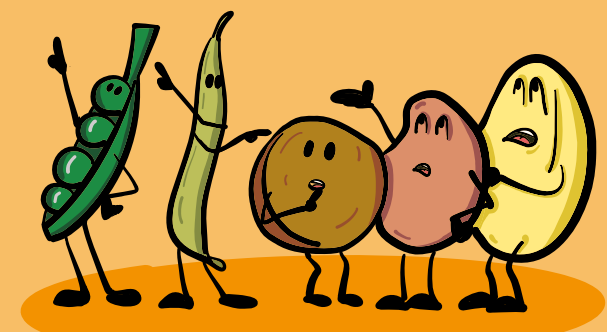
WHAT DOES
SCIENCE SAY?
THE BfR SCIENCE COMIC





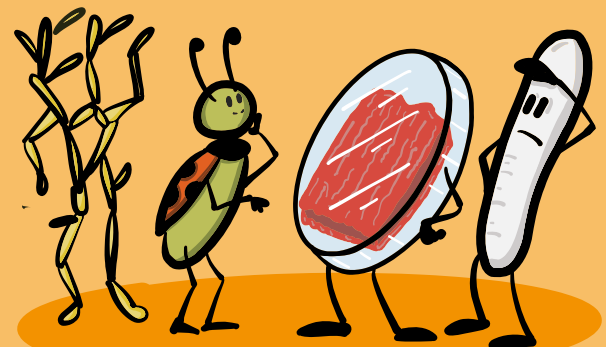
ALTERNATIVE PROTEIN SOURCES

COMMON ON THE E.U. MARKET



- PEAS
- BEANS
- LENTILS
- SOY
- LUPINS

NOT COMMON ON THE E.U. MARKET YET



- INSECTS
- CULTURED MEAT
- MYCOPROTEIN BIOMASS
- MICROORGANISMS

PROGNOSES POINT TO A GLOBAL PROTEIN DEFICIT IN THE SUPPLY OF THE WORLD'S GROWING POPULATION. THIS COULD BE OFFSET BY ALTERNATIVE PROTEIN SOURCES.*

EXCUSE ME, DOCTOR!?

THE ECOLOGICAL FOOTPRINT OF SEVERAL ALTERNATIVE PROTEIN SOURCES SUCH AS INSECTS IS FAR SMALLER THAN FOR CATTLE OR PIGS.

THAT'S EXACTLY RIGHT! AND **WHY?** SHOOT!!!

OUR PLEASURE!

* SOURCE: BFR FAQ ALTERNATIVE PROTEIN SOURCES, (NOV. 2024), https://www.bfr.bund.de/en/lupins_insects_or_lab_grown_meat_what_is_the_current_state_of_health_risk_assessment_for_alternative_protein_sources_319953.html (ZUGRIFF: 2/12/2024)

GLOBAL PROTEIN DEMAND WILL INCREASE BY 75 % BY 2050.**

LESS LAND AND WATER IS NEEDED FOR PRODUCTION AND THEY PRODUCE LESS GREENHOUSE GAS THAN CONVENTIONAL LIVESTOCK FARMING.

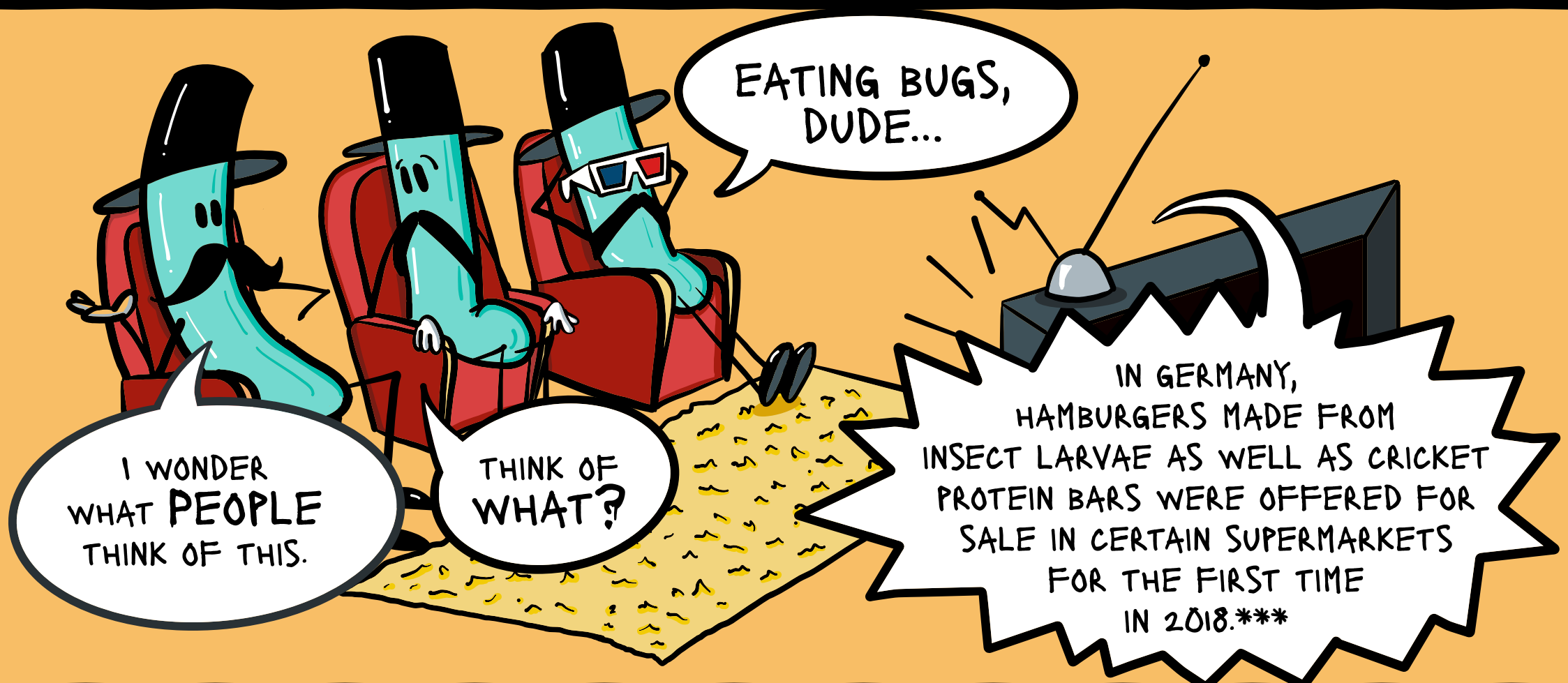
** SOURCE: REPORT FOR HIGH-LEVEL EXPERT FORUM „HOW TO FEED THE WORLD 2050“, (OCT 2009), FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS (FAO), https://www.fao.org/fileadmin/templates/wsfs/docs/ISSUES_PAPERS/HLEF2050_INVESTMENT.PDF (ACCESS: 22/11/2024)

LEGUMES SUCH AS PEAS, BEANS, LENTILS AND SOY HAVE BEEN ESTABLISHED AS PLANT-BASED ALTERNATIVE PROTEIN SOURCES HERE FOR SOME TIME. NOW, THIS ALSO INCLUDES LUPINS...

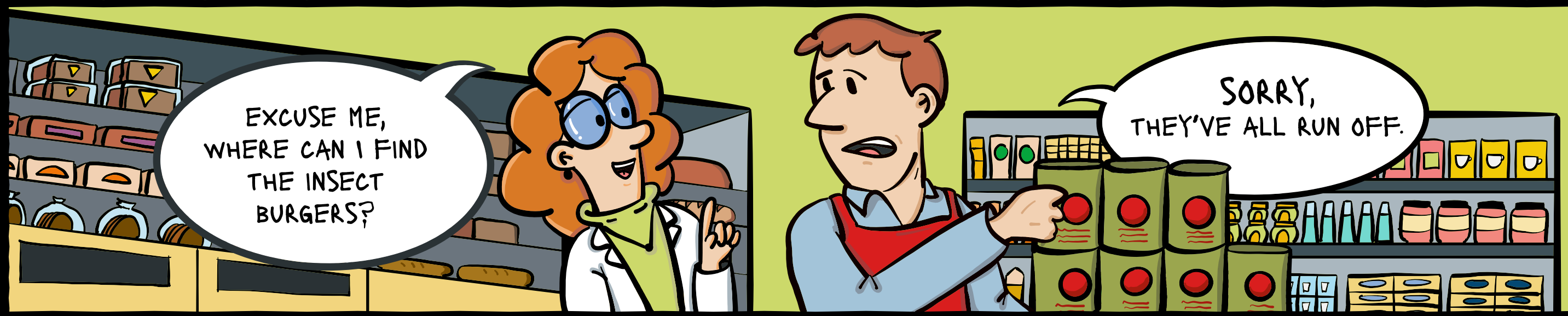
MYCOPROTEINS FROM FUNGI ARE ALSO BEING USED IN PROCESSED MEAT SUBSTITUTES. IN ASIA AND AFRICA MICROALGAE ARE AN IMPORTANT SOURCE OF PROTEINS.

...WHICH HAVE THE HIGHEST PROTEIN CONTENT OF ALL DOMESTIC LEGUMES.



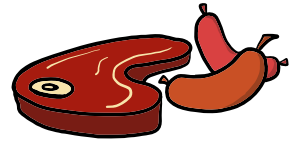


WOW! WHAT ABOUT INSECTS AND CULTURED MEAT?



*** SOURCE: INSEKTENBURGER, "PASTA & CO: WAS IST AUS DEM TREND MIT LARVEN UND GRILLEN GEWORDEN?", BUSINESSINSIDER.DE/GRÜNDERSZENE, (JUL 2021), [HTTPS://WWW.BUSINESSINSIDER.DE/GRÜNDERSZENE, \(JUL 2021\)](https://www.businessinsider.de/gruenderszene/food/insekten-trend-lebensmittel-2021-02/), [HTTPS://WWW.BUSINESSINSIDER.DE/GRÜNDERSZENE/FOOD/INSEKTEN-TREND-LEBENSMITTEL-2021-02/](https://www.businessinsider.de/gruenderszene/food/insekten-trend-lebensmittel-2021-02/), (ACCESS: 22/11/2024)

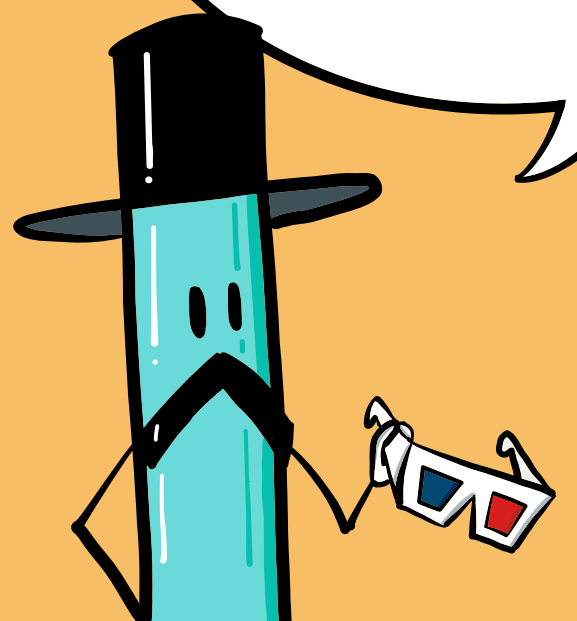


BUT;
PEOPLE IN GERMANY
ARE OPEN TO PROTEIN
SOURCES THAT AREN'T
TRADITIONALLY
MEAT-BASED.

WHICH FOOD CATEGORIES DO YOU TYPICALLY CONSUME ON A DAILY BASIS? **			2016	2024
FRUITS & VEGETABLES			74%	71%
DAIRY PRODUCTS			59%	62%
MEAT & SAUSAGES			34%	23%
VEGAN + VEGETARIAN ALTERNATIVES TO ANIMAL PRODUCTS			2%	10%
FISH & SEAFOOD			2%	1%

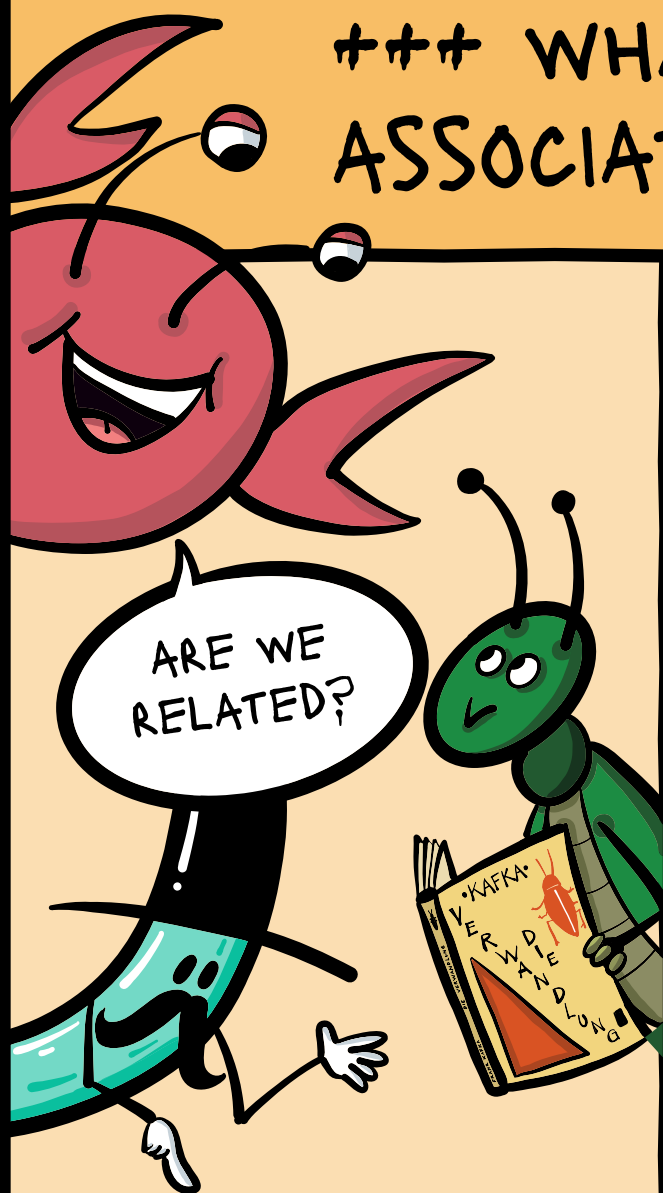
** SOURCE: SAMPLE: 1,001 REPRESENTATIVE GERMAN CITIZENS AGED 14 YEARS AND OLDER, FORSA NUTRITION REPORT 2024, ON BEHALF OF BMEL.

ALTHOUGH
THE CONSUMPTION OF
PLANT-BASED PROTEINS
CONTINUES TO INCREASE,
CONSUMERS IN EUROPE ARE
+++ **SKEPTICAL** +++
OF EATING INSECTS.*



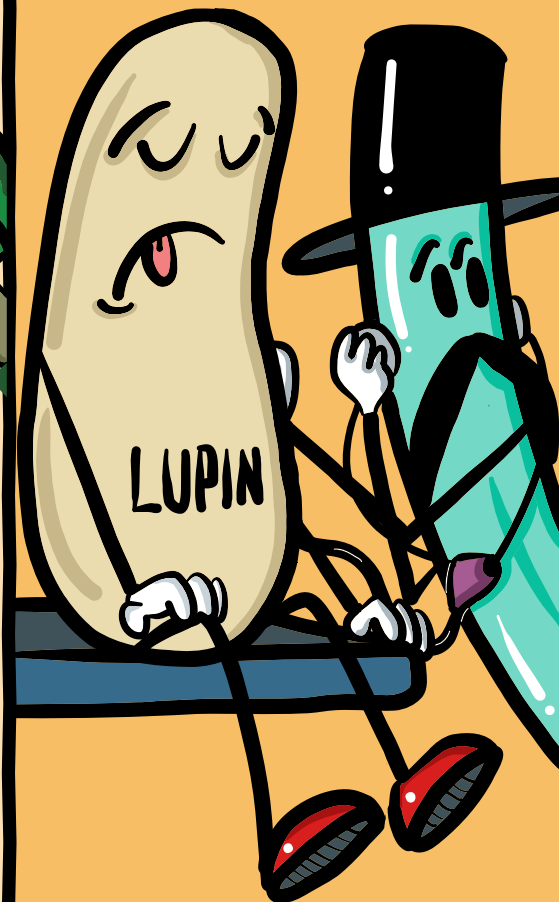
* SOURCE BFR FAQ ALTERNATIVE PROTEIN SOURCES, NOV. 2024, [HTTPS://WWW.BFR.BUND.DE/EN/LUPINS__INSECTS__OR__LAB_GROWN_MEAT__WHAT_IS_THE_CURRENT_STATE_OF_HEALTH_RISK_ASSESSMENT_FOR_ALTERNATIVE_PROTEIN_SOURCES_317453.HTML](https://www.bfr.bund.de/en/LUPINS__INSECTS__OR__LAB_GROWN_MEAT__WHAT_IS_THE_CURRENT_STATE_OF_HEALTH_RISK_ASSESSMENT_FOR_ALTERNATIVE_PROTEIN_SOURCES_317453.HTML), (ZUGRIFF: 2/12/2024)

+++ WHAT IS KNOWN ABOUT POTENTIAL HEALTH RISKS ASSOCIATED WITH ALTERNATIVE PROTEIN SOURCES? +++



MICROBIOLOGICAL RISKS

NOVEL PROTEIN SOURCES MAY CONTAIN BACTERIA, VIRUSES OR...

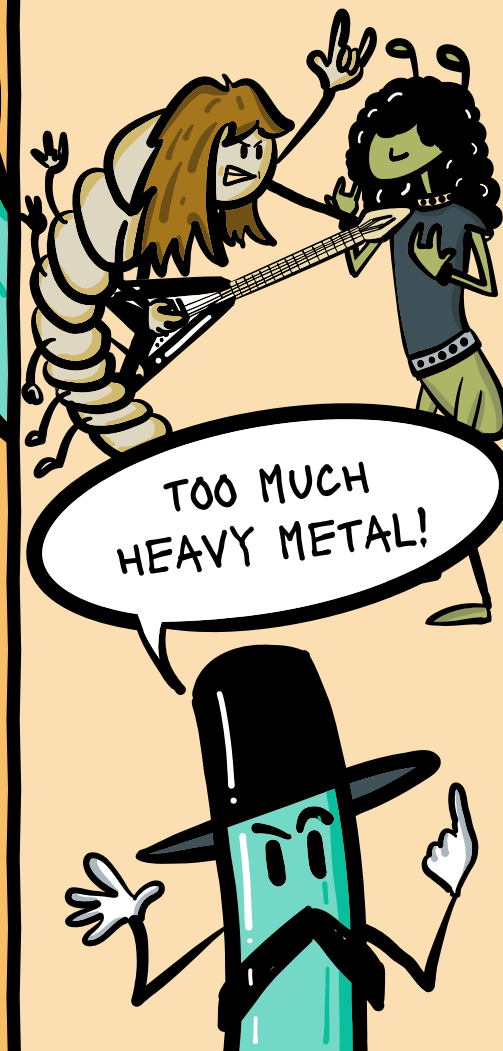


...OTHER MICROBIOLOGICAL CONTAMINANTS.

INADEQUATE PROCESSING OR HYGIENE DEFICIENCIES CAN INCREASE THE RISK.

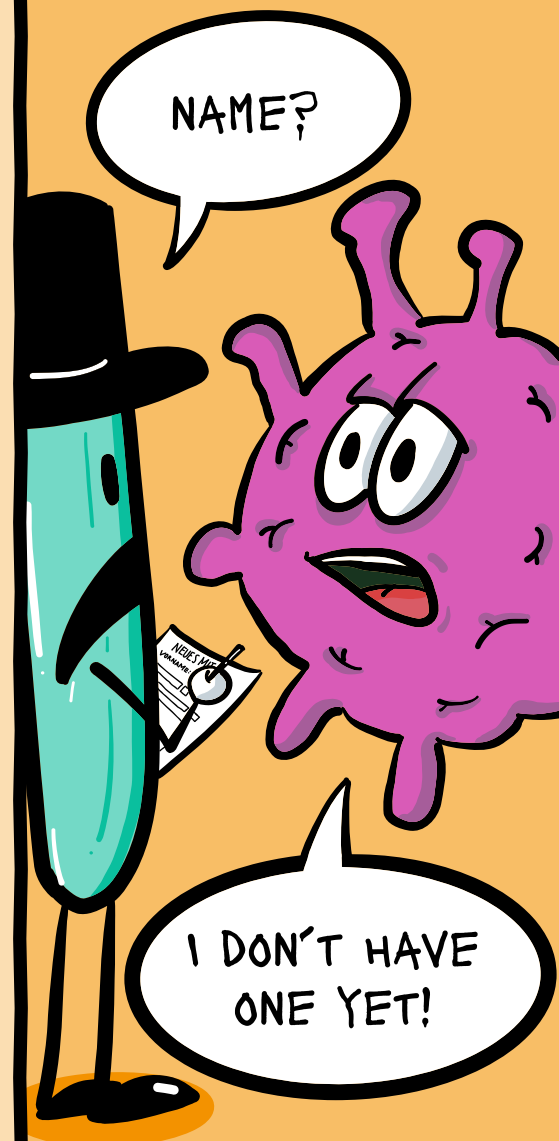
CONTAMINANTS

THEY CAN ACCUMULATE UNDESIRABLE SUBSTANCES SUCH AS HEAVY METALS, PESTICIDES, OR CHEMICALS, E.G. IF THEY COME FROM CONTAMINATED AREAS.



UNKNOWN TOXINS

THIS APPLIES PARTICULARLY TO EXOTIC PLANTS OR NEWLY DISCOVERED MICROORGANISMS.



PROCESSING

PROCESS CONTAMINANTS MAY BE FORMED DURING PRODUCTION.



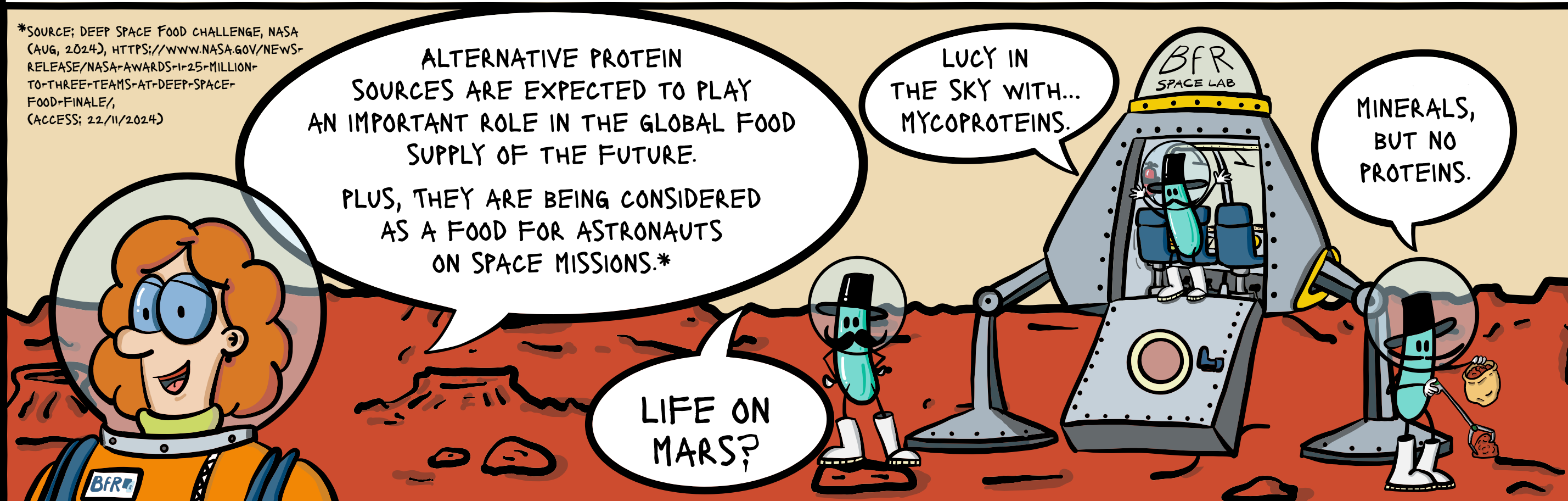
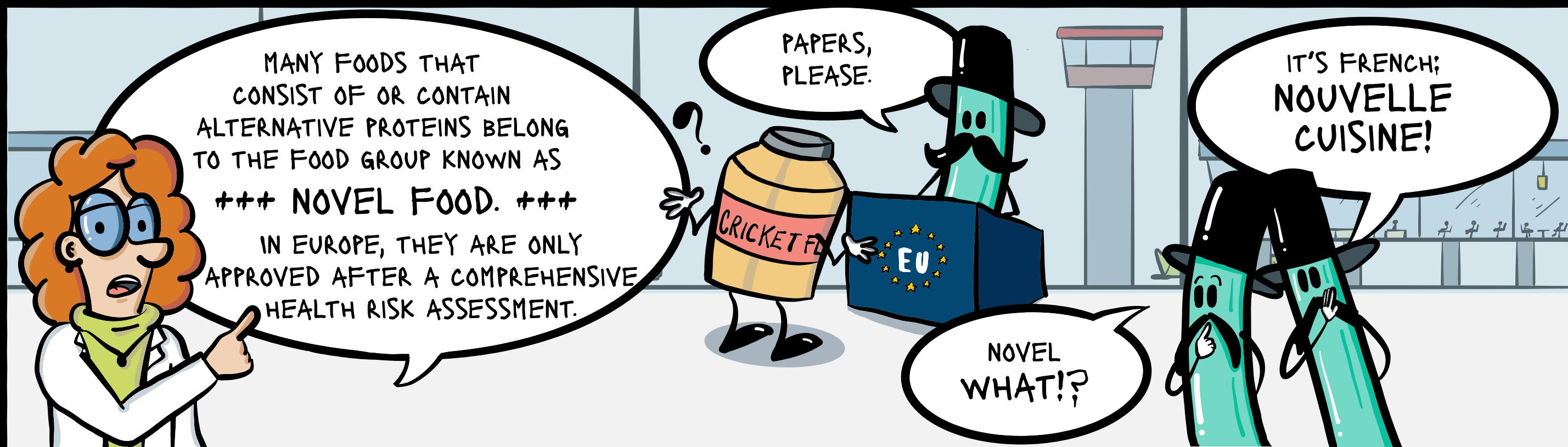
ALLERGIC REACTIONS (CROSS REACTIVITY)

PEOPLE ALLERGIC TO CRUSTACEANS, DUST MITES AND MOLLUSCS MAY EXPERIENCE ALLERGIC REACTIONS TO INSECTS AS WELL, DUE TO THEIR VERY SIMILAR PROTEINS.

THE BFR IS TASKED WITH ASSESSING EXISTING HEALTH RISKS AND IDENTIFYING NEW ONES.

THIS ALSO INCLUDES DEVELOPING TESTS ON THE ALLERGENIC POTENTIAL OF ALTERNATIVE PROTEIN SOURCES.





*SOURCE: DEEP SPACE FOOD CHALLENGE, NASA (AUG, 2024), [HTTPS://WWW.NASA.GOV/NEWS-RELEASE/NASA-AWARDS-1-25-MILLION-TO-THREE-TEAMS-AT-DEEP-SPACE-FOOD-FINALE/](https://www.nasa.gov/news-release/nasa-awards-1-25-million-to-three-teams-at-deep-space-food-finale/), (ACCESS: 22/11/2024)

This text version is a translation of the original German text which is the only legally binding version.

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Protecting Health