CHALMERS
UNIVERSITY OF TECHNOLOGY

CITIZEN SCIENCE UNLOCKS THE DIVERSITY OF SWEDISH HONEY YEAST

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MICROBIAL DIVERSITY IS A FANTASTIC RESOURCE FOR APPLIED BIOTECHNOLOGY. YEASTS CAN BE DEVELOPED INTO EFFICIENT MICROBIAL CELL FACTORIES, BUT FIRST, THEY MUST BE CAPTURED! HONEYBEES COLLECT SUGAR AND POLLEN FROM A WIDE VARIETY OF PLANTS...

...SIMULTANEOUSLY, BEES ALSO GATHER VARIOUS MICROORGANISMS FROM THE ENVIRONMENT, WHICH BECOME A SMALL BUT NATURAL PART OF HONEY.

WE USED SOCIAL MEDIA TO CONTACT THE BEEKEEPERS IN SWEDEN AND ASKED THEM TO HELP US CAPTURE THE NATURAL BIODIVERSITY OF HONEY YEASTS.

THIS IS WHAT OUR POST LOOKED LIKE, WRITTEN IN SWEDISH →

ÄR DU BIODLARE OCH VILL HJÄLPA CHALMERSFORSKARE ATT HITTA VILDJÄST I HONUNG?

Vi vet väldigt lite om vilka vilda jäst-arter som finns i svensk honung. Jästforskare på Chalmers tekniska högskola söker därför efter biodlare som kan och vill hjälpa till att upptäcka den biologiska mångfalden av jäster som döljer sig i honung.

Forskningsprojektet utförs vid institutionen för life sciences, Chalmers tekniska högskola, Göteborg.
Forskningsledare: Cecilia Geijer, docent.

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THE RESPONSE WAS MASSIVE; WITHIN A WEEK, WE RECEIVED HUNDREDS OF EMAILS FROM BEEKEEPERS WHO WANTED TO CONTRIBUTE TO OUR CITIZEN SCIENCE PROJECT...

...WE SENT THEM A SAMPLING KIT CONTAINING SHORT INSTRUCTIONS, STERILE TUBES, AND A PRE-ADDRESSED RETURN ENVELOPE.

Honey ID 1
Honey ID 2
2 kg
Return address To Chalmers

THIS APPROACH ALLOWED US TO SAMPLE HONEY FROM A HUNDRED UNIQUE GEOGRAPHIC LOCATIONS WITHOUT TRAVELLING.

H_2O

Honey ID 1

WE DILUTED THE FRESH HONEY SAMPLES 1:4 IN WATER AND CENTRIFUGED THEM. THIS ALLOWED US TO COLLECT THE CELLS FROM THE BOTTOM PELLETS.

WE SPREAD THE PELLETS ON YPDF PLATES (YEAST PEPTONE DEXTROSE FRUCTOSE) WITH ANTIBIOTICS TO PREVENT BACTERIAL GROWTH.

SINGLE COLONIES WERE ISOLATED AND PURE-STREAKED.

THE DNA WAS EXTRACTED FROM THE STRAINS, THE ITS-BARCODING REGIONS WERE PCR-AMPLIFIED, AND THE SPECIES WERE UNCOVERED!

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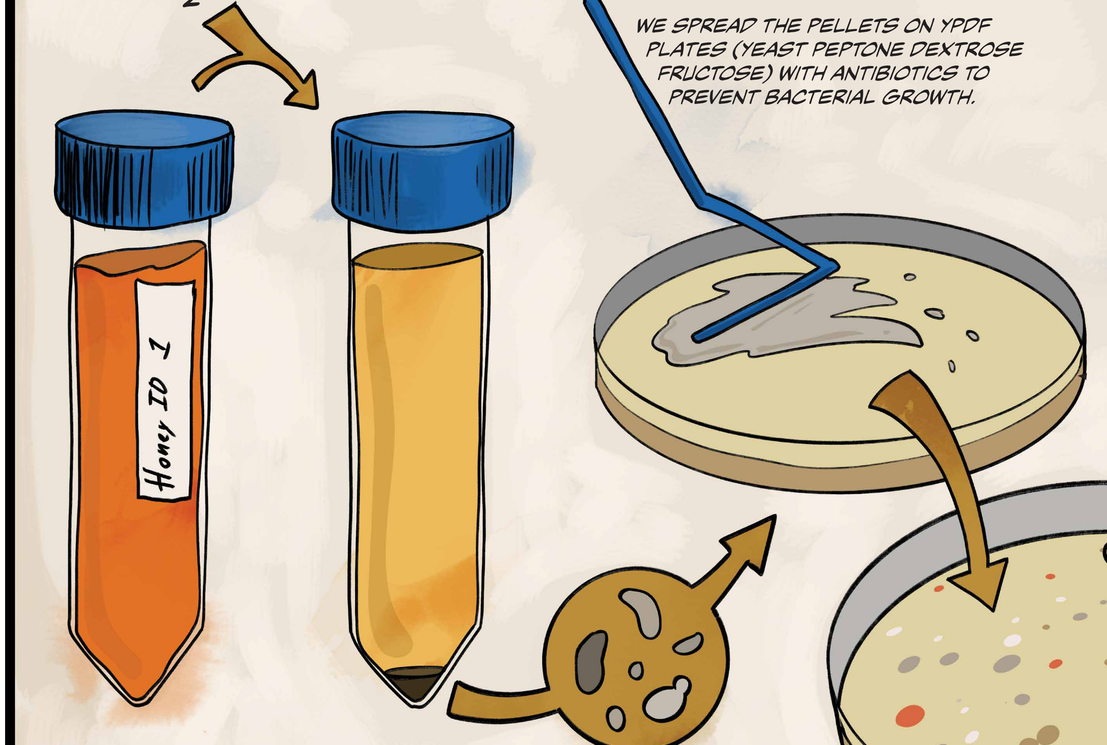
CULTURES WERE PRESERVED IN -80°C GLYCEROL STOCKS FOR LATER USE. THE ENTIRE STRAIN COLLECTION SPANS A TOTAL OF 2500 ISOLATES, WHILE WE HAVE NOT YET IDENTIFIED ALL STRAINS, WE BELIEVE IT CONTAINS AROUND 100 DIFFERENT SPECIES.

WE FOUND A DIVERSE SET OF SPECIES!



MANY SPECIES PRODUCE VALUABLE METABOLITES SUCH AS MICROBIAL OILS, SURFACTANTS, AND POLYOLS WITH BIOTECHNOLOGICAL APPLICATIONS. WITH A LARGE AND DEFINED STRAIN COLLECTION LIKE THIS, THE APPLICATIONS ARE ENDLESS. SEVERAL OF THE IDENTIFIED HONEY YEASTS CAN FACILITATE THE SHIFT TO SUSTAINABLE AND ENERGY-EFFICIENT BIOCHEMICAL PRODUCTION USING YEASTS AS FUTURE CELL FACTORIES...

...WE ARE CURRENTLY SCREENING THE HONEY YEASTS FOR MOLD-BIOCONTROL ACTIVITY. BIOCONTROL COMPOUNDS CAN BE USED TO PREVENT SPOILAGE OF FRUITS AND VEGETABLES AND PROLONG THEIR SHELF LIFE.

TO BE CONTINUED...

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