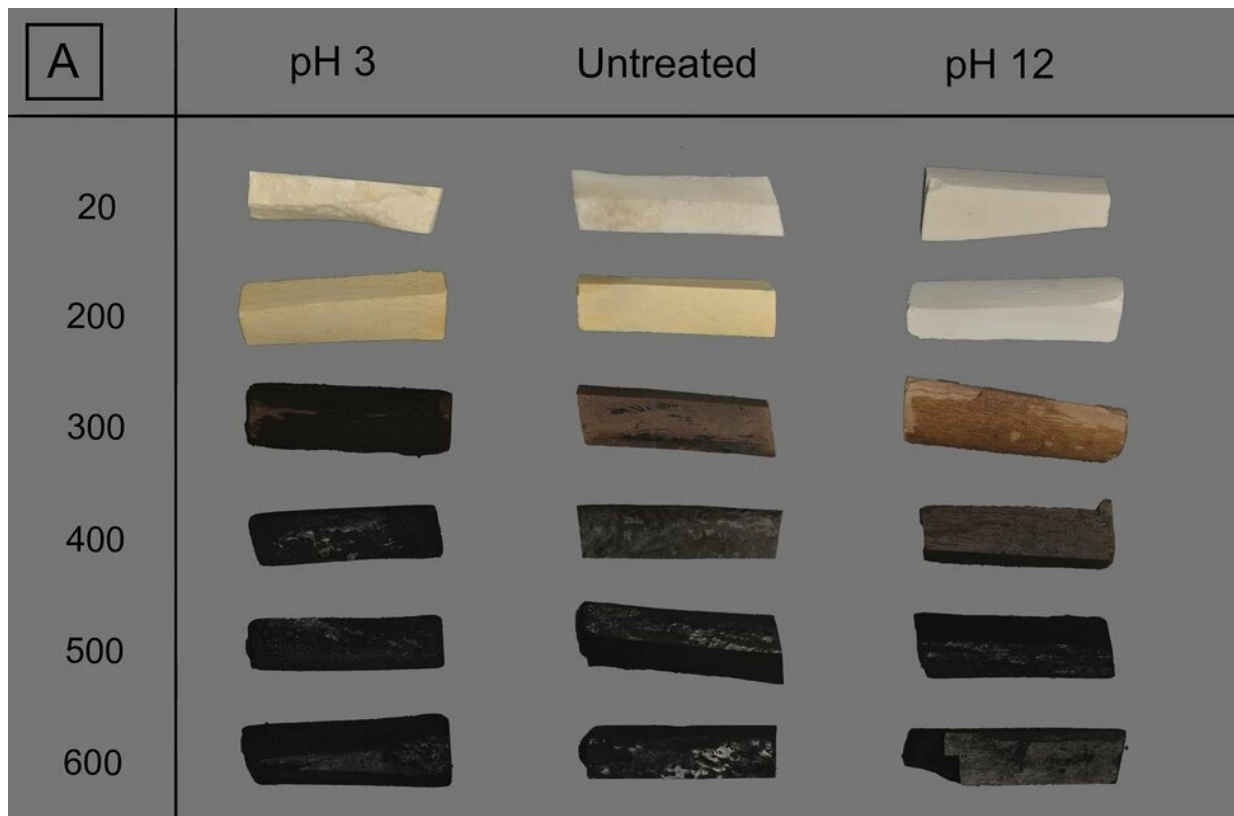


New technique makes it easier to determine how human ancestors used fire

November 2 2022, by Dagmar Aarts



Overview of the variation in color for charred (A) and combusted (B) bone exposed to pH 3 and pH 12 conditions. Credit: *Scientific Reports* (2022). DOI: 10.1038/s41598-022-21622-5

The use of fire can tell us a lot about human evolution. Archaeologist Femke Reidsma has developed a more accurate technique to identify

how our ancestors used fire, implying that existing archaeological studies may need to be revised. Reidsma's study was published in *Scientific Reports* on November 2.

Archaeologists can learn a lot about how our ancestors used fire by studying heated bone and other remains in the [soil](#). And fire use gives us insight into a whole host of steps within human evolution: cooking, keeping ourselves warm, hunting and influencing the landscape around us, for instance, but also the development of language and culture.

Reidsma wondered whether the techniques [archaeologists](#) use to say something about fire use were reliable. "I wanted to know whether we are drawing the right conclusions when remains—heated bones in this case—have been under certain conditions in the ground."

Lab research

The answer proved to be no, Reidsma discovered after experiments in the lab. She heated bones in different ways, with and without oxygen. From her previous research, she already knew that this makes a difference to a bone's composition and therefore to what can happen to it in the ground.

For the publication in *Scientific Reports*, Reidsma studied the effect of different pH values (acid, alkaline and neutral) on the heated bones because the soil can have different chemical compositions and consequently different pH values. This resulted in a [toolkit](#) comprising a reference dataset and a collection of analytical techniques that provide a more accurate picture of what has happened to heated bones in the soil.

Human behavior

Archaeologists will be able to use the toolkit at any site, regardless of its age or location, to see whether the absence of traces of fire is because no fire was used or because no remains of fire have been preserved. "This will tell us more about [human evolution](#)," says Reidsma. The toolkit will also enable archaeologists to correct for the effect of soil and interpret the use of fire more accurately if heated [bone](#) has survived.

Reidsma thinks that some existing [archaeological studies](#) will need revising on the basis of her study. For example, studies that aim to ascertain which early hominins could use fire based on the presence and absence of heated material. "Until now, we had no data on the effect of soil conditions on the material, so that was not taken into account in previous studies."

Forensic research

Not only can the new toolkit be widely used by archaeologists but it is also of interest to others who work with bones found in the ground. Forensic experts, for instance, who are investigating a [fire](#).

"The effect of soil on remains is also relevant to their work," says Reidsma. "I therefore hope that the publication in *Scientific Reports* will allow a wide scientific audience to read about my research."

More information: Femke H. Reidsma, Laboratory-based experimental research into the effect of diagenesis on heated bone: implications and improved tools for the characterisation of ancient fire, *Scientific Reports* (2022). [DOI: 10.1038/s41598-022-21622-5](https://doi.org/10.1038/s41598-022-21622-5)

Provided by Leiden University

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