

Evolution & Behavior

High in the Pamir Mountains: Ancient Cannabis Smoking in Western China

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ABSTRACT

This study traces some of the earliest evidence for cannabis smoking back to ancient burials in the high mountains of the Pamirs in far western China. People were burning the plant about 2500 years ago as part of a mortuary ritual. The chemical analysis suggests that those people were aware of and targeting plants with a higher THC level than would be expected



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Cannabis is one of the most contentious and widely used drug plants in the world today. However, its history of use and the role that it played among peoples in the past is poorly understood. Historians and archaeologists have debated about ancient drug use for over a century, and cannabis has been the focus of this debate. Nevertheless, it is hard to wade through all the claims of ancient cannabis use to separate fact from myth. With modern scientific methods, it is now possible for scholars to trace back these early uses. In this study, published in *Science Advances* in June of 2019, an international group of researchers examined the chemical signature on incense burners from ancient graves. The burners provided early evidence of cannabinoid residues and

suggested that people were burning the plant as part of a funerary ritual. High levels of THC on these burners also indicated that the specific plants that they used had higher active compound levels than what is typical for wild populations.

The species, *Cannabis sativa*, is hugely diverse in morphology and chemical composition. There are cultivated varieties that can grow over four meters tall and dwarfing varieties that are less than half a meter tall. Likewise, some varieties have been selected for fiber use, with low levels of active compounds, and others chosen for their active compounds. The species was first cultivated and eventually domesticated in East Asia as a grain crop,

for its oily seeds, more than 6000 years ago. However, the lineage that led to hemp followed a different pathway towards domestication than the cannabis plants used as a drug. Additionally, wild cannabis plants are prominent from what is today central China to the Caucasus. The wild plants are also low in THC, but some select populations with higher chemical production levels may have existed in the past.

The widely cited account of Herodotus from around 450B.C. provides an ancient description of the people who lived around the Caspian Sea using the plant in mortuary rituals. Similarly, the discovery of a pouch of cannabis seeds in a frozen burial of the Pazyryk Culture, in the Altai Mountains of southern Russia, dates to roughly 300B.C., further illustrating how wide-spread this practice was. Archaeologists have also recently discovered desiccated cannabis plants from burials at the Jiaya and Yanghai cemeteries in the autonomous region of Xinjiang in western China. This chemical residue study was conducted on burners recovered from the Jirzankal Cemetery in the Tashkurgan Tajik Autonomous County of the Xinjiang in western China, on the west bank of the Tashkurgan River. The area is hyper-arid and frozen for most of the year, leading to exceptional preservation, but would not have been ideal for people to live in the past. The cemetery extends across three terraces, and the lowest one is at about 3060masl. The highest one is at about 3080masl. The graves are visible on the surface due to stone designs and patters laid out as markers. A team from the Institute of Archaeology, Chinese Academy of Social Sciences, under the direction of Xinhua Wu, excavated the site.

Researchers took samples from the inside and outside surfaces of the wooden burners. Then, they

processed them in the laboratory at the Institute for Vertebrate Paleontology and Paleoanthropology under the direction of Meng Ren. The overall study was organized, directed, and run by Yimin Yang of the University of the Chinese Academy of Sciences. The samples were processed using GC-MS (Gas Chromatography-Mass Spectrometry). The method breaks down the samples into their smallest forms and provides a material reading of the compounds present. This team of scholars targeted these artifacts, given the likelihood that they were used for cannabis burning. All participating scholars were pleased to see how well preserved the chemical signature was.

While there are several other significant discoveries of ancient cannabis use for its chemical properties that date to the late first millennium BC, our study really emphasizes that people were interacting with this plant and aware of the higher levels of chemical production. It is clear that humans have always observed the biotic world around them and interacted directly with plants. While older discoveries of cannabis use may come out in the future, with a greater application of phytochemical studies in archaeology, our research is crucial for understanding the antiquity of drug use.

Our study shows that people were burning cannabis in western China at about 2500 years ago as part of a mortuary ritual. The chemical analysis suggests that this cannabis had a higher THC level than would be expected from the wild. Such levels, possibly imply that people were aware of and targeting specific plants or populations of plants with higher chemical production.