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Introduction

Palynology, the study of pollen and spores, has found increasing application in forensic science, particularly in criminal investigations and archaeological research [1]. Pollen grains, due to their durability and widespread distribution, can be preserved in a variety of materials, such as soil, fabrics, and human remains, making them invaluable tools for tracing the movements of individuals and reconstructing past environments. The ability to identify specific plant species and their geographic distribution has led to the integration of palynology into forensic science, where it is used to provide critical evidence in cases involving unexplained deaths, missing persons, and historical investigations [2]. In forensic contexts, pollen analysis can help establish the geographic origin of a suspect, victim, or object, providing essential clues about crime scenes. Pollen assemblages found on a victim's clothing, for example, can link them to a particular location or suggest the timing of an event [3]. Moreover, the seasonal and regional variations in pollen types allow forensic palynologists to estimate the time of death or the time period during which a crime occurred. The technique also aids in the investigation of cold cases by providing new avenues for linking people and places based on subtle traces of environmental evidence that might have been overlooked by other methods. In archaeology, palynology offers a window into past landscapes, ecosystems, and human activity [4]. Ancient pollen records preserved in sediment cores from lakes, bogs, or archaeological layers can reveal the history of human settlement, agricultural practices, and environmental change over millennia.

Results and Discussion

The application of palynology in forensic science has yielded significant findings, particularly in cases where conventional methods, such as DNA or fingerprint analysis, are inconclusive [5]. In one forensic case study, pollen samples collected from a victim's clothing were analyzed and matched to specific plant species found only in a particular region. This geographical link helped to narrow down the crime scene location and supported the hypothesis that the victim had been in a remote area prior to their death. Similarly, pollen found on tools or objects can suggest their origin, helping to place them at a specific location or at a particular time, which can be vital in solving crimes. In another case involving a historical crime investigation,
