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HOW TO CITE:
Thackeray F. Use of cocaine and cannabis in 17th-century Italy and England, with reference to Shakespeare. S Afr J Sci. 2025;121(9/10), Art. #21465. https://doi.org/10.17159/sajs.2025/21465

ARTICLE INCLUDES:
☐ Peer review
☐ Supplementary material

KEYWORDS:
cannabis, cocaine, tobacco pipe, Shakespeare, 17th century

PUBLISHED:
29 September 2025

Use of cocaine and cannabis in 17th-century Italy and England, with reference to Shakespeare

Significance:

- Chemical evidence for the use of cocaine (*Erythroxylum*) and cannabis (*Cannabis*) in the early 17th century has been obtained from corpses in a crypt in Milan.
- Chemical evidence for the smoking of cocaine and cannabis is indicated from chemical analyses of early 17th-century clay 'tobacco' pipes from England.
- The combination of literary and chemical evidence supports a hypothesis that William Shakespeare used hemp/cannabis for creative writing ("invention in a noted weed", Sonnet 76).
- There is no evidence that the Bard used *Erythroxylum.* Sonnet 76 relates to turning away from "compounds strange", i.e. strange drugs.
- There was a need to be cryptic about the smoking of cannabis in the 17th century.

Giordano et al.[1] have published a dramatic article entitled 'Forensic toxicology backdates the use of coca plant (*Erythroxylum* spp.) in Europe to the early 1600s', pointing to the probable chewing of cocaine-rich leaves. The new evidence has been obtained from archaeotoxicological analysis of brain tissue from human bodies in an early 17th century Ca'Granada crypt in Milan, supplementing evidence (from femoral bone) for the use of cannabis (*Cannabis* spp.) by other individuals represented in the same crypt adjacent a hospital.[2] They state:

> *The alkaloid of cocaine was detected in two separate biological samples and can be associated* [with] Erythroxylum *spp. consumption. Given that the plant was not listed inside the detailed hospital pharmacopeia, it may not have been given as a medicinal remedy but may have been used for other purposes*.[1]

Whereas the new report refers to early 17th century human cranial tissue in Italy, attention can be directed to a publication by Thackeray et al.[3] in 2001 in the *South African Journal of Science*, pointing to the smoking of coca leaves in early 17th century clay 'tobacco' pipes from Stratford-upon-Avon (Harvard House, specimen WS-7A) and Abingdon (near Oxford, specimen 1912.6) in England. Cocaine was indicated by m/z mass:charge ratios determined from gas chromatography with mass spectroscopy (GCMS) of residues in the pipe fragments.

In his *The Herball* of 1597, the botanist John Gerard mentioned a kind of tobacco as "the henbane of Peru". Henbane in Europe is a plant with toxic effects. In 1579, during his circumnavigation of the world, Sir Francis Drake sailed into the Peruvian capital of Lima, and it is probable that he (among others) collected coca leaves – evidently the 'henbane' tobacco from Peru to which Gerard referred. Together with the results of chemical analyses of 'tobacco' pipes from the vicinity of Stratford-upon-Avon and Oxford[3], this presents a strong case that coca leaves were being smoked in England in the early 17th century.

Shakespeare

Thackeray et al.[3] were careful to note that, in their study, neither of the pipes with cocaine ($n = 2$ out of a sample of 24) came from the foundations of Shakespeare's house (New Place). Furthermore, it could not be claimed that any of the pipes were necessarily smoked by the Bard.

The chemical evidence for cocaine was mentioned by Thackeray et al.[3] in relation to Shakespeare's Sonnet 76 in which "compounds strange" occurs. The word 'compound' in the early 17th century in England most certainly referred to drugs. It would seem apparent that the sonneteer was indicating a preference to *turn away* from "compounds strange"[4,5].

Chemical (GCMS) evidence from residues in clay 'tobacco' pipes from Stratford-upon-Avon and environs also points to the smoking of cannabis[3], based on signals with the following m/z ratios: 193, 231, 238, 243, 246, 258, 271, 295, 299, 310 and 314. Although Thackeray et al.[3] were extremely cautious in their interpretations on account of low intensities, it can be noted that *all* of these 11 m/z values relate to cannabis. Suggestive evidence for the latter was discovered in 8 out of 24 pipe fragments, and in 4 samples from New Place, Shakespeare's residence.

Thackeray's[4,5] interpretation of Sonnet 76 is that the Bard was cryptically referring to a preference for "the noted weed" (cf. cannabis, as a kind of 'tobacco'), instead of "compounds strange" (cf. cocaine). In one scenario[5], Shakespeare smoked cannabis moderately as a source of inspiration (cf. "The Tenth Muse" for "invention" in Sonnet 38), reflected also by "*invention* in a noted weed" in Sonnet 76 where "invention" refers to creative writing[5]. The late Lester Grinspoon[6] from Harvard Medical School stated that the use of cannabis has the potential to "promote fluidity of association and enhance insight and creativity", at least in moderation. This is in complete contrast to the effects of *Erythroxylum,* i.e. cocaine.

Discussion

Giordano et al.[1] claim that their results are "the first evidence of *Erythroxylum* spp. use in Europe before the 19th century, backdating our understanding of the presence of the plant by almost two centuries". The earlier chemical signature for cocaine, reported in 2001 by Thackeray et al.[3], was based in part from the pipe specimen from

Abingdon with a bowl diameter of 9.8 mm, indicating a date range of 1600–1620 if one uses measurements given by Friederich[7] as a basis for chronological estimates. The Ca'Granada crypt samples from Milan, with evidence of cocaine and *Cannabis* as well as *Papaver* (opium poppy)[8], were apparently accumulated between 1638 and 1697.[2]

On the basis of research undertaken by Giordano et al.[1] and by Thackeray et al.[3], it would seem that the smoking and/or chewing of coca leaves, in England, Italy and probably elsewhere in Europe, was practised in the early 17th century, if not before. Sir Francis Drake had had the potential opportunity to introduce coca leaves to England after his visit to Peru in 1579. At about the same time, John Hawkins (in 1573) and Sir Walter Raleigh (in 1586) introduced tobacco in the form of *Nicotiana.* The latter plant was indeed also identified by Thackeray et al.[3] from their study of early 17th century English clay pipes.

What needs to be recognised is that more than one kind of 'tobacco' was smoked in Stratford-upon-Avon and elsewhere four centuries ago. In Thackeray's[4,5] scenario, Shakespeare was selective about which to use, preferring a "noted weed" (cf. cannabis) to facilitate creativity, turning away from "compounds strange" (cf. cocaine).

Hemp/cannabis in the form of tobacco was evidently a source of inspiration (muse) in a poem called 'In Praise of Hempseed', written in 1620 by John Taylor:

> *A number have contagiously rehearsed*
>
> *And on Tobacco* [hemp] *vapourised and versed* [smoked and wrote verse],
>
> *Maintaining that it was a drug divine*
>
> *Fit to be served by all the Sisters nine* [nine Muses, sources of inspiration].[5]

Remarkably, this verse makes an explicit connection between smoking and writing. Furthermore, Taylor's poem is extraordinarily interesting

Source: Engraving by William Marshall, reproduced with kind permission of The Library, King's College, Cambridge.

Figure 1: Gentleman smoking a pipe held in one hand, while holding a piece of rope (made from hemp/*Cannabis*) in the other, both objects exuding smoke.[9]

as it reflects a connection between smoking and a "number" of people who "rehearsed". Most certainly in Shakespeare's time, "rehearsed" was used in the context of acting. For example, in a play within a play (*A Midsummer Night's Dream*, Act 3, Scene 1) we have: "Here's a marvellous convenient place for our rehearsal," and "Come, sit down… and rehearse your parts."

We can infer from Taylor's verse that the "number" of individuals who "rehearsed" evidently included not only actors but also writers who "vapourised" hemp (*Cannabis*), "fit to be served by [Muses] nine" for literary as well as theatrical purposes. Of course, the Bard was both actor and writer.

Taylor makes no mention of Shakespeare by name in the context of smoking ("vapourising") cannabis, but he does so in the context of paper being produced from hemp for the printing of "Folios"[5]. Reference to hemp in relation to paper was evidently safe without running any risk. By contrast, the risk of having books burnt because of explicit reference to the effects of cannabis had been real. Garcia da Orta was a botanist who published a treatise on *The Simples and Compounds* [drugs] *of India*, including *Cannabis*. His books were burnt after the Pope condemned the plant.[5] Perish the thought that any of Shakespeare's works should have been burnt by a literary censor such as John Whitgift, Archbishop of Canterbury, analogous to the Pope.[5]

Evidently, there had been a need to be cryptic. In France, Rabelais created the word 'pantagruelion' to refer cryptically to *Cannabis* in his satirical *Gargantua and Pantagruel*. Shakespeare would have been familiar with the works of Rabelais because he uses the word 'Gargantua' in *As You Like It* (Act 3, Scene 2).

The need to be cryptic is reflected in an early 17th century engraving by William Marshall (Figure 1) in *Barnabee's Journall.*[9] In this scene, a man is shown smoking a pipe held in one hand, and curiously burning a piece of rope in the other. It may not be coincidental that the latter material was manufactured from hemp. In its dry form (*siccum* in the engraving), when combusted, such rope would have exuded vapour. The scene may be considered to be at least a *symbolic and cryptic* reference to the smoking of cannabis, with a sense of humour.

Smoke emanating from the pipe in Figure 1 is associated with the Latin words "*sic omnia fumus*", meaning "so we smoke everything." The latter could have been intended as a humorous and again cryptic reference to the smoking of more than one kind of 'tobacco', including not only *Nicotiana* from North America (common tobacco), but also *Cannabis* from India.[3]

In early 17th century England, "stigma" was one of three concepts expressed by the word "noted" (cf. "the *noted* weed" in Sonnet 76).[5,10] Other meanings of "noted" were the concepts of "well-known" or "notorious".[9] Even today, in many countries around the world, cannabis is stigmatised, well known and notorious, despite widespread claims for its medicinal and nutritional advantages.[11] Unquestionably, it has value in terms of its fibre for paper, clothing and rope.

Shakespeare never uses the botanical term *Cannabis* by name, nor does he even make use of the word 'tobacco', recognising perhaps the awful risk of offending a literary censor associated with the Church. However, he cryptically refers to *cannabis* in the line "What hempen homespuns have we swaggering here?" (*A Midsummer Night's Dream*, Act 3, Scene 1), where "homespuns" refers to clothing, otherwise referred to as "weeds". "Swaggering" is derived from the 16th-century 'swag' meaning inter alia "to move unsteadily" potentially associated with abuse of cannabis.

Thackeray[5] has formulated the 'Shakespeare-Hemp-Cannabis (SHC) Hypothesis' as follows: "William Shakespeare discreetly smoked stigmatised cannabis/hemp/weed – with a moderate degree of the mind-stimulating compound tetrahydrocannabinol (THC) – associated with a source of inspiration for creative writing ("invention in a noted weed" in cryptic wordplay in Sonnet 76), constituting a "Tenth Muse" which "gives invention light (*lux* in Latin)" (Sonnet 38) to supplement the nine Muses known to the Greeks." How can we ever test this SHC hypothesis? As noted above, Giordano et al.[2] have demonstrated the feasibility of detecting cannabis chemically from femoral (leg) bones of individuals preserved in a 17th-century crypt in Milan. Unfortunately, it has not been possible to undertake the same kind of analyses on Shakespeare's femora, given the epitaph on his tombstone, said to have been written by the Bard himself: "*cursed be he who moves my bones*". However, the evidence from both literary and chemical sources would seem to strongly support the SHC hypothesis that Shakespeare used cannabis for creative writing ("invention"). For reasons which are obvious, I am unable fully to validate my ideas, but suggest they are well worth considering.

Acknowledgements

I wish to extend my thanks to James Clements and The Library, King's College, Cambridge, for permission to reproduce the engraving by William Marshall (Figure 1). The Shakespeare Birthplace Trust is thanked for the opportunity to analyse 'tobacco' pipes from Stratford-upon-Avon and environs. Four anonymous readers helped to improve the original manuscript and I am most grateful to them.

Declarations

I have no competing interests to declare. I have no AI or LLM use to declare.

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