In Vitro Extraction and Conversion Experiment of Psilocybe Cubensis Mushrooms

in stomach acid

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Background

Nausea and gastrointestinal distress are the single most common negative side effects of consuming c. cubensis mushrooms. There are various theories for the exact cause but most focus in the chitin content of the mushroom, which is an indigestible polysaccharide which is known to cause inflammation and gastric distress. More recent studies, however, have found that even if the psilocybin is administered in a pure form, the nausea and gastrointestinal distress can persist [1], which opens up the possibility that the initial dephosphorylation of the psilocybin to psilocin could be the cause of the discomfort.

To explore this issue further, an in-vitro experiment utilizing artificial gastric juice was performed.

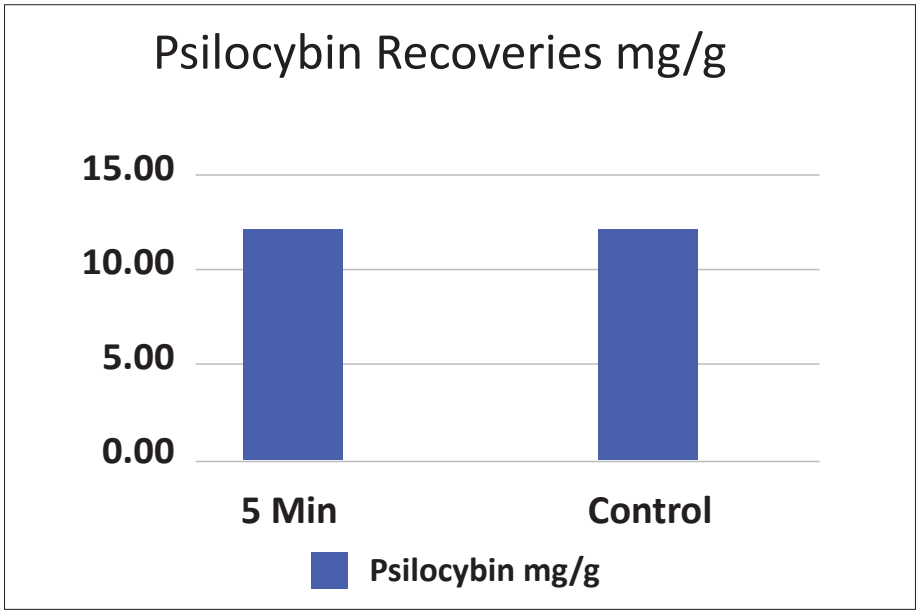
Setup

For this experiment 4 samples of 200mg (+/-2mg) of dried and finely ground homogenized p. cubensis mushrooms were mixed with 10mL of artificial gastric juice (Carolina Biological Supply), gently shaken for 5, 15, 30 and 60 minutes respectively, then filtered and immediately analyzed via HPLC for their psilocybin and psilocin content.

As a control, a similar sample was prepared but extracted with methanol overnight, to give the full amount of these compounds present in the homogenized p. cubensis mushrooms.

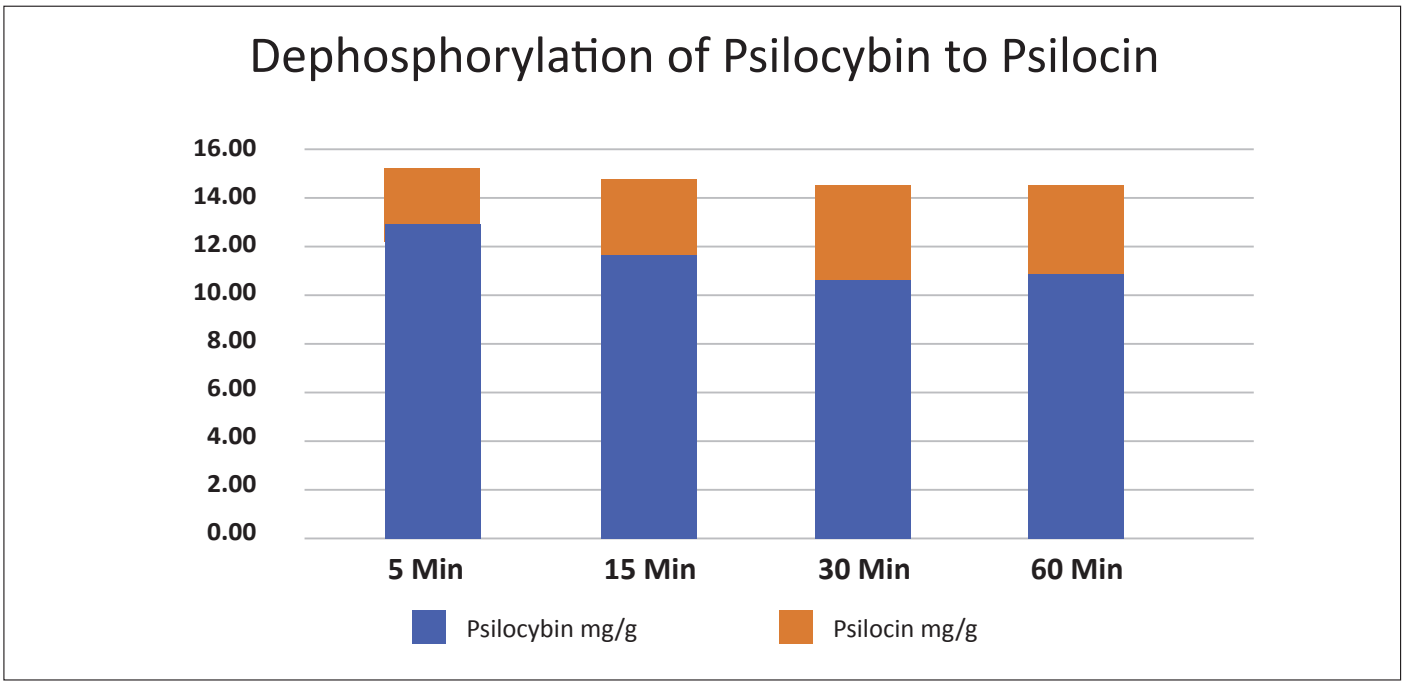
Results

A) Extraction recoveries – The first analyzed sample, after only 5 minutes already showed 100% extraction recoveries when compared with the control and no further increase in recoveries was observed in the following samples. It was also noted that the extraction recoveries for psilocin were actually higher than the control, which while interesting, falls outside of the scope of this experiment:



Results

B) Dephosphorylation (conversion) from Psilocybin to Psilocin – the dephosphorylation of psilocybin to psilocin appears to be fairly slow and stabilizing after just 30 minutes. Unlike in water and most acidic drinks, the process does not appear to degrade the active compounds at all and still shows full amount of active compound:



Conclusions

Considering that gastric juice is primarily hydrochloric acid, it is a bit unexpected that the dephosphorylation of psilocybin to psilocin does not occur as rapid as it has been demonstrated in other acidic liquids – for example, orange juice shows a complete dephosphorylation of all psilocybin to psilocin within the first 5 minutes while lemon juice shows a 50% conversion within just over 30 mins.

This also means that the primary mechanism of psilocybin dephosphorylation after human consumption of p. cubensis does not occur in the stomach due to the acidity but instead happens primarily via alkaline phosphatase in the liver and other parts of the body, resulting in psilocybin entering the blood stream before being dephosphorylated.

These findings also give more credence to specific consumption methods aimed at preventing side effects like nausea, such as Lemon Tek and simply mixing ground mushrooms into orange juice.

Based on the data collected here and in our experiments for 'A scientific look at psilocybin consumption method […]', it appears that one of the best ways to consume ground p. cubensis mushrooms is stirring the powdered mushrooms into orange juice, waiting 15 – 30 minutes for full extraction and conversion and consuming the resulting drink. If the psilocybin dephosphorylation is the cause for the nausea, this should effectively eliminate the issue.

[1] Griffiths, R. R., Johnson, M. W., Carducci, M. A., Umbricht, A., Richards, W. A., Richards, B. D., Cosimano, M. P., & Klinedinst, M. A. (2016). Psilocybin produces substantial and sustained decreases in depression and anxiety in patients with life-threatening cancer: A randomized double-blind trial. Journal of Psychopharmacology, 30(12), 1181–1197. https://doi.org/10.1177/0269881116675513