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Short communication

Phytochemical and Antimicrobial Potential of Ipecae Root Extract as a Result of Microbial Spoilage

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Abstract

It was investigated how microbial deterioration affected the phytochemical makeup and antibacterial capability of Ipecae root extract. Initial phytochemical analysis of the plain, undegraded extract revealed the existence of glycosides and saponins, but following microbial degradation, these compounds were not found in the extract; instead, sugars, free phenols, and tannins (both hydrolysable and condensed) were predominant. So it was determined that the microbes that caused the spoilage broke down the glycoside connections and created simple sugars, which were then used as dietary nutrients (Smith-Palmer A et al, 2001). By producing more strong antimicrobial medications, they changed the extract's phytochemical makeup, created phenolic compounds, and possibly prevented the development of other microbes.

Based on the fact that the acidic metabolite inhibited the growth of all test microorganisms and displayed inhibition zone diameters (IZD) equal to or greater than 30mm against Coliform bacilli, Escherica coli, Salmonella typhi, and Staphylococcus aureus, it was determined that it could be a good antibiotic drug (or source of one such drug).

Keywords: Phytochemistry, Antimicrobial potential, Microbial spoilage, Ipecae root extract

INTRODUCTION

Our food serves as a source of nutrients for microorganisms to consume for their own growth. By breaking down carbs, lipids, proteins, and other food items, they use our food ingredients and cause enzymatic and chemical changes in the food contents (Rauha JP et al., 2000). They may even synthesize new compounds causing in degradation and spoilage of the food. Which bacteria may develop in a diet depends greatly on the types and ratios of nutrients present. Thus, even within the same medium, some microorganisms may have access to peptides, amino acids, ammonia, urea, and other simple nitrogenous substances while others may not.

ABOUT THE STUDY

During our investigation into plant extracts and their secondary metabolites, we noticed that some plant extracts, particularly those from food plants, and their primary metabolites were susceptible to spoiling by airborne microbes. We have looked at the phytochemical composition of the plant extracts and/or secondary metabolites before and after the microbial deterioration in an effort to monitor and identify the dietary elements taken by these microbes and the phytochemical alterations they generated. In order to determine which phytochemical compounds were impacted by the microbial spoilage and what novel products were produced, we report on the impact of microbial spoilage on antimicrobial potential and phytochemical composition of Ipecae root extract and its acidic, basic, and neutral metabolites (Ejele AE et al., 2012).

While the microbially degraded extract showed the absence of cardio-active glycosides and saponins, which were initially present in the extract before microbial spoilage, preliminary phytochemical screening of the neat undegraded extract revealed presence of alkaloids, amino acids, cardio-active glycosides, saponins, and tannins (Bakkali F et al., 2008). However, following the microbial destruction of the extract,

the flavonoids, tannins, and sugars (which were previously missing in the extract before microbial assault) emerged.

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According to these findings, the microbes that caused the microbial spoilage likely destroyed the glycosides and saponins to create aglycons and simple sugars, which were then converted into their dietary components. The sugars would then be released once the glycosidic connections break. The degraded extract's presence of flavonoids, higher concentrations of tannins and free phenols, and confirmation that polyphenolic glycosides were likely involved. On the other hand, since proteins, peptides, and amino acids are known to serve as energy meals for proteolytic microbes, the decreased amounts of amino acids in the degraded extract likely indicated that the microorganisms fed on them.

Before microbial degradation, phytochemical screening of different metabolites is conducted. The findings demonstrated that the main constituents of the acidic metabolite were flavonoids and free phenols, with minor levels of amino acids and tannins.

The acidic metabolite's inclusion of the polyphenolic chemicals of plant origin known as flavonoids, which have been linked to a variety of physiological functions, transforms the substance into a valuable medicine. (Silliker JH, 1980). Thus, hydroxylated analogues of flavones have the diuretic, antioxidant, and anti-inflammatory properties whereas other flavones appear to improve weak capillary blood vessels. Small amounts of flavones may also operate as heart stimulants.

The flavonoids can reduce oxidative stress in the liver and kidney, which makes them effective in the therapy of hypertension. They are also used to treat haemorrhoids, venous insufficiency, and capillary permeability. A diet lacking in flavonoids has been related to aberrant capillary leakiness, discomfort in the limbs, which can cause pains, weakness, and leg cramps.

CONCLUSION

It was investigated how microbial deterioration affected the antibacterial potential and phytochemical makeup of Ipaeca root extract and its metabolites. Initial phytochemical analysis of the extract revealed the existence of glycosides and saponins, among other things. However, after microbial deterioration, these compounds were no longer present in the extract; instead, flavonoids, free phenols, and sugars took centre stage. This work therefore provides evidence for the hypothesis that glycoside biodegradation results in the production of simple sugars and aglycons, which may be flavonoids, simple phenols, or tannins with antibacterial activity.

Significant antibiotic action was demonstrated by the acidic metabolite of the microbially degraded extract against the human pathogens tested (C. albicans, E. coli, S. typhi, Strep. spp, S. aureus, and C. bacilli). Thus, it was determined that bacteria responsible for the spoilage (Bacillus spp. and Aspergillus spp.) likely broke down glycosidic connections to form simple sugars that they fed on. In the process, they changed the extract's phytochemical makeup and possibly prevented the development of additional microbes by producing stronger antimicrobial medicines.

Given that it inhibited the growth of all test microorganisms and displayed inhibition zone diameters (IZD) equal to or greater than 30mm against C. bacilli, E. coli, S. typhi, and S. aureus, it was determined that the acidic metabolite isolated from the microbially degraded extract could be a good antibiotic drug.

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