INTRODUCTION

Discovery of penicillin from *Penicillium notatum* brought a revolution in the age of antibiotics. Since then, fungal domain has been constantly explored for various bioactive metabolites. Over the past two decades, another group of fungal system known as endophytes that reside inside the plant has been constantly explored for its potential pharmaceutical applications. Endophyte produces certain biochemicals that protect the host plant from biotic and abiotic stress [1]. With the course of evolution, these host plant endophytes gain the property to produces similar compounds like their host. In the past decade, over 500 fungal metabolites have been used as potential drugs [2].

Pancreatic lipase (PL) is the main target as anti-obesity agent due to its important role in metabolism of fats. Orlistat is only partly natural PL inhibitor that also serves certain side effects [3]. Shortage of safe and reliable PL inhibitors has motivated researchers to explore new compounds, which might be responsible for the particular activity. The current study marks the first report of exploration of endophytic fungi from Andaman Islands of India have been explored for their potential PL inhibitor. The bioactive compound was thus isolated, purified, and analyzed using gas chromatography.

RESULTS

It was found that inhibitory concentration of a compound (R = 0.64) isolated from crude hexane extract of endophytic fungal isolate from *Citrus limon* was 15.46 µg/ml. Gas chromatogram of the extract showed the presence of caryophyllene which might be responsible for the particular inhibitory activity. The bioactive fungus was microscopically identified as *Pestalotiopsis* species.

CONCLUSION

As caryophyllene is component of many oils and is non-toxic, so it can be potential source of safe and effective anti-obesity drug. The potential endophytic fungal isolate was examined under the microscope to characterize it on the basis of its microscopic characters and morphology. The culture was grown on potato dextrose agar (PDA) and synthetischer nährstoffarmer agar and was stained using lactophenol cotton blue. Visualizing certain morphological characteristics such as color, colony size, and texture and microscopic characters such as the conidia and hyphae. The microscopic characters were studied using a polarizing optical microscope (Olympus BX-51 P) coupled with charge-coupled device camera and measurements carried out using image J software. At least 30 observations were made per species [7,8]. The potential solvent extract was separated on silica plates using thin-layer chromatography using solvent hexanemethanol (70:30). The compounds separated on silica plates were scraped, and subsequent inhibitory concentration (IC<sub>50</sub>) was calculated of respective fractions as described by Queiroz et al. [9]. The fraction showing highest IC<sub>50</sub> value was analyzed for compounds present using gas chromatography and mass spectroscopy (GC-MS).

Around 39 endophytic fungal isolates were obtained from which about 38% fungal cultures have been isolated from *Aegle marmelos*, 36% from *C. limon*, and rest from *Azadiractha indica*. From these 39 endophytes, only 5 cultures showed PL inhibitory above 50%. Among these 9CSTHAL isolated from stems of *C. limon* showed inhibition percentage of 83% followed by 23AMLPB (75%) from *A. marmelos*. After solvent extraction, there was slight increase in lipase inhibitory activity of all the selected culture filtrates. The hexane extract of 9CSTHAL inhibited PL by 87%. The hexane extract was then resolved into three bands on silica plates of three different R<sub>f</sub> (0.46, 0.64, and 0.85). IC<sub>50</sub> of compound 2 (R<sub>f</sub> = 0.64) was better than compound 1 and 3. It inhibited PL with an IC<sub>50</sub> of 15.46 µg/ml. GC-MS analysis of bioactive compound showed the presence of caryophyllene (Fig. 1).

Conclusion: As caryophyllene is component of many oils and is non-toxic, so it can be potential source of safe and effective anti-obesity drug.
The first peak at retention time 7.584 minutes matches with caryophyllene. Caryophyllene is a sesquiterpene which is a component of oils. Terpenes have been known to possess antilipase activity [10]. Caryophyllene has been known to possess antioxidant, anti-acne, and anticancer activities [11,12]. Using microscopic tools, the bioactive fungi was identified as Pestalotiopsis sp. Colonies on PDA were white, cottony, and raised, and margins were nearly round (Fig. 2).

Continuous research on anti-obesity drugs has made scientist realize the importance of different ways to treat obesity. Despite the present era, the new drugs in the market are ineffective and are combined with side effects. These anti-obesity drugs are still the combination of old salts with slight modifications. People are now again moving to Ayurveda. Till date, no other natural drug has got the Food and Drug Administration approval, so the present report might confirm it a safe and effective anti-obesity drug.

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