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Data Article

Data on the inhibitory effect of endophytic fungi of traditional medicinal plants against pancreatic lipase (PL)

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ABSTRACT

This article describes isolation and pancreatic lipase (PL) inhibitory potential of 18 endophytic fungi isolated from the various parts of six indigenous medicinal plants. PL catalyzes absorption and hydrolysis of triglycerides into di-glycerides into mono-glycerides and free fatty acids. PL inhibitors are well-known for the disruption of pancreatic lipase activity. The quest for novel pancreatic lipase inhibitors is crucially important owing to their therapeutic potential in the treatment of obesity and related chronic diseases. The present dataset provides information about the presence of endophytic fungi in the internal tissues of selected plants and the PL inhibitory potential of their metabolites using bioassay based screening. Absence of the yellow zone surrounding the standard Orlistat and test extract indicated PL inhibition due to the cumulative effect of metabolites present in the extract. The data suggests that TLC bio-autographic method is simple, rapid and reproducible and therefore it could be effectively used for high throughput screening of PL inhibitors from natural sources.

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Specifications Table

Subject area	Biology
More specific subject area	Secondary metabolites and enzyme inhibition
Type of data	Tables and figures
How data was acquired	TLC Bio-autography on silica gel 60 F_{254} 25 × 25 cm plates (Merck, Germany) using Spraylin automatic sample applicator (Aetron, India).
Data format	Analysed
Experimental factors	The endophytic fungi were isolated from the differnet tissues of various indigenous medicinal plants and cultivated at shake flask. Metabolites were extracted using ethyl acetate.
Experimental features	Inhibitory effects of extracts of endophytic fungi against PL
Data source location	North Maharashtra, MS, India. (21.26°N and 75.11°E). Data analysis: Shirpur, MS, India
Data accessibility	The data is available with this article.

Value of Data

- The dataset can be useful in the field of rapid throughput screening of fungal extracts for the presence of enzyme inhibitors.
- The data provides *in vitro* validation for significant PL inhibitory effect, which is an important target for the development of anti-obesity lead compounds.
- This data may suggest further studies on the detailed characterization of PL inhibitors from endophytic fungi for possible future therapeutic application.

1. Data

The data summarized in Table 1 lists the percent inhibition of PL by inhibitors present in crude extract of endophytic fungi isolated from their host plant. A total of eighteen fungal endophytes were isolated from the different parts of the selected plants. Data shown in Fig. 1 represents inhibition of PL by extracts of endophytes using phenol red olive oil agar method. Complete absence of yellow halo surrounding standard, Orlistat well and extract of CLL-2 showed complete inhibition of pancreatic lipase by the metabolites present in the test extract. However, partial inhibition was seen in the well containing the extract CLL-1. Tube assay in Fig. 2 showed a dose dependent PL inhibition by the selected extract. Color intensity in the tube 2–6 in (Fig. 2) changed from pink to red as function of inhibition of PL. Data shown in Fig. 3 represents TLC bio-autography based screening of fungal extract for PL inhibition. In order to confirm the effectiveness of enzyme assay, extract of endophytes was screened for pancreatic lipase inhibition by modifying TLC bio-autographic method. This modified method is rapid and a large number of samples can be screened in a single TLC plate in a shorter duration [1,2]. Change in the colour of the plate from red to orange yellow indicated PL activity in the control while absence of yellow halo indicates PL inhibition (Fig. 3).

2. Experimental design, materials and methods

2.1. Microorganisms and preparation of extract

Endophytic fungi were isolated from various tissues of the selected plants as per standard isolation method [3]. After isolation, pure culture of each isolate was maintained on sterile potato dextrose agar (PDA) medium as a stock culture at 4 °C.

The isolated endophytic fungi were grown on agar plugs [4]. After visible growth, the agar plugs were crushed and metabolite extraction was carried out using ethyl acetate. All the crude extracts of each isolated fungi were screened out for qualitative inhibition of pancreatic lipase by various methods.

2.2. PL inhibition assay: chromogenic olive oil plate method

The ethyl acetate extract of the test endophytes was screened for pancreatic lipase inhibitory activity by chromogenic olive oil plate method. This method is based on change in the color of media due

Table 1
Source of endophytic fungi and their lipase inhibitory potential.

Sr. No.	Host plant	Tissue	Isolated endophytic fungi	Lipase inhibition	% inhibition
1	*Citrus lemon*	Leaves	**CLL1**	+++	**100**
2		Leaves	CLL2	+	50
3		Leaves	CLL3	+	50
4		Bark	CLB1	+	50
5		Bark	CLB2	−	Nil
6	*Nerium oleander*	Leaves	NOL1	+	40
7		Bark	NOB1	−	Nil
8	*Withania somnifera*	Leaves	WSL1	−	Nil
9		Leaves	WSL2	−	Nil
10		Bark	**WSB1**	+++	**100**
11		Bark	WSB2	−	Nil
12	*Aloe vera*	Leaves	AVL1	+	40
13		Bark	AVB1	−	Nil
14		Bark	AVB2	−	Nil
15	*Punica granatum*	Leaves	PGL1	−	Nil
16		Bark	PGB1	−	Nil
17	*Catharanthus roseus*	Leaves	CRL1	−	Nil
18		Bark	CRB1	++	60
19	**Orlistat standard** (120 mg/ml)			+++	**100**

+++: Complete inhibition, ++: Moderate Inhibition, +: Low inhibition, -: No inhibition. The values are average of triplicate samples (n = 3).
The isolates designated with bold font show 100% inhibition of the PL. It for the purpose of readers' attention only.

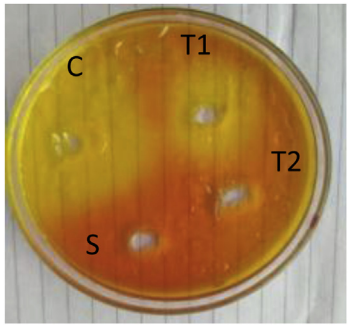

Fig. 1. Olive oil plate method for screening of endophytes, C: control; T1: test extract of CLL1; T2: test extract of CLL-2; S: Standard Orlistat.

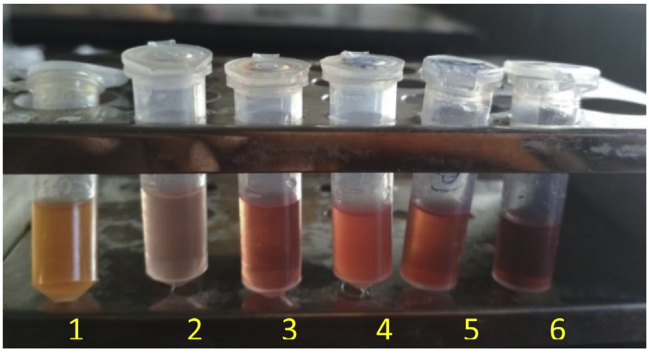

Fig. 2. Lipase assay in tube: 1: control, 2–6: crude extract of endophyte

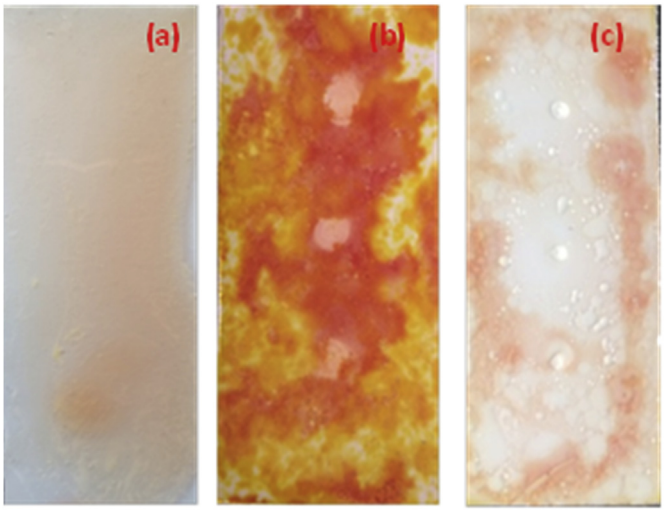

Fig. 3. TLC Bio-autography. (a) Control. (b) Test extract of endophytes. (c) Standard Orlistat.

to acid production as result of enzyme activity [5]. Plates of Olive oil agar were prepared and wells were punched. Then, 100 μL of preincubated master-mix of porcine pancreatic lipase (PPL, 50 μL) and extract (50 μL) of each endophyte was loaded in a well. The control well comprised of PPL preincubated with distilled water instead of culture extract. Orlistat (120 mg/mL) were preincubated with PPL and used as standard inhibitor of PPL. All plates were incubated at 37 °C for 24 hr.

2.3. Lipase inhibition assay using tube method

PPL enzyme (100 μL, 10 mg/mL) in phosphate buffer (pH 7.4) was preincubated with same volume of the test extract and the Orlistat standard (1–10 mg/mL) separately. Distilled water instead of test extract or Orlistat was used as control. All tubes were incubated at 37 °C for 20 min. After incubation, 100 μL of substrate prepared in distilled water (pH 7.4) was added in each tube and again incubated at 37 °C for 20 min. After incubation, phenol red indicator (10 μL) was added to each tube and the tubes were observed for the change in color. Assay was performed in triplicates.

2.4. TLC bio-autography

The aluminum coated TLC (silica gel F_{254} 25 × 25 cm) sheets were used for TLC bio-autography. The data was obtained by spotting test extracts and standard PL inhibitor, Orlistat (100, 50 and 10 μg/mL) onto a separate TLC plate (2.5 × 10 cm). Ethyl acetate was spotted on another TLC sheet and used as control plate. After complete drying of spots, Whatmann filter paper was impregnated with PPL solution (10 mg/mL) in phosphate buffer (pH 7.4) was overlaid on the all spotted plates. All the plates were incubated at 37 °C for 15 min for enzyme-inhibitor interactions. Substrate agar solution with few drops of phenol red indicator was poured on the all plates after the filter paper was peeled off [6,7]. Thereafter, all the plates were incubated at 37 °C for 20 min for enzyme substrate reactions.

2.5. Data analysis

Data reveals formation of yellow halo due to the enzyme (PL) activity; whereas absence of yellow halo surrounding the standard and test extract of endophytic fungus showed complete inhibition of PL by the metabolites present in the test extract. A dose dependent inhibition of PL was observed in tube assay. TLC bio-autographic data confirmed the presence of PL inhibitory metabolites in the test extract.

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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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