Similarly, *Lasiodiplodia* was also reported as a frequent pathogen among sweet oranges in Brazil (Slippers and Wingfield, 2007), which is consistent with (Dantas et al., 2003) results for 'Pera' variety where the *Lasiodiplodia* rot was 53% of the total fruit rots while Wright and Harmon (2009) reported *Lasiodiplodia* rot as an important post-harvest disease in warm and humid growing regions such as Florida and Caribean. Twenty-four species of *Lasiodiplodia* are known to have been distinguished based on their DNA phylogeny together with their conidial morphology and morphology and size of their paraphyses (Burgess et al., 2006). Generally, all the known species of *Lasiodiplodia* are associated with various symptoms such as dieback, root rot, fruits rot and leaf spots among many others (Punithalingham, 1980). So, *Lasiodiplodia* sp IMI50324 is a common soil pathogen associated with woody hosts in the tropics and which causes brown rot in orange fruit (Oladele and Aborisade, 2015). Initial infection shows as light brown discolouration on any area of the fruit surface. As the decay develops, the lesion becomes more brown, firm and slippery (Ismail and Zhang, 2004).

Currently, these pathogens are primarily controlled by application of fungicides either as dips, sprays, fumigants, treated wraps and box liners or in waxes and coatings. Citrus growers and sellers have routinely applied synthetic fungicides (chemicals) on their fruits for the management of post-harvest diseases. Numerous studies have been conducted to evaluate the effectiveness of various fungicides against common post-harvest pathogens affecting oranges, such as *Penicillium digitatum* and *Penicillium italicum* (Rosenberger et al., 2018), with none on *Lasiodiplodia.* Those studies provide important information for selecting appropriate fungicides and application protocols for combating post-harvest diseases in citrus fruits.

Nonetheless, synthetic fungicides could result in health hazards during application process as well as residual accumulation in the fruits. Synthetic preservatives have raised concerns regarding their potential health risks and environmental impact, underscoring the need for innovative and eco-friendly solutions (Gupta et al., 2014). Besides, export markets are increasingly more sensitive to the use of chemicals for disease control coupled with the fact that most chemicals are expensive and inaccessible to local farmers who are the major bulk producers of this fruit in Nigeria. The escalating demand for safe and sustainable food preservation methods has prompted researchers to explore alternative solutions beyond conventional synthetic preservatives. Hence, the use of non-chemical ecofriendly means of control such as botanicals have emerged as viable alternatives.

Besides, the rising awareness of health and environmental concerns associated with synthetic additives has led to a renewed interest in natural antimicrobial compounds derived from plant sources, thus making the utilization of plant-derived compounds as potential alternatives to synthetic additives to gain prominence, Therefore, the research investigated the antifungal efficacy of aqueous extract of *Tridax procumbens* against brown rot pathogen of orange fruits during ambient storage and its potential as a suitable alternative to synthetic preservatives. Phytochemical and bio active compositions of the aqueous extract was also investigated.

1 Materials and Methods

1.1 Source of fruits

Mature, green healthy orange fruits were harvested from a commercial orchard in September 2023 from a citrus farm in Igbatoro, Akure North, Nigeria. Fruits of uniform size and colour were selected. Before treatment, the fruits were washed with clean water, disinfected for 10 min in 10 % sodium hypochlorite and allowed to air-dry at room temperature.

1.2 Preparation of spore suspension

A ten-day old agar slant culture of *Lasiodiplodia* sp (IMI Number: 503248) on malt extract agar (MEA) was used to prepare spore suspension. Sterile water was poured into the slant and shaken vigorously to dislodge the spores from the vegetative hyphae. The wash water was collected in a sterilized beaker. One milliliter of the suspension was spread on an area of 1 cm^2 and allowed to dry on a clean microscope slide before counting spores using the formula of Breed Direct Counting Technique (Ogundana, 1989) under the high dry ×40 objective microscope (Olympus).