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Central European Journal of Experimental Biology, 2020, 8 (2): 1-4
(http://www.scholarsresearchlibrary.com)

ISSN:2278-7364

In vitro Evaluation of Insecticidal and Antifungal potencies of organic product strip concentrates of *Punica granatum*

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ABSTRACT

Diverse natural product strip concentrates of Punica granatum were tried in vitro for their insecticidal and antifungal exercises against two irritations (Myzus persicae and Phthorimaea operculella) and four parasites (Botrytis cinerea, Fusarium sambucinum, Penicillium digitatum and Aspergillus niger). Indeed, critical mortalities were recorded on grown-ups rewarded with fluid, ethanol and methanol extricates with mortalities of 29%, 53% and 55%, individually. For potato tuber moth, comparable impacts were seen on the main larval infiltration of Phthorimaea operculella into potato tubers and the quantity of eggs. Furthermore, all concentrates tried were seen as successful in checking the mycelial development just for Penicillium digitatum and Fusarium sambucinum when contrasted with the control. Be that as it may, no huge distinction among control and rewarded growths was found on account of Botrytis cinerea and Aspergillus niger. The treatment with these plant concentrates might be promising in shielding plants from nuisances and illnesses contaminations.

Keywords: *Punica granatum, extracts, biological activities, In vitro Evaluation.*

INTRODUCTION

The overeager and unpredictable utilization of a large portion of the manufactured fungicides has made various kinds of natural and toxicological issues. As of late, in various pieces of the world, consideration has been paid towards misuse of higher plant items as novel chemotherapeutants in plant assurance. The prevalence of botanical pesticides is by and by expanding and some plant items are being utilized comprehensively as green pesticides [1, 2].

However, there is a pressing need to grow minimal effort safe control options and ecological neighbourly. Extensive endeavours have been centred on plant determined materials, possibly valuable as business bio insecticides. *Punica granatum*, usually known as pomegranate has a place with family *Punicaceae*. It is a local bush of focal Asia, particularly parts of Iran in the Transcaucasia-Caspian area [3] from where it has spread to the remainder of the world [4, 5].

Pomegranate is a significant harvest known by its taste and wholesome and restorative properties [6-8]. A few investigations have detailed the antimicrobial [9] and insecticidal [10, 11] exercises of concentrates from various tree parts, for example, bark, leaves, natural product, and organic product strip.

The aim of the present study is to evaluate the insecticidal and antifungal activities in vitro of the aqueous, ethanol and methanol fruit peel extracts from *P. granatum* against pests as *Myzus persicae* and *Phthorimaea operculella* and plant diseases as *Botrytis cinerea*, *Fusarium sambucinum*, *Penicillium digitatum* and *Aspergillus niger*.

MATERIALS AND METHODS

Planning of pomegranate strip extricates

Pomegranates, *P. granatum* cv. Kalaii were acquired from nearby market. The organic products were washed and the strips were physically expelled, dried at room temperature (20°C to 25°C) and powdered to get 0.5 mm size. Around 100 g of the powder was removed by mixing utilizing an attractive stirrer with 300 ml of ethanol, methanol and water for 24 h each at 25°C.

The concentrate was sieved through Whatman channel paper to expel strip particles. After filtration, the ethanol and methanol removes were let to vanish at room temperature during 48 h and the fluid concentrate was dissipated under vacuum at 100°C.

Creepy crawlies

Green peach aphids, *Myzus persicae Sulzer*, were gathered from pepper crop leaves in the Regional Center of Research on Horticulture and Organic Agriculture (CRRHAB) and legitimately utilized in the analyses.

Settlements of the potato tuber moth *Phthorimaea operculella* have been kept up for a long time in the Entomology Laboratory of the Regional Research Center on Horticulture and Organic Agriculture (CRRHAB). *P. operculella* provinces were kept in standard conditions at 27 °C and 65 % mugginess. Hatchlings were benefited from potato tubers.

Contagious strains

The four test contagious species, *Botrytis cinerea*, Fusarium sambucinum, *Penicillium digitatum* and *Aspergillus niger* were acquired from the research facility of Phytopathology in the CRRHAB. These growths are among the most significant pathogenic organisms of affordable criticalness to plants. They were refined during 7 days at 25°C on potato dextrose Agar (PDA) medium changed with 300 mg/l of streptomycin sulfate before use.

Bioassays

Insecticidal action measure against *Myzus persicae***:** Twenty mg of every unrefined concentrate was disintegrated in refined water to get the last convergence of 2%. 5 µl of every arrangement (ethanol, methanol and fluid) was splashed legitimately on pepper leaves assaulted by *Myzus persicae*. The control got 5 µl of refined water. The leaves containing the creepy crawlies were set in petri dishes estimating 9cm*1.3 cm covered with channel paper. Plates were kept up in a climatic chamber at 25 ± 2ºC, relative moistness of 70 ± 10% and photoperiod of 12 h. The appraisal of death rate was recorded following 24 hours.

Insecticidal action examine against *Phthorimaea operculella***:** To look at the level of larval infiltration of *P. operculella*, the primary larval instar was utilized in light of the fact that it searches and mines into the host [12]. From the outset, every potato tuber was plunged in 1 ml of 5% methanolic natural product strip concentrates of *P. granatum*. At the point when dissolvable was dissipated and tubers were dried, they (five potato tubers) per treatment were moved into plastic boxes with ventilated covers kept at 25±2ºC, relative stickiness of 70 ± 10% and photoperiod of 16: 8 (Light : Dark). Swarmed tubers were presented on each case. Hence, larval infiltration was recorded with the quantity of people moving into potatoes. For the oviposition-inclination action, the quantity of eggs was resolved under a binocular magnifying instrument.

Antifungal movement test: Viability of watery, ethanol and methanol natural product strip concentrates of *P. granatum* were concentrated in vitro against plant organisms by harmed food strategy. 20 mg of each concentrate was broken up in 1 ml of refined water and versed on Potato Dextrose Agar as basal culture medium. For the control, refined water was utilized. The test organisms were brooded at 25±2°C in obscurity. On the fourth day, the mycelial development of organisms was recorded.

Factual investigations: Five replications were performed for each test. For factual examination among a few methods, all the information were exposed to a single direction investigation of fluctuation (ANOVA) trailed by mean correlations (at P = 0.05) and Student-Newman-Keuls (SPSS 11.0).

RESULTS AND DISCUSSION

Insecticidal exercises

All concentrates of natural product strip of pomegranate that were inspected in the current investigation had a fundamentally high harmfulness impact on *Myzus persicae* when contrasted with untreated control.

Comparative discoveries were acquired by Mohammad [13] and Ben Hamouda et al. [11] where the ethanol removes likewise prompted mortality of *Tribolium confusum* and *Tribolium castaneum* hatchlings and grown-ups. Gandhi et al. [10] demonstrated that showering of this powder prompted 40% to 85% of *Tribolium castaneum* grown-up mortality.

In addition, results show that ethanolic, methanolic and watery strip natural product concentrates of pomegranate had a high preventive impact on potato tuber moth larval entrance with 77% not exactly the untreated control. Mohammad [8] revealed a solid anti-agents impact (86.7%) brought about by ethanol concentrate of pomegranate organic product strip following two hours of presentation at a convergence of 2.5% for *Tribolium confusum*. Be that as it may, Ben Hamouda et al. [11] indicated that lone ethanol extricate demonstrated a low anti-agents action against *Tribolium castaneum*.

As per study, applying all concentrates of strip product of pomegranate on potato tubers decreased egg laying of the *P. operculella* though the vermin wanted to lay eggs on un-rewarded tubers. The normal number of laid eggs on tubers rewarded with ethanol, methanol and watery concentrates were 4.8, 6.6 and 8.4 eggs/tuber, individually. In this manner, the bug liked to oviposit on non-rewarded tubers with a mean of 16eggs/tuber. These outcomes exhibited that pomegranate removes had inhibitory impacts against the bug.

Koide et al. [14] revealed that poisonousness brought about by *P. granatum* is because of the astringent properties of tannins contained in the strip natural product which stop creepy crawly's pervasion. Moilanen and Salminen [15] demonstrated that strip is rich in ellagitannins that are considered as harmful against creepy crawlies.

Antifungal exercises

The antifungal properties of ethanol , methanol and watery concentrates of organic product strip pomegranate were assessed in vitro against *Botrytis cinerea*, *Fusarium sambucinum*, *Penicillium digitatum* and *Aspergillus niger* utilizing PDA as basal medium as standard Poisoned Food Technique [16]. Results uncovered that all concentrates tried were seen as viable in checking the mycelial development just for *Penicillium digitatum* and *Fusarium sambucinum* when contrasted with the control. Percent hindrance of the test microbe with all plant removes extended from 8.9 to 26.79 % on account of *F. sambucinum* with the most elevated impact of ethanolic separate; and from 27.58 to 40.24% for *P. digitatum* with the most noteworthy impact of methanolic extricate. Dahham et al. [17] likewise affirm the inhibitory impact of the methanol extricate against *P. digitatum* which was credited to phenols. Also, Azzouz and Bullerman [18] and Tehranifar et al. [19] revealed that strip natural product concentrates of *P. granatum* can hinder the development of certain potato decay infections. In any case, no critical contrast among control and rewarded organisms was found on account of *Botrytis cinerea* and *Aspergillus niger*. Al-Zoreky [9] indicated that fluid concentrate had no inhibitory action on *A. niger*. So also, Aguilar et al. [20] detailed that some *Aspergillus* species endured the tannins contained in ellagitannins and utilized them as carbon source.

This starter information recommends that the ethanol and methanol concentrates of the pomegranate natural product strip ought to be additionally explored so as to decide its synthetic structure and to explain more its insecticidal and antifungal possibilities.

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