

Title

Antifungal properties of water-soluble extract from *Chenopodium quinoa* against *Botrytis* sp.

Authors

Calvache, C.A.¹, Quelal, M.F.¹, Corral, M.S.¹, Núñez, J.G.¹, Morales Z.P.¹

Institution

¹ Faculty of Engineering and Agricultural Sciences, Universidad de las Américas (UDLA), 170122 Quito, Ecuador.

Abstract

Quinoa (*Chenopodium quinoa*) is a plant that is part of the ancient Andean cultures history, such as the Incas and Araucanians, it was part of their central daily diet. Its geographical area extends from northern Colombia to southern Chile with a cultivation range on 2500mmsm, rainfall not exceeding 500 mm and an average temperature up to 14 ° C. Crops in Ecuador, ranging from north to south the Sierra area, saw the light from the pre-Inca era and constitutes a traditional regional crop. It is used in human food because of its high nutritional content and also healing, analgesic and disinfectant properties are attributed to this plant. In the present study we performed a water soluble extract from quinoa seeds in order to check its inhibitory action against *Botrytis* sp. a leading rotting fungus that attacks postharvest products in Latin America. This fungus is characterized by a great germination and growth capacity, it develops a whitish mycelium that becomes leaden by conidia formation and pollute rapidly through drafts. To determine the antifungal activity of the water-soluble extract, the agar diffusion assay was done, Petri plates (90 mm diameter), containing 10 ml of Potato Dextrose Agar, were inoculated with the fungus. The plates were incubated at 25 °C for 72 h. After the mycelial colony had developed, sterile blank paper disks (0.5 cm diameter) were placed at the distance of 0.5 cm away from the rim of the mycelial colony. Ten microliters of the water-soluble extract to be tested were added to the disks. The tests indicated fungus mycelial growth reduction with inhibition zones formation, showing noticeable results after 48 hours of being placed the extracts. The quinoa antifungal activity has already been reported due to its capacity to associate with steroids of fungal membranes, causing damage to its integrity and pore formation consistent with the obtained results. Therefore, the quinoa seeds have an antifungal effect for *Botrytis* sp., which would control the development and growth of the fungus in postharvest crops, representing a great option to maintain exportable vegetable products quality, including the most important products in Ecuador, such as banana and cocoa.

Key words: Antifungal activity, *Amaranthaceae*, Ascomycota