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1 **Low intensity ultrasound as a pretreatment to drying of daylilies: Impact on**
2 **enzyme inactivation, color changes and nutrition quality parameters**

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10 **Abstract:**

11 Effects of thermal and low intensity ultrasound combined with heat (LIUH)
12 pretreatment prior to microwave vacuum drying on enzyme inactivation, color
13 changes and nutrition quality properties of dried daylilies were investigated. The
14 peroxidase (POD), ascorbic acid oxidase (AAO) and polyphenoloxidase (PPO)
15 thermal and LIUH (0.2 and 0.4 W/cm²) inactivation were determined and compared at
16 70, 80 and 90°C. Significant reduction in the POD, AAO and PPO activity was seen
17 in daylilies after an ambient LIUH pretreatment than thermal pretreatment. POD,
18 AAO and PPO thermal and LIUH inactivation followed the first order kinetics. LIUH
19 pretreatment had a more positive influence on maintaining color of dried daylilies
20 than thermal pretreatment. Furthermore, LIUH pretreatment resulted in a significant
21 increase in chlorophylls, carotenoids (lutein, zeaxanthin and β-carotene), and a
22 decrease in degree of browning and 5-hydroxymethylfurfural (HMF) when compared
23 with thermal pretreatment. The antioxidant activity and contents of several nutritional
24 components of dried daylilies pretreated by LIUH were also higher than that of dried
25 daylilies pretreated by thermal pretreatment. This study provides a basis for the design
26 of LIUH conditions to control vegetables browning and color changes prior to drying
27 processing.

28 **Key words:** Low intensity ultrasound; Enzyme inactivation; Browning; Anti-oxidant
29 activity; Daylilies

30 **1. Introduction**

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