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Understanding insect movement behavior in chickpea flour using X-ray micro-computed tomography

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ABSTRACT

Nutritional profiles of flours can be significantly altered, both chemically and physically, due to insect infestations. Chickpeas are a rich source of nutrition, especially protein, and their flours are used in different food formulations at varying fineness levels (particle sizes). This emphasizes the need for understanding and predicting insect movement in various streams of chickpea flours obtained from roller mills. Developing pest control strategies for stored chickpea flour require *a priori* knowledge of insect movement and behavior. The aim of the current study was to investigate the potential of 3D X-ray micro-computed tomography (micro-CT) for mapping the paths navigated by insects in chickpea flours at three different fineness levels obtained from a roller mill. Our preliminary results indicate that it was possible to identify the path length, pattern and direction of movement of *Tribolium madens* (Charpentier), black flour beetle, through flour bulks. This important behavior of insects can be utilized in developing appropriate pest management studies in flours.

Keywords: Chickpea, Flour, Roller mill, Black beetle, X-ray micro-CT