

An ongoing climate change exposes plants to a whole range of environmental factors contributing to ever-increasing stressful conditions. The stress response of plants can reduce the yield of cereals, which make up a large part of food, thus increasing a threat to food security. It is therefore important to cultivate stress-resistant plants to ensure food security. The ability to cultivate resistant plants requires to understand their defensive mechanisms. Non-specific stress indicators with a protective function, such as phenolic compounds (FLs), help to determine the stress response of plants.

The aim of the present review is to summarize the knowledge about the effects of stress factors imposed by climate change on the accumulation and localization of secondary metabolites, with protective function in cereals, especially in barley (*Hordeum vulgare* L.). Further, to summarize the available information about the methods, which are used to detect and localize secondary metabolites in leaf tissues.

For detailed detection and determination of FL's content we can use chromatographic methods, e.g. HPLC. More accurate localization of FLs in tissues and cells requires the use of histochemical detections. One of the most commonly used methods is the method of Neu's reaction using fluorescence microscopy. The combination of the Neu's reaction with modern imaging and analytical methods allows very precise determination and localization of phenolic compounds in a plant sample. Understanding to the localization and accumulation of phenolic compounds can help us to determine appropriate, enough resistant genotypes of plants.