

**Abstract:**

**Algae and cyanobacteria, due of their evolutionary antiquity, are widely distributed primary producers that can withstand extreme environmental stresses. Low temperature, freezing and melting, and desiccation and rewetting, are common stresses prevalent mainly in polar regions and in winter seasons of temperate areas. In terms of physiological effects, these types of stresses share similar effects or are closely related to one another.**

**Low temperatures and desiccation exert a variety of stresses that need to be negated or lessened by adaptations. Specifically, adaptations to chill, freeze, and desiccation stresses will be discussed, as well as strategies that allow for stress avoidance or resistant morphological adaptations.**

**In this thesis, characteristics, functions and mechanisms of these adaptations and stresses are reviewed, as well as potential biotechnological uses of said adaptations.**

**Key words: algae, cyanobacteria, freezing, chill, desiccation, abiotic stress, cryoprotectants, osmoprotectants, akinetes, cryoinjury**