

## EFFECT OF DIFFERENT NITROGEN SOURCES ON GROWTH AND BIOCHEMICAL COMPOSITION OF THE GREEN MICROALGAE *SCENEDESMUS OBLIQUUS* AND *CHLORELLA KESSLERI*

MOSTAFA, M. EL-SHEEKH<sup>1</sup>; HAMED, M. ELADEL<sup>2</sup>; MOHAMED, G. BATTAH<sup>2</sup> & SOMIA, M. ABD-ELAL<sup>2</sup>

Botany Department, Faculty of Science, Tanta University<sup>1</sup> and Zagazig University, Benha branch<sup>2</sup>

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### ABSTRACT

Growth and biochemical composition of *Scenedesmus obliquus* and *Chlorella kessleri* were investigated under different nitrogen sources. Urea stimulated the growth measured as optical density, chlorophyll *a*, dry weight and protein content. On the other hand, ammonium chloride induced carbohydrate content; sodium nitrate increased the total lipids. Elevated carbohydrate content of *S. obliquus* and *C. kessleri* was due to the increase in the polysaccharide fraction with ammonium chloride and urea. Urea induced the biosynthesis of albumin; globulin and insoluble protein fraction, while sodium nitrate induced accumulation of glutelin and ammonium chloride favored protamin fraction accumulation in both algae. Amino acids profile detected from *C. kessleri* grown under different nitrogen sources revealed that, leucine was the major essential amino acid, while phenylalanine was the minor essential amino acid. Glutamic acid, aspartic acid, and proline were the major non-essential amino acids detected in *C. kessleri*, while tyrosine was the minor non-essential amino acid. Cysteine was detected when ammonium chloride used as nitrogen source. It was evident that sodium nitrate induced proline amino acid compared with the different nitrogen sources. Ammonium chloride increased arginine amino acid as compared with sodium nitrate and urea. Methionine was recorded in case of sodium nitrate and urea, while it was not detected with ammonium chloride.

### INTRODUCTION

Microalgae are being used as nutrient dense foods and sources of fine chemicals. They contain significant amounts of lipid, protein, chlorophyll, carotenoids, vitamins, minerals and pigments. They may also have active biological compounds that enhance health (Kay, 1991 and Lourenco *et al.*, 2002). The nutritional value of microalgae may be judged by their content and quality of proteins, amino acids, carbohydrates, sugars, lipids, polyunsaturated fatty acids, vitamins and minerals (Brown *et al.*, 1997). Jeffrey *et al.*, (1994) have determined how to optimize the synthesis of particular nutrients by growth phase and environmental conditions. These include temperature, light, time of harvest (young or old cells), and salinity of the growth medium, nutrients, nitrogen source, aeration, culture mode (batch, semi-continuous or continuous), and CO<sub>2</sub> enrichment.

Nitrogen is an essential nutritional element for the growth of algae. Algae are able to utilize nitrate, ammonia or other organic sources of nitrogen such as urea. Generally, the preferred nitrogen supply is in the form of ammonia or urea,