

# Virgin Olive Oil Composition as a Function of Nitrogen, Phosphorus and Potassium Plant Nutrition

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Recent modernization of olive cultivation has introduced and promoted densely planted orchards that are irrigated via systems that can also be utilized for nutrient application. Plant growth, fruit production and oil yield, and its quality are all expected to be influenced by the levels of available nutrients. Through the last several years we study the independent effects of N, P and K concentrations in irrigation solution on the composition and quality of extra virgin olive oils produced from “Barnea” olives by applying a wide range of macronutrient concentrations under highly controlled conditions. The results presented here suggested that oil composition is significantly influenced by P and N levels, while K levels have a minor effect only. Unsaturation levels were unaffected by the treatments but, within the unsaturated fatty acids, the levels of PUFA increased compared to those of MUFA. Specifically, levels of the MUFA C18:1, polyphenol content and peroxide values decreased while levels of the PUFA C18:3 increased in response to higher doses of N and P. Decreased MUFA and levels of polyphenol, coupled with increased levels of linolenic acid demonstrate both a potential negative influence on oil profile alongside with increases in nutritional benefits arising from increased levels omega 3 fatty acids in the oil. Results of two consecutive years will be discussed, also in relation to fruit bearing of the trees. The sum of effects of nutrient application on oil yield and composition should be considered in designing olive-orchard-management strategies.