FACTORIAL ANALYSIS ON FLOODED SOIL RECOVERY USING
SOIL CONTAINING ARBUSCULAR MYCORRHIZAL FUNGI

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ABSTRACT
This paper presents the factorial analysis on flooded soil (FS) recovery using soil containing
Arbuscular Mycorrhizal fungi (SA) with the help of a selected host plant, Allium cepa L.
(onion plant). In order to study the most contributing factor for the soil recovery, five factors
were selected namely; pH of soil, water content, SA/FS ratio, light supply and depth of soil.
This was to study the ability of SA to recover the nutrients (nitrogen, phosphorus and
potassium) in the FS. Experimental design table was constructed using the concept of two
level factorial by employing Design Expert® software (Ver 7.1.6). Soil sample was collected
after 12 days and analyzed for nitrogen, phosphorus and potassium concentrations using
HACH Spectrophotometer. Later, the data was analyzed in the named software to determine
the main effect of respective factors and interaction between factors. The results showed that
water content, light supply and depth of soil were the important factors for nutrients recovery.
The best condition for FS recovery using SA was at: pH of soil (4), water content (28 ml),
SA/FS ratio (1:5), depth of soil (5 cm) and with light supply.

INTRODUCTION
The rainy season to the eastern part of Peninsular Malaysia which occurs in the period
between October and March always bring about the devastative effect not only to human
being but also to ecosystem. This effect is especially on agricultural soil since agriculture
occupies a large proportion of the landscape. Flooded soils create significant challenges for
agricultural lands. The floods have many direct impacts, with the most prominent one being
the flooded soil syndrome where the soils losses their beneficial fungi which mobilize soil
based plant nutrients. Flooding and long periods of waterlogging have resulted in the
depletion of nutrients. Prolonged flooding reduces the concentration of nitrogen, N,
phosphorus, P and potassium, K. N appears to have been denitrified and lost from the system.
Since P uptake depends on microbes in most plant, prolonged waterlogging has reduced
microbial activity which in turns affects the absorption of P into the plant roots [1]. Soil K is
less available in soils that remain wet since wet soils are more prone to compaction, which
restricts plant root growth and uptake of soil K.