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Short Communication

Analysis of preliminary phytochemical screening of *Typhonium flagelliforme*

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Typhonium flagelliforme **(Araceae) is a medicinal herb which is endowed with curative properties against a variety of illness including injuries, oedema, coughs, pulmonary ailments, bleeding and cancer. In order to assess its phytochemical components, an experiment was conducted on one to six month old *ex vitro* and *in vitro* extracts of *T. flagelliforme.* The active (*ex vitro* and *in vitro*) extracts of *T. flagelliforme* were screened for phytochemicals components such as alkaloids, flavonlids, terpenoids and steroids. Alkaloids and flavonoids are the main phytochemical constituents of *T. flagelliforme* which are found to be in the highest amount in two and four month old of *ex vitro* plants. High amounts of main phytochemical constituents were observed during the flowering process which started in two month old plant and finished at the end of the three month old plant.**

Key words: *Typhonium flagelliforme,* phytochemicals, traditional medicine.

INTRODUCTION

Typhonium flagelliforme is a medicinal herb which belongs to the Araceae (Arum) family. Su et al. (2000) described that mature *T. flagelliforme* plant can grow up to 26 cm in height. All varieties of this plant produced a single inflorescence consisting of a spadix, surrounded by a long and slender greenish yellow spathe. The spathe is the length and width of 15.37 ± 1.17 cm long and 1.44 ± 0.07 cm broad at the widest portion. The spadix is divided into four portions: a lower 0.41±0.03 cm pistillate portion, an intermediate 1.48 ± 0.14 cm portion with sterile flowers, a 0.34 ± 0.05 cm staminate portion and terminated with lemon yellow 12.92 ± 1.25 cm rodent tail-like appendix. *Typhonium* can be found from India to Australia and is spread northward to the sub-temperature areas of the Eastern Asia up to Sri Lanka (Nicolson and Sivadasan, 1981). It can also be found in the

Malaysian Forests, especially in the Eastern and Northern parts of the Malaysian Peninsula (Hsuan, 1978). Traditionally, *T. flagelliforme* is taken with fruit juice or as dry extract with other herbal medicine for the treatment of different types of cancer (Teo and Chang, 1996). Perry and Metzger, 1980 reported that the people in Philippi have been using the flowers of *T. flagelliforme* to arrest bleeding and as remedial for the treatment of injury. Methods used in phytochemical screening should be simple, rapid and can be done with the help of minimum equipment and reasonably selective classes of compounds under study (Sofawora, 1993).

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MATERIALS AND METHODS

Plant material

Fresh *T. flagelliforme* plants (1 - 6 months old *ex vitro* and one sample of *in vitro*) were collected from Laboratory of Agriculture Technology, University Putra Malaysia.

Extraction of the plant material

A preliminary study was conducted to determine the most active extract against cancer cells. According to polarity index, one solvent system was selected for the extraction namely mixture of methanol

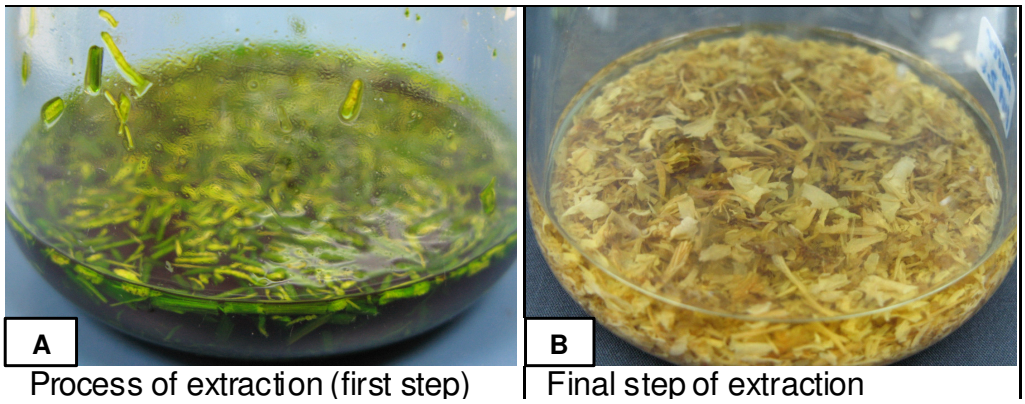

Figure 1. *T. flagelliforme* at different stages of extraction.

(MeOH) and dichloromethane (DCM) at ratio of 1:1. A total of 300 g dried material of *T. flagelliforme* of each sample was used for the extraction, in which the material was soaked for three days at room temperature. The process was repeated several times with the same solvent system until the solvent portion became colorless (Figure 1). The solvent extract was then concentrated under reduced pressure using a rotary evaporator (Büch Rotavapor R- 200). After that, the concentrated extract was transferred into conical flasks and the residual solvent was removed. After drying in an oven incubator, dried crude extract was weighted and stored at -20℃ for further analysis.

Methods for Screening of Phytochemical Components

Alkaloids

20 mg of plant crude extract was added to 10 ml methanol and placed in a sonic bath to dissolve. The extract was then filtered using a Whatman No.1 filter paper; 2 ml of filtrate was taken and mixed with 1% HCl. To 1 ml of this mixture, 6 drops of Mayer's reagent, Wagner's reagent or Dragendroff reagent were added. Within few minutes in the presence of alkaloids with the use of Mayer's reagent, a yellow-creamish precipitate colour is expected; with Wagner's reagents in the presence of alkaloids, a brownish red precipitate is produced while an orange precipitate was observed using the Dragendroff's reagent.

Flavonoids

20 mg of plant crude extract was mixed with 10 ml methanol and filtered; 2 ml of filtrate solution was taken and mixed with concentrated HCl. Magnesium ribbon was added until a pink- tomato red colour was gauged, indicating the presence of flavonoids.

Steroids

20 mg of plant crude extract was mixed with 1 ml methanol and filtrated. Then, 1 ml chloroform and 1 ml concentrated H_2SO_4 were added into the filtrate in which a yellow green fluorescent indicates the presence of steroids.

Terpenoids

10 ml chloroform was added into 20 mg of crude extract. This was followed by the filtration process, whereas 2 ml acetic anhydride and concentrated H_2SO_4 were added into the filtrate and in presence of terpenoids, a blue green ring should appear on top of the mixture.

RESULTS AND DISCUSSION

Phytochemical investigation revealed the presence of flavonoids in all *ex vitro* plants at different time point of growth, as indicated in Table 1. The strong appearance of flavonoids was found in two and six month old plant extracts with influential appearance of pink-tomato red colour. One month old plant extract showed the weakest appearance of flavonoids with light orange colour. However the *in vitro* plant extract showed negative presence of flavonoids indicated by a yellow colour.

Phytochemical analysis showed the presence of terpenoids only in four month old *ex vitro* plants extract, as indicated in Table 1. This demonstrated the presence of terpenoids in the extractions, indicated by a blue green ring appearance on the top of the mixture. Strong steroids presence was noted in the *in vitro* plants extract with yellow green fluorescent indicative of positivity of the six *ex vitro* plants. Only the six month old plants extract showed a weak presence of steroids with a very light yellow green fluorescent appearance. The presence of alkaloids as described before could be done with three different reagents such as Mayer's reagent, Wagner's reagent or Dragendroff reagent. In the present study, only Mayer's and Dragendroff reagents were used. As indicated in Table 1, based on the Mayer's reagent, strong presence of alkaloids was observed in the two month old plants extract with a creamish precipitate colour. Moderate presence of alkaloids was also found in the three month old plants. A weak presence of alkaloids was found in the *in vitro* plants by appearance of light creamish precipitate. Using the Dragendroff reagent to test for alkaloids, strong presence of alkaloids was found in the four month old *ex vitro* plants with orange precipitate observed, although a weak presence of alkaloids was found

Table 1. Phytochemical test of *T. fagelliforme.*

Time	Alkaloids		Flavonoids	Steroids	Terpenoids
	Mayer	Dragendroff			
in vitro	+	-	-	+ ++	-
1 months	-	-	+	-	-
2 months	++ +	-	++++	-	-
3 months	++	-	+ +	-	-
4 months	-	+++	+++	-	+
5 months	-	+	+++	-	-
6 months	-	-	++++	+	-

+: Weak presence, ++: moderate presence, +++: strong presence, ++++: very strong presence, and -: Absent.

in the five month old *ex vitro* with a very dark appearance of orange precipitate.

Diversity of medicinal plants and herbs containing various phytochemicals with biological activity can be of valuable therapeutic key. Much of the protective effect of fruits and vegetables also has been attributed to the phytochemicals, which are the non-nutrient plant components. Different phytochemicals have been found to have a broad range of activities, which may help in protection against chronic diseases (Liu, 2003). Alkaloids and flavonoids are the major phytochemicals found in *T. flagelliforme.* Of all the *ex vitro* plants, the two and four month old plants contained the highest amounts of the phytoconstituents (alkaloids and flavonoids). It is interesting to note these phytochemicals are commonly associated with various pharmacological activities of natural products (Cragg and Newman, 2005). According to Ferguson et al. (2004), several plant species rich in flavonoids were reported having disease prevention and therapeutic properties. This observation is of particular importance since flavonoids are ingredients of many vegetables and fruits and the association of vegetable and fruit consumption with reduced cancer risk has been reported. There is much evidence that flavonoids have important effects on various biological systems. These effects may have therapeutic uses, but this potential of the flavonoids has not yet been realized even though a large body of research supports the possible utilization of these compounds in medicine (Mascolo et al., 1999).

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