

CHAPTER 24

The Miracle of *Ficus deltoidea* on Uterus

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Abstract

Today there is resurgence in worldwide interest in herbal medicine for medicinal purposes. More than 40% of commonly prescribed drugs found their origins in plants. In Malaysia, herbal medicine has gained popularity as alternative to modern medicine due to increasing interest among consumers and scientific community. This is further supported by the establishment of Traditional and Complementary Medicine Division under Ministry of Health, Malaysia as well as the presence of NKEA EPP#1 Research Grant Scheme under Ministry of Agriculture. In supporting to this matter, discovery of scientific evidences, innovation and inventions of natural products are being required. *Ficus deltoidea*, is a perennial herb that is used by Malay women to assist labour, firm the uterus post-delivery and to prevent postpartum bleeding. Failure of uterine contraction during parturition and post-partum period can lead to complication during labour and also post- partum hemorrhage. In view of its claimed on uterotonic action, the mechanisms underlying plant's effect on uterine contraction were investigated. The novelty of this project is the potential of *F.deltoidea* to stimulate urine contraction and firming the uterus, that could be developed as a new product in the market. The special criteria are referring to its mechanism of action and pharmacology effects which are similar with agonist drugs for example: oxytocin, that act on oxytocin receptor in uterine tissue. Meanwhile, *in vivo* study showed that compound were not toxic up to 1000mg/kg. Based on the scientific findings, this products could be used to assist the delivery process for women, firm the uterus and prevent bleeding during postpartum period. The commercialization

potential includes targeting the public, private hospitals, pharmacies and a consumers to consume this extract as a product supplement for pregnant women starts when the labour pain initiates, for preventing postpartum bleeding and also to firm the uterus.

Introduction

Introduction to medicinal plant

More than 35,000 plant species around the world have recorded for medicinal purposes (Srivastava et al., 1996). However, the number could be much higher due to knowledge on the indigenous uses of plants was mostly passed on orally from one generation to the next and has largely remained undocumented. According to the World Health Organization (WHO), approximately 80% of the people in developing countries depend on traditional medicines for the primary health care, of which a major portion involves the use of plants extracts or active principles originating from parts of plant (Farnsworth et al., 1985). Today there is resurgence in worldwide interest in herbal medicine for medicinal purposes (Salleh & Ahmad, 2013). This is based on the fact that more than 40% of commonly prescribed medicines throughout the world found their origins directly or indirectly in plants (Farnsworth & Soejarto, 1991), which include several major life-saving drugs such as reserpine, atropine, quabain, vinblastine, vincristine and taxol (Salleh & Ahmad, 2013). Since the last twenty years, herbal medicine consumption increase sharply in the Unites States (Johnston et al., 1999), while in Malaysia, herbal medicine has gained popularity as alternative to modern medicine due to public awareness and increasing interest among consumers and scientific community (Salleh & Ahmad, 2013). This is further supported by the establishment of Traditional and Complementary Mediciner Division under the Minitstry of Health, as well as the presence of NKEA EPP#1 Research Grant Scheme under Ministry of Agriculture, Malaysia. In supporting this matter, discovery of scientific evidences, innovation and inventions of natural products are being required.

Plant that possess uterotonic activities: uterotonic plants

Uterotonic plants are plants that can stimulate uterine contraction. They are used to induce and maintain labour, remove the retained placenta, to treat post- partum bleeding and as abortifacient. These plants are also called oxytoxic plants (Gruber & O'Brien, 2011). Oxytoxin plants have long been used to induce uterine contraction since ancient time. These plants are consumed towards the end of gestation or at the onset of labour to induce birth (Knoche et al., 2008). Additionally, they also help the uterus and vagina to contract during involution in the postpartum period. Oxytoxic plants confer advantages as they do not have side effects as compared to the synthetic oxytoxin, prostaglandin and ergomterine. Despite the worldwide use of these plants mainly in the developing countries, however, scientific evidences to support their beneficial effects are still on the way for full discovery.

Ficus deltoidea

One of the plant that are very popular among our local women in inducing uterine contraction is *Ficus deltoidea* (Salleh & Ahmad, 2013). *Ficus deltoidea* (*F.deltoidea*) is known as mas cotek in Malay language, with the word ‘mas’ means gold and ‘cotek’ means spot. The Malay called this plant mas cotek to refer to the golden spots found on its leaf surface. It is called with different names at different locations such as *serapat angin* or *sempit-sempit* in Sabah, Malaysia; *tabat barito* or *ara burung* in Indonesia and *kangkalibang* in Africa. It is a small perennial herb which rarely exceeds 2 meters in height and is domestically cultivated. In Malaysia, most of *F.deltoidea* species largely found in the eastern states of Terengganu and Kelantan. Based on traditional beliefs, local Malay women used the leaves of *F.deltoidea* water decoction to facilitate childbirth as well as a traditional herbal drink after childbirth to help strengthen the uterus (Daily Express, 2000). It is frequently consumed by women of all reproductive ages and is claimed to promote uterine contraction, firm the cervix and to aid vaginal contraction in the postpartum period (Salleh & Ahmad, 2013).

Studies of *F.deltoidea* have received tremendous responses because this plant has many usages to treat diseases as well as to maintain health. Some studies have demonstrated various biological activities of *F.deltoidea* extracts (from various part of the plant), including antioxidant activities (Hakiman & Maziah 2009), antinociceptive (Sulaiman et al., 2008), antiinflammation (Zakaria et al., 2011), antidiabetic activities (Misbah et al., 2013), anti-hypertensive activity (Razali et al., 2013), wound healing on neck skin of rats (Abdulla et al., 2010), anti- peptic ulcer (Zahraet al., 2009), anti- oral ulcer (Ahmad et al., 2016) and uterine contraction via multiple binding receptor (Salleh & Ahmad, 2013).



Fig. 1 shows: (A) The whole plant; (B) Leaf; (C) Fruit; (D) Seed

Problem statement

Failure of uterine contraction during parturition can leads to complication during labour and also causes post- partum haemorrhage during post- partum period. Half of a million women die annually across the world due to pregnancy and childbirth. Approximately

one quarter of these deaths are caused by primary post- partum haemorrhage (Ahmad, 2010). Pitocin (synthetic oxytocin) that is commercially used by most of the hospitals in Malaysia very expensive and imported from overseas. Moreover, copyright and patterned was from Israel. To the best of our knowledge, this is the first study to investigate the effect of this plant on the uterus (if any).

Objectives

- I. To investigate the *F.deltoidea* leave extract effects on uterine contraction.
- II. To produce and develop the supplement specific for women to assist delivery process,to eases the labouring process. It is also used to firm the uterus and prevent bleeding during post- partum period.
- III. To invent the *F.deltoidea* leave extract product in form of tea bag and capsule: and name it as 'MIRACLE'.

Methodology



Fig. 2 Study design and methodology

Novelty

The novelty of this project is the potential of *F.deltoidea* to stimulate urine contraction and firming the uterus, that could be developed as a new product in the market- natural resources based.



Fig.3 Capsules and tea bags of Miracle brand product (originally *F.deltoidea* leaves extract).

Special criteria

The special criteria are referring to its mechanism of action and pharmacology effects which are similar with agonist drugs for example: oxytocin, that act on oxytocin receptor in uterine tissue. Meanwhile, in vivo study showed that compound were not toxic up to 1000mg/kg (Salleh & Ahmad, 2013). Based on the scientific findings, this-products could be used to assist the delivery process for women, firm the uterus and prevent bleeding

during postpartum period (Salleh & Ahmad, 2013). Based on anti-microbe test, the extract free from contamination (Vivi & Naguib, 2016).

Traditional claims:

Based on traditional claims, local Malay women used the female leaves extract of *F.deltoidea* in form of water decoction to facilitate childbirth and as a traditional drink (*air jamu*) to help strengthen the uterus (Salleh & Ahmad, 2013; Ahmad, 2010). It is frequently consumed by women from all of reproductive ages and also claimed to promote uterine contraction, firm the cervix and to aid vaginal contraction in the postpartum period (Ahmad, 2010).

Scientific evidences:

From journal written by Salleh & Ahmad, 2013; ISI index, Tier 2 and also from thesis book written by Ahmad, 2010), with permission from the author).

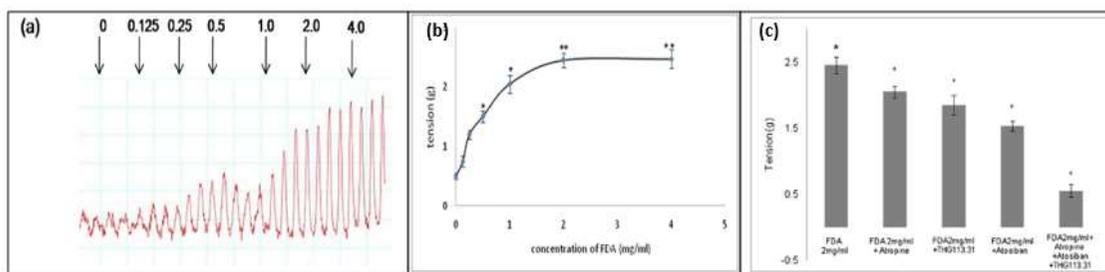


Fig. 4 (a) Tracing of isometric uterine contraction following administration of various doses of *Ficus deltoidea* female leaves extract; (b) Effect of FDA(*F.deltoidea*) on uterine contraction; (c) Mean Emax following administration of FDA (*F. deltoidea*) at 2mg/ml and in the presence of atropine, THG113.31 and atosiban. Atropine caused the least inhibition while atosiban produced the greatest inhibition on the Emax. Concomitant administration of all three antagonists resulted in a remarkable decrease in the Emax. n = 6 rats per group, *p <0.05.

Usefulness/ Social implication

The usefulness of *F.deltoidea* leave extract based product is to assist the delivery process for women. It is also used to firm the uterus and prevent the bleeding during postpartum period. Besides, it can be used to relieve the process of period pain.

Commercial value

The commercialization potential includes targeting the public and private's hospitals, pharmacies, and also consumers to consume *F.deltoidea* leaves extract as a product supplement for pregnant women. It is suggested to be used when pregnant women feel labour pain because it can prevent postpartum bleeding and also play role to firm the uterus. The ability of this product to penetrate Malaysian market is expected to be very high due to the product differentiations and no similar product that has been established

in the market so far (due to only we have the scientific evidences effect on uterus). Cost of this product is very competitive due to facts that *Ficus deltoidea* are abundance and can easily be grown in nature or commercially plant in Malaysia's climate. Moreover, development and productions of the plant could offer more opportunity in the development of small and medium entrepreneurs(SME) for Malaysian and enhance the growth of Malaysian economy in line with the aspiration of the government of Malaysia.

Intellectual properties

Copyright protected.

Conclusion

As a whole, the present study provides scientific evidences on the oxytotoxic potentials of *F.deltoidea* leave extract. To the best our knowledge, this is the first study that demonstrates the effect of *F.deltoidea* leaves extract on uterine contractile activity. These findings justify the traditional use of *F.deltoidea* leave extract as uterotonic agent.

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