

# การเหนี่ยวนำการคลอดในแม่สุกร โดยใช้สารโปรสตาแกลนดิน เอฟ<sub>2</sub> ฮู อัลฟา

(INDUCTION OF PARTURITION IN SOWS WITH  
PROSTAGLANDIN F<sub>2</sub>∞)

ปราจีน วีรกุล\*

P. Virakul\*

ธงชัย เฉลิมชัยกิจ\*\*

T. Chalermchaikij\*\*

พีรศักดิ์ จันทร์ประทีป\*

P. Chantaraprateep\*

\* ภาควิชาสัตวศาสตร์ - เชนูเวชวิทยาและวิทยาการสืบพันธุ์

\*\* นายสัตวแพทย์ประจำโรงพยาบาลสัตว์ คณะสัตวแพทยศาสตร์

จุฬาลงกรณ์มหาวิทยาลัย

(Faculty of Veterinary Medicine, Chulalongkorn University)

## Abstract

A single dose of 10 mg. Prostaglandin F<sub>2</sub>∞ (PGF<sub>2</sub>∞; Lutalyse (R)) was administered to 13 and 7 pregnant sows days 111 and 112, parturition took place within 26.25 ± 4.55 and 22.92 ± 4.98 hrs. respectively in addition, double doses of 10 mg. PGF<sub>2</sub>∞ 24 hrs. apart was employed in 4 pregnant sows day 112 and parturition took place within 5.52 ± 4.39 hrs. after the treatment. Number of piglets, birth weight and weaning weight were not significantly different from controls (p 0.50). Besides, parturition was also induced in sows with prolonged gestations days 115 and 117.

## คำนำ

สารโปรสตาแกลนดิน (Prostaglandins), Kurzrok & Lieb ได้ค้นพบครั้งแรกในปี 1930 โดยสกัดจากน้ำอสุจิของคนและ Seminal vesicle ของแกะ และในปี 1934 Nobel Laureate Von Euler ได้ตั้งชื่อว่า Prostaglandin (PG) (Macdonal, 1975)

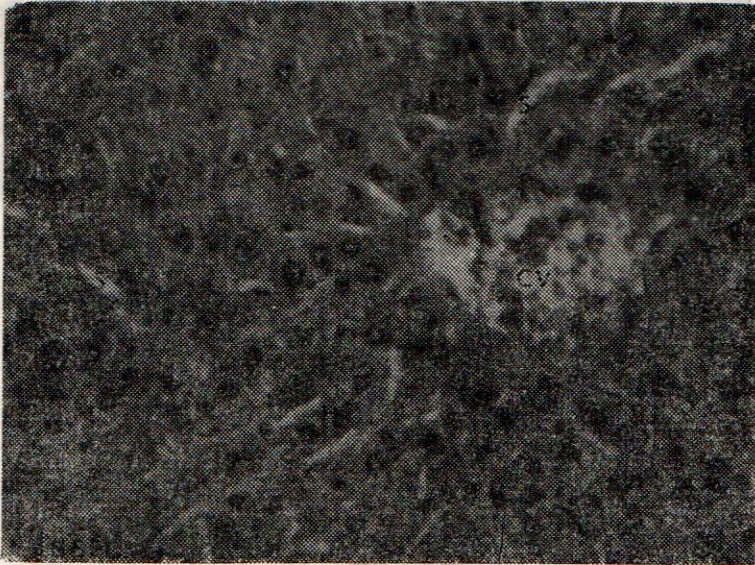


Fig. 1 A liver lobule of the experimental cattle No. 2490 which appeared normal (H & E, 400 x)

CV = central vein, HC = hepatic cord, S = sinusoids

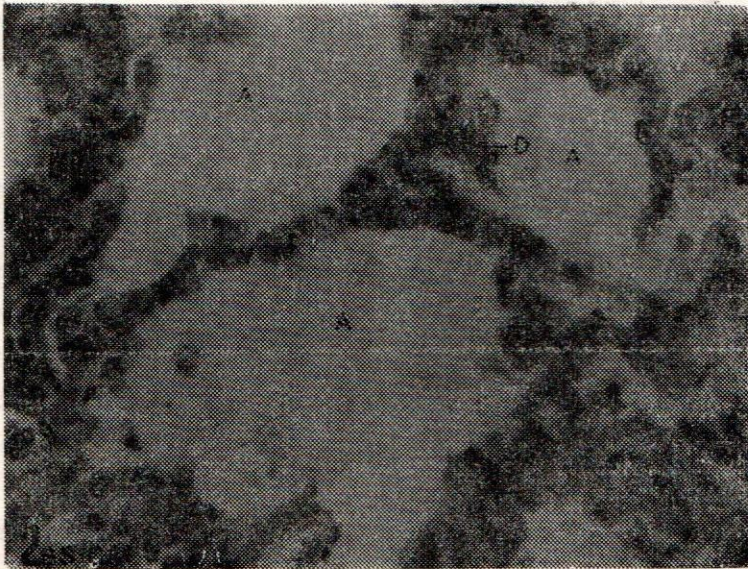


Fig. 2 Lung of the experimental cattle No. 2492 showed no difference from the control. (H & E, 400 x)

A = alveoli, W = alveolar wall, D = Dust cell

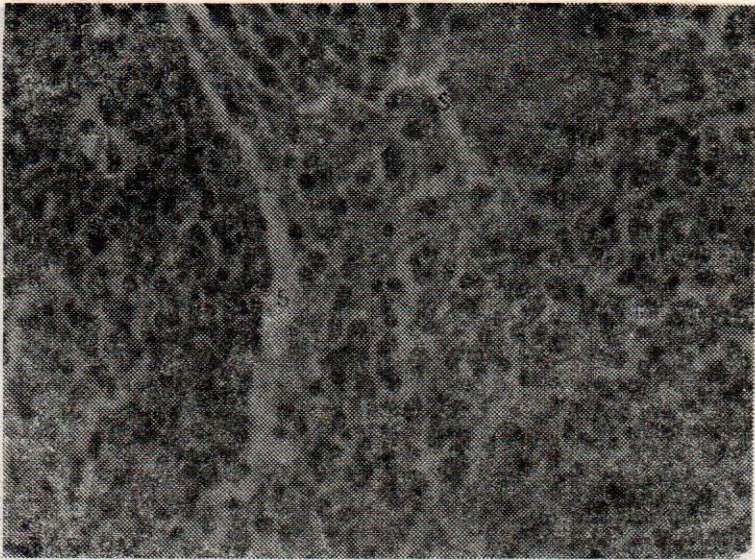


Fig. 3 Lymph node medulla of the cattle No. 2491 illustrated normal micro-anatomy (H & E, 400 x)

L = lymphocyte, R = reticular cell, S = sinusoid,  
ST = cross section of the septum

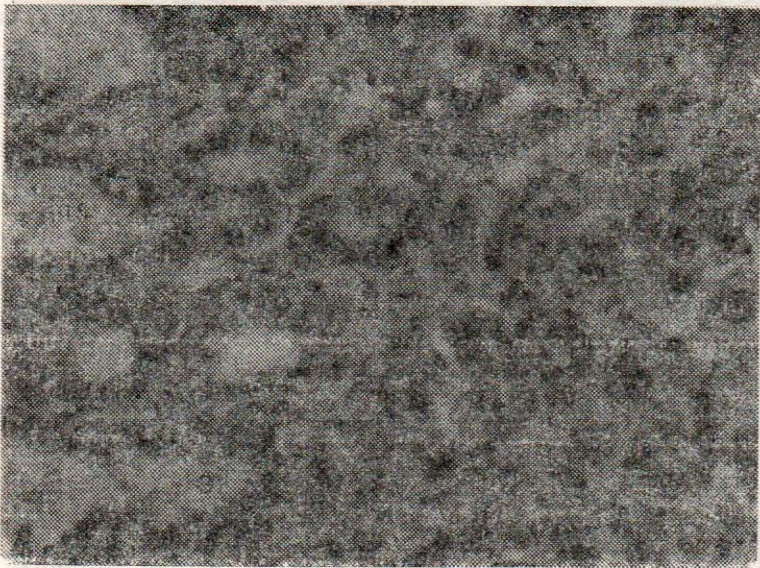


Fig. 4 Abomasum of the cattle No. 2495 revealed no pathological change (H & E, 400 x) C = chief cell, GP = gastric pit, LS = luminal surface, P = parietal cells, V = villus

### Discussion

The samples of sunnhemp hay, from Khon Kaen, contained pyrrolizidine alkaloid in both N-oxide form and tertiary base ranging from 0.001% to 0.01%. At this stage it is impossible to state whether this level of alkaloid is high or low since there have been no previous analyses to which we can compare. The total percentage of alkaloid was utilized in calculating the amount of alkaloid consumed by each animal. As illustrated in Table 2 the group II animals ingested 20.02 grams of pyrrolizidine alkaloid per 100 kg. body weight in 4 months. The group III cattle consumed 8.46 grams of alkaloid over the same period of time. In this experiment, it can be inferred that 20.02 grams of alkaloid per 100 kg. body weight is the greatest quantity possible taken voluntarily by an animal in the period of 4 months. However it is not known whether pyrrolizidine alkaloid is accumulated in body tissue and in this study the quantity of alkaloid taken every 2 weeks by the same group of animals was determined from the sunnhemp consumed. Information on accumulation is not available in mammals. A study by Mattocks (1971) in the Cinnabar moth (*Callimorpha jacbaeae* L.) revealed that it was positively accumulated. The insects and the mammals, however, are too far apart in the animal kingdom to draw any conclusion. It is only possible to state from this experiment that the experiment cattle could consume sunnhemp hay at will without any harmful effect reveals within 4 months.

The nutritive values of each feedstuff are shown in one histogram. of interest is the finding that sunnhemp hay possesses the highest amount of crude protein and lipid content. The carbohydrate as represented by the crude fiber and nitrogen-free extract does not differ from others significantly. In general the Verano stylo hay is also rich in crude protein.

The nutritive values of each feedstuff match well with the growth curve. As expected, group II animals (G. II) grew best of all because of the best feedstuff. Groups III and IV (G. III & G. IV) gained less weight respectively. The growth curve of group I (G. I) ran down progressively. This shows that the cattle could not survive healthily on rice straw for a long period of time. In the real situation of Thailand, however, cattle only live on rice straw for a period of 3 months.

The blood picture of control group changed slightly from the base line. The total erythrocyte count decreased in all three animals. Such decrease could

be ascribed to the poor quality of rice straw and the limited physical exercise in the experimental lot. It is a generally accepted fact that the red blood cells increase after regular exercise (Compenhaver 1964.) The total leucocyte counts also changed from the base line, two decreased (Nos. 2489, 2490) but one (No. 2498) increased. This change could be said with considerable confidence to be physiological in origin, and in turn this physiological change could stem from low nutritional values of rice straw. The increase of leucocytes in general is due to the increase of neutrophil (Benjamin, 1969), but the increase in other cell types are not uncommon. In this experiment it was found that neutrophil did not increase from the base line. The decrease of leucocytes as found in No. 2498 and 2490 may be explained as physiological phenomenon plus the effect of malnutrition, because Trautmann and Fiebiger (1952) reported that young cattle possess more leucocyte than the adult ones. The base line data, however, may not be generally accepted but it serves as a control of any change to come in our experiment. Blood samples were drawn at the same time of a day, in the morning just before feeding, to avoid possible timely fluctuation. Factors which may produce the decrease of the leucocyte include ; 1) infection, 2) cachectic and debilitated conditions, 3) hemopoietic disorder, 4) physical agents such as x-rays and radium, 5) chemicals (Antibiotics, Sulfonamides, Analgesics, Antihistamines, Anticonvulsants, Antithyroid drugs, Hemopoietic depressants, Arsenicals, Barbiturates, D.D.T., Atabrine, Quinine, Diamox), 6) elements (Lead, mercury, bismuth, gold) (Benjamin, 1969). The general decrease of the blood cell counts as shown in the histogram for the first group could be related to the cachectic condition of the animal. There was a striking increase of basophil in all three animals but the reason for such an increase was not known. Basophils normally produce heparin and histamine in the connective tissue together with mast cells (Copenhaver, 1964).

The blood examination of group II animals fed with 100% sunnhemp showed that both total erythrocyte count and total leucocyte count were higher than that of group I but the amount of other cell types did not differ markedly from group I. In general, all values were lower than the base line measured before the experiment. As expected, blood counts in general were better than group I. Again, of particular interest was the increase of basophils.

Group III animals fed with 75% rice straw and 25% sunnhemp showed a similar blood count to group I. A constant finding was the increase of basophils.

Group IV animals fed with 75% rice straw and 25% Verano stylo exhibited an increase in total erythrocyte count and total leucocyte count. Other cell types of white blood corpuscle follow the same pattern of reduction from the base line. Basophils increased constantly, greater than the other groups.

The increase of basophils was found in all groups of animals; so that it can not be related solely to the debilitating condition of group I animals. The animals fed with the Verano stylo exhibited the greatest increase of basophil; this is hard to explain. The three substances secreted by basophil (or mast cells) act differently: serotonin acts as a vasoconstrictor and in muscle contraction, heparin as anticoagulant, and histamine irritates tissues. In humans, the basophils increase in such infections as small pox, chickenpox, and chronic sinus inflammation (Copenhaver, 1964). Our experimental animals, however, appeared normal throughout the experiment.

of the 840 microslides prepared from 84 organ samples and examined, no pathological change at the cellular level was found. This provides the information that pyrrolizidine alkaloid is not toxic to cattle as proved by the normal micro-anatomy of the liver, lung and kidney harvested from the experimental animals. It was reported that pyrrolizidine alkaloid from *Senecio jacobaea* caused organ pathology in pigs. The organ involved are liver, lung and kidney; and the main effects are necrosis, edema, and fibrosis (Hooper, 1968). Alkaloid from this same plant did not affect horses, cattle or sheep. This experiment clarifies that sunnhemp alkaloid is not harmful to cattle and it can promote growth considerably. The animals in this experiment consumed about 2 kg. dried sunnhemp per kg. body weight which is more than a poisonous level of 0.14 kg./kg. body weight of dried *Senecio jacobaea* (Hooper, 1968).

### Conclusion.

Sunnhemp grown on sandy soil of Khon Kaen, Thailand, and dried under sunlight for 2 days contains 16.39% crude protein, 1.56% ether extract, 36.37% crude fiber, 7.45% ash, 38.23% nitrogen-free extract, Its crude protein content was higher than that of the Verano stylo. It contained pyrrolizidine

alkaloid in the form of N-oxide and tertiary base about 0.001-0.01%. The animals ingested 8.46-20.02 grams of alkaloid throughout the experiment or about 2 kg. dried sunnhemp per kg. body weight. Cattle quickly adapted to sunnhemp hay as judged by the voluntary intake. As a result group I I animals grew better than the other groups. Verano stylo hay was second in the nutritional value, thus the growth rate of group I V was third. The general health of the cattle also followed the good-to-poor order as follows : Group I I, group I I I, group I V and group I.

Blood examination corresponded to general health and condition. In all groups of animals the blood counts changed from the base line with more blood constituents decreasing and only few increasing. A constant finding was the increase of basophils which could not be satisfactorily explained by the data.

No gross lesions were found in the organ likely to be damaged as reported in the literature; there was no evidence of cellular pathology such as necrosis, edema, and fibrosis in the liver, lung, kidney, heart, abomasum, jejunum. It could be concluded that sunnhemp hay or more specifically, its alkaloid was not toxic to cattle. In addition it promotes growth better than Verano stylo hay and rice straw. A definite conclusion must await the extension of this study to a larger, more meaningful sample size. Twelve cattle, could not represent the population scientifically as they vary individually.

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