

## Parasite larvae contamination in local made food “Pla Ra” from a rural village in Mahasarakham Province: a small survey

วิโรจน์ ไววานิชกิจ<sup>1</sup>

สุวรรณี นิธิอุทัย<sup>2</sup>

มหกิจ อินทร์กลับ<sup>3</sup>

### Abstract:

Parasite larvae contamination in local made food “Pla Ra” from a rural village in Mahasarakham Province: a small survey

Wiwanitkit V, Nithiuthai S, Inklub M.

Department of Laboratory Medicine, Faculty of Medicine,

Department of Pathology, Faculty of Veterinary Science,

Chulalongkorn University, Bangkok, 10330, Thailand

Songkla Med J 2002; 20(3): 175-179

*Parasitic infestation is still an important health problem in Southeast Asia, especially the Northeastern Region of Thailand and Laos. A number of domestic foods, especially raw foods, are contaminated with parasites. In this study, a survey of the parasite contamination in a local food named “Pla Ra”, or traditional fermented fish, was performed. Collection of food samples from all available food stalls in a rural village, Non Samran, Borabue district, Mahasarakham province, was done.*

---

<sup>1</sup>M.D., Lecturer, Department of Laboratory Medicine, Faculty of Medicine <sup>3</sup>Student <sup>2</sup>Associate Professor, Department of Pathology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, 10330, Thailand

รับต้นฉบับวันที่ 25 มีนาคม 2545 รับลงตีพิมพ์วันที่ 15 สิงหาคม 2545

Each sample was analyzed for possible parasitic contamination by compression and sedimentation. In this study, 16 Pla Ra samples were collected. Interestingly, from this survey, no parasite contamination was detected. Since the total samples in this study are rather few, the implications are limited.

**Key words:** Pla Ra, parasite

### บทคัดย่อ:

การติดเชื้อพยาธิเป็นปัญหาสาธารณสุขที่สำคัญในเอเชียอาคเนย์ โดยเฉพาะทางภาคตะวันออกเฉียงเหนือของไทยและลาว อาหารพื้นเมืองหลายชนิดโดยเฉพาะอาหารที่ทำจากปลาที่ไม่ผ่านการปรุงสุก มีส่วนเกี่ยวข้องกับการติดเชื้อพยาธิจากการเจือปนในอาหาร ในการศึกษานี้ได้ทำการศึกษาขนาดเล็กในวงจำกัดในตัวอย่างอาหารจำพวกปลาร้าทำเองที่เก็บมาจากหมู่บ้านชนบท หมู่บ้านโนนสำราญ อำเภอบรบือ จังหวัดมหาสารคาม โดยเก็บตัวอย่างตัวได้ทั้งสิ้น 16 ตัวอย่าง ทำการตรวจหาการเจือปนของพยาธิ แต่ไม่พบการเจือปนแต่อย่างใด อย่างไรก็ตามเนื่องจากการศึกษาขนาดเล็กการขยายผลออกไปจึงมีจำกัด

**คำสำคัญ:** ปลาร้า, พยาธิ

### Introduction

Fluke infestation is an important health problem in Southeast Asia, especially for the Northeastern Region of Thailand and Laos, where fish-borne trematodes particularly *Opisthorchis viverrini* and other flukes of the family Heterophyidae, are commonly found<sup>1</sup>. These parasitic diseases bring several disorders, especially obstructive jaundice and cholangiocarcinoma. In the life cycle of these flukes, several kinds of freshwater fishes, especially in the cyprinoid group, are the second intermediate host<sup>2</sup>. Exposure of human beings to the metacercariae of these flukes is mainly from consumption of the raw uncooked fish containing the infective stage<sup>3</sup>. Apart from the fluke, the other important parasite found in fresh water fishes is the *Gnasthostoma* spp. Infection from this parasite is less prevalent than the fluke, but the symptoms can be severe. Therefore, awareness of this parasite is important as well.

Many traditional menus in Thailand and other nearby countries include raw fish. A number of these domestic foods have been reported as possibly contaminated with parasites<sup>3</sup>. Fermentation of the freshwater fish in salt and semi-cooked rice called “Khao Khua”, making a famous traditional local food called “Pla Ra”, is widely performed in Northeastern of

Thailand and Laos PDR (People’s Democratic Republic). Local people have prepared several dishes from uncooked “Pla Ra” for a long time. Therefore, “Pla Ra” is an important local consumption culture.

Thus, the viability of larvae of the parasite in the flesh of the wild caught freshwater fish is an important factor in this food-borne infection. It is believed that ingestion of this raw fish is the major factor of fluke infestation among the local domestic people. A previous study by Jadsri and Noojoy<sup>4</sup> showed that eating this traditional food is a risk for parasitic infection<sup>4</sup>. Thus, this study was undertaken to survey parasitic contamination in locally made “Pla Ra” in a village in an area with high endemic fluke infection<sup>5</sup>.

### Materials and methods

This study was performed as a cross-sectional study. A survey of parasite contamination in “Pla Ra” in a market in the endemic area was performed.

#### Study community

A rural village, Non Samran, Borabue district, Mahasarakham province, which is located in an area with a high prevalence of helminthic infestation, was chosen for the study.

A market where many villagers sell their various goods is located there. A number of locally made foods from several nearby villages are sold at the market. This village is the center of the other nearby villages and may be a good representative for the rural villages in the nearby areas. The local geographical area can be described as the Mae Moon – Mae Khong river plain with monsoon type weather (two main seasons: summer and winter). More than 300 people come to this market every week.

#### Sampling technique, laboratory analysis and data collection

The sample collections were performed in two periods in the third week of October 1999. Food samples from all available shops in the village were gathered. Sampling was performed from 10:00–15:00. Also, the source of the “Pla Ra” was asked of the merchants. All samples were collected, labeled and immediately sent to the laboratory for further analysis. Concerning sample collection, a sample of uncooked “Pla Ra”, fermented from cyprinoid fish, was simple randomly selected from each hawker stall, with about 100 milliliters of the fish paste liquid, “Nam Pla Ra”. No preservative was added to the samples. We included the Nam Pla Ra into the study since the parasite may distribute from the flesh into the liquid during the fermentation period. Transportation of the samples to the laboratory was performed at ambient temperature.

The laboratory analysis was performed at the Parasitology Laboratory of the Parasitology Unit, Department of Pathology, Faculty of Veterinarian Science, Chulalongkorn University, Bangkok. Each sample was analyzed for possible parasitic contamination by compression and sedimentation. Briefly, each collected specimen was separated into two parts, solid and liquid parts. All solid parts were examined for parasite larvae in the flesh by a compression technique modified from the method previously described by Chanawong et al<sup>6</sup>. In brief, the flesh was minced then compressed in a petridish, then the parasite was looked for under stereoscopic microscope (Olympus Optical, Japan) using high power (X 400).

In analysis of the liquid part, Nam Pla Ra, the sedimentation technique was used<sup>7</sup>. Briefly, each sample was suspended in saline solution and allowed to settle. Then the sedi-

ment was collected and examined for parasitic contamination under a stereoscopic microscope (Olympus Optical, Japan) using high power (X 400). Data from microscopic examinations were recorded, and descriptive statistical analysis performed on the recorded data.

#### Results

In the study, a food sample was collected from each of the 16 available shops in the village. Our Pla Ra samples were from the common source each prepared from the fish caught within the study area. Also, the prepared Pla Ra was distributed to the other nearby villages. The regimen for preparation is the same as already described. Each sample passed the fermentation for at least 3 months. From the examination, no fluke contamination was detected (Table 1).

Table 1 Detection of parasite in 16 food samples

parasite	Proportion of contaminated to total sample	
	Solid part	Liquid part
<i>Gnasthostoma</i> spp.	0/16	0/16
Fluke	0/16	0/16

#### Discussion

Fish borne infestation is an important public health problem among the domestic people in Northeastern Thailand and Laos<sup>1</sup>. Due to traditional culture, consumption of the raw, uncooked and poorly preserved fish is a major risk factor for infection from many parasites, especially for *Opisthorchis viverrini*<sup>3</sup>. A wide spectrum of pathological manifestations of these fish-borne diseases is possible. Concerning fluke infestation, the most serious long-term complication is severe obstructive jaundice and liver function abnormalities in hepatobiliary carcinoma called cholangiocarcinoma<sup>8</sup>. Furthermore, the highest prevalence of this cancer was reported in the studied area<sup>9</sup>. Concerning the gnasthostomiasis, severe symptoms including death can result from the visceral larva migrans.

Many northeastern Thai–Laos PDR local foods are prepared based on poorly cooked freshwater fish, which can be a possible source of fluke transmission. Several traditional foods, such as “Pla Som” (salted semi-fermented fish) and “Lab Pla” (raw fish in spicy salad) are mentioned for contamination of parasite larvae<sup>10</sup>. In our study, a survey of possible fluke contamination in a local food called “Pla Ra”, or traditional fermented raw fish, a popular local food product, was performed.

In this study, no parasite contamination in the collected food samples was detected, as in previous studies<sup>11–12</sup>. This is an interesting finding since the survey of the metacercariae infestation in the fresh water fish in the nearby area revealed a high rate of metacercariae infection<sup>13</sup>. Our findings are different from those of Kom *et al.*<sup>11</sup> since the preparation of Pla Som and Lab Pla are totally different from that of Pla Ra. Pla Som and Lab Pla are the dished food, served within a few hours of preparation, but Pla Ra is served of preparation, for several months. Two major probable explanations for this result can be given. First, an active ingredient, such as salt, during preparation of “Pla Ra” can induce degeneration of possibly contaminating parasitic larvae<sup>14</sup>. A recent report<sup>15</sup>, indicated that salt can induce degeneration of the fluke metacercariae in many uncooked local food preparations within a short period. The other possible explanation is that the surveyed village is under the fluke control program, and sanitation may be good.

Some limitations of this study should be noted. First, as already indicated, the total samples in this study were few. A negative study needs far more controls than a positive study in order to reach a conclusion that a food source is not a possible vehicle for the infection. However, combining the results from these studies with the two similar previous studies (Table 2), it seems that the Pla Ra may be a parasite free food. Secondly, although in this study we tried our best to control for the technical procedures of specimen collection, transport, or microscopic analysis, some false negatives can be expected (the sensitivity of the our methods are about 80%), and additional antigenic techniques would be required for further study.

## Conclusion

**Surveys on other local markets in the rural community are needed before a final conclusion. A survey on other properties of this famous food, such as a study of pathogenic microbial contamination, is suggested. Furthermore, a large-scale sanitation survey covering other various local foods is recommended. After recording the background data needed to select the village and the types of food that could be infection sources, the best approach would be to do a case-control study of villagers with and without infection to determine food eating habits. Another approach would be to sample more fish at different times of the year to determine species and time of infection, and the level of infection.**

**Table 2 Contamination of parasite in Pla Ra in the previous studies<sup>11–12</sup>**

Study	Part of food	Setting	Contamination rate
Wiwanitkit et al (2000)	Solid	Ubonratchatane	0 %
Wiwanitkit et al (2001)	Liquid	Ubonratchatane	0 %
Present study	Solid + liquid	Maharakham	0 %

## Acknowledgement

We would like to thank Chansakul C, Chongboonprasert C, and Tangwattakanont K., who helped us in analysis of the specimens.

## References

1. Radomyos B, Wongsaraj T, Wilairatana P, et al. Opisthorchiasis and intestinal fluke infestations in northern Thailand. *Southeast Asian J Trop Med Public Health* 1998; 29: 123-127.
2. Srisawangwong T, Sithithaworn P, Tesana S. Metacercariae isolated from cyprinoid fishes in Khon Kaen district by digestion technique. *Southeast Asian J Trop Med Public Health* 1997; 28 (Suppl 1): 224-226.
3. WHO. Control of food-borne trematode infections. Report of a WHO study group. WHO Tech Rep Ser 1995; 849: 157pp.
4. Jadsri S, Noojoy A. A study of liver fluke infection in Sukhothai, Thailand. *Southeast Asian J Trop Med Public Health* 1999; 30: 588-593.
5. Wiwanitkit V, Chunhapran P, Suwansaksri J. Prevalence of intestinal parasite and self-prevention behaviors of villagers in a rural villagers after *Opisthorchis viverrini* control program, Maharakam Province, Thailand. Presented at The Joint International Meeting on Tropical Medicine, Bangkok, Thailand, 2001.
6. Chanawong A, Waikagul J, Thammapalerd N. Detection of shared antigens of human liver flukes *Opisthorchis viverrini* and its snail host, *Bithynia spp.* *Trop Med Parasitol* 1990; 41: 419-421.
7. Nithiuthai S. Diagnostic technique in veterinarian parasitology. Bangkok: Chulalongkorn University Press, 1997.
8. Preuksaraj S. Public health aspects of opisthorchiasis in Thailand. *Arzneimittelforschung* 1984; 34: 1119-1120
9. Wiwanitkit V. Etiological study of hyperalkalinephosphatasemia among the Thai hospitalized cancerous patients, a 2-year retrospective study in a Thai tertiary hospital. The 22<sup>nd</sup> Annual Scientific Meeting of the International Association of Cancer Registries, Khon Kaen, Thailand during November 8-10, 2000.
10. Kom S, Methanitikorn R, Sukontason K, Piangjai S, Choochote W. Viability of metacercariae in northern Thai traditional food. *Southeast Asian J Trop Med Public Health* 1998; 29: 714-716.
11. Wiwanitkit V, Nithiuthai S. Survey of fluke contamination in a traditional food "Nam Pla Ra". Presented at The 8<sup>th</sup> World Congress on Clinical Nutrition, Phitsanulok, Thailand, 2000.
12. Wiwanitkit V, Nithiuthai S. Survey of fluke contamination in a traditional food "Pla Ra". Presented at The Joint International Meeting on Tropical Medicine, Bangkok, Thailand, 2001.
13. Wiwanitkit V, Nithiuthai S, Suwansaksri J. Prevalence of metacercariae in the fresh water fish, Lum Cha muak, Nakornratchasrima Province. Presented at The Joint International Meeting on Tropical Medicine, Bangkok, Thailand, 2001.
14. Wiwanitkit V, Nithiuthai S, Suwansaksri J. Survival of heterophyid metacercariae in uncooked Thai fish dishes. *Ann Trop Med Parasitol.* 2001; 95: 725-727.
15. Sukontason K, Methanitikorn R, Sukontason K, Piangjai S, Choochote W. Viability of metacercariae in northern Thai traditional foods. *Southeast Asian J Trop Med Public Health* 1998; 29: 714-716.