Finding of metacercariae of Fasciola hepatica in emollients for human consumption in an endemic area of Peru

Hallazgo de metacercarias de Fasciola hepatica en emolientes de consumo humano en un área endémica del Perú

Aldo Reynoso’, Santiago Cuadros’, Vicente Maco’, Luis A. Marcos’

Abstract
The liver fluke Fasciola hepatica is an important public health problem in Peru, being the classic risk factor the consumption of watercress or other aquatic-plants. We conducted an observational study to determine the contamination index with metacercariae (infective form) of F. hepatica in emollients for human consuming sold by vendors in a popular market from an endemic area (Arequipa - southern of Peru). A total of three types of emollients from 20 vendors were collected. A total of 60 emollient samples (alfalfa, n=20; non-alfalfa, n=20; and ractania/boldo, n=20) were analyzed under the microscope. We found 55% of metacercariae in emollients made from alfalfa, 70% from non-alfalfa and 15% from ractania or boldo. In conclusion, metacercariae of F. hepatica is present in emollients sold by vendors in a popular market in an endemic area for Fascioliasis in Peru.

Key words: Fasciola hepatica | Metacercariae | Emollients | Medicago sativa | Peru | (Source: BIREME: DeCs).

Resumen
El parasito del hígado, Fasciola hepatica, es un importante problema de salud publica en el Perú, siendo el clásico factor de riesgo el consumo de berros o otras plantas acuáticas. Se llevo a cabo un estudio observacional para determinar el índice de contaminación con metacercarias (forma infectante) de F. hepatica en emolientes para consumo humano el cual es vendido en un mercado popular de Arequipa, una área endémica en Perú. Se recolectaron un total de tres tipos de emolientes de 20 vendedores. Un total de 60 muestras de emolientes (alfalfa, n=20; sin alfalfa, n=20; y de ractania/boldo, n=20) fueron examinadas bajo el microscopio. Se encontraron metacercarias de Fasciola en el 55% de los emolientes de alfalfa, 70% del sin alfalfa y 15% del ractania y/o boldo. En conclusión, metacercarias de F. hepatica están presentes en emolientes vendidas en un Mercado popular en un área endémica de Perú.

Palabras clave: Fasciola hepática | Metacercaria | Emolientes | Medicago sativa | Peru | (Fuente: BIREME: DeCs).
**Introductión**

Fascioliasis is a parasitic disease caused by the flukes *Fasciola hepatica* or/and *F. gigantica* that affects herbivorous mammals, such as sheep, cattle, goats, among others. Fascioliasis has been reported in more than 51 countries, and an estimate of 17 million people may be infected. Peru is one of the countries with the widest and highest prevalence of Fascioliasis worldwide. Prevalence rates ranged from 8% to 37% in humans have been reported in Peru. Fascioliasis may also cause significant morbidity. Hundreds of human cases have been hospitalized by one of the following complications from this parasitic infection: cholangitis, cholecystitis, subcapsular hepatic hematoma, hemobilia, severe abdominal pain, fever, liver abscesses and biliary obstruction. The impact of Fascioliasis in rural areas is significant since almost 8 million people is estimated at risk in Peru. A common risk factor for acquiring fascioliasis has been consumption of watercress (*Nasturtium officinale*), but the consumption of this plant is not the most common route of infection for Fascioliasis. For instance, out of 277 patients with *F. hepatica* infection diagnosed in Lima city, less than half of them (45.6%) had a history of consumption of watercress. On the other hand, drinking emollients has been found as a potential a risk factor. Despite emollients has been described as potential source of acquiring Fascioliasis, few studies have reported the finding of metacercariae (infective form) in these beverages. The objective of the present study was to examine for metacercariae the emollients in a popular market from an endemic area of Fascioliasis.

**Materials and methods**

**Study area.** The study took place between August and December 2002, in Majes and Siguas Valley Irrigation, Caylloma Province, Arequipa Department; located approximately 160 km from the city of Arequipa, at an altitude of 1160 m (around 3,800 ft) above sea level (16°18′03″ LS; 72°16′13″ LO). The area is cold (annual mean temperature, 10.5 °C). The consuming of emollients is on a daily basis by the population, most commonly at breakfast.

**Emollients samples.** A random sample of 20 vendors were selected for this study from one of the most popular market in town. One random sample of 1,000 mL from each emollient: alfalfa (*Medicago sativa*), non-alfalfa were not limited to but included ratania or boldo was obtained and placed into a labelled bottle that contained 10% formalin. Samples were immediately transported to the Laboratory of Faculdad de Veterinaria, Universidad Nacional San Agustin in Arequipa.

**Emollients Analysis.** According to a protocol previously described, we analyzed each sample as follows: 150ml of vegetal liquid and 100 g of herb were passed through three filters (150 um, 75 um and 63 um). The plants were exposed to sulphuric acid for 10 min; then, the acid was neutralized with cooper sulphate. Finally, it was centrifuged in 1500 rpm for 5 min. The sediment was placed in smears and analyzed under the light microscope (10X and 20X). The metacercariae of *F. hepatica* were recognized microscopically by an expert parasitologist (S.C.)

**Results**

From the 60 emollient’s samples, 46.6% (n=28) had the presence of metacercariae of *F. hepatica* (Fig. 1 and 2). Emollients made from non-alfalfa herbs had the highest prevalence of metacercariae (70%), whereas the alfalfa’s emollients had a prevalence of 55% (Table 1). No further characterization of herbs was performed in the non-alfalfa emollient’s group.
However, this is the first time that a study finds such a high rate of contamination in this region. It suggests that there may be a risk for human infection. Taken into account the significant liver impairment caused by this infection, urgent epidemiological studies should be carried out in this populations in order to identify, treat and avoid the well-known complications of this disease.

Table 1. Findings of metacercariae of F. hepatica in emollients in Arequipa.

<table>
<thead>
<tr>
<th>Source of preparation</th>
<th>Positive % (n=Total of sample)</th>
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<tbody>
<tr>
<td>Alfalfa</td>
<td>55% (n=20)</td>
</tr>
<tr>
<td>Non-Alfalfa emollients</td>
<td>70% (n=20)</td>
</tr>
<tr>
<td>Ratania and Boldo</td>
<td>15% (n=20)</td>
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Discussion

Fascioliasis We found a high rate of emollients contaminated with metacercariae of F. hepatica (46.6% global prevalence) in a popular market for human consuming at the Majes Irrigation in Arequipa (southern of Peru). Similar results were found by Romani in 1998 in vegetables for emollients preparation in Arequipa city. The finding of metacercariae in emollients may are irrigated with contaminated water. Once the cercariae reach the plants, the metacercariae encyst on alfalfa stems or leaves that might be the route how the plants get contaminated. The building of channel irrigations seems to be an additional factor since it would be a vehicle for the intermediate host (Lymnae spp.) as others proposed. Then the need of irrigations in countries such Peru is of primary necessity in view of the lack of irrigation systems to water the fields in many desert places and they may also be a source of water for human consumption. But,

Figure 1 and 2. Metacercariae of F. hepatica (100x).
surveillance programs may need to be implemented to determine the rate of contamination of these irrigation channels by larvae of *F. hepatica*, among other water-borne diseases.

Arequipa is an endemic area for Fascioliasis. Between 1970 and 1955, there were reported 79 patients with Fascioliasis in a local hospital, most of them acquired the infection likely while living in the large city of Arequipa.\(^\text{20}\)

As the number of reported human cases by *Fasciola* is not trivial in Peru (up to 5 cases per month reported in reference centers),\(^\text{21}\) control programs are urgently needed in endemic areas. For public health reasons, risk factors for the infection should be clearly identified because they would help on implementing successful interventions to decrease the infection rates in the population. In conclusion, the emollients made from alfalfa and other plants may be carrying metacercariae of *F. hepatica* but these findings should be confirmed by DNA-based testing in future studies.

**Author's contributions:**

**Conflict of interest:** None.

**Funding:** None

### References


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