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From waste to dairy: Enhancing camel milk production with sustainable feed alternatives

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Abstract

The arid and semi-arid Draa-Tafilalet region is ideal for camels, which are well-adapted to the climate. There is a growing demand for camel milk products across Morocco, presenting an opportunity to boost local incomes. However, frequent droughts are reducing pasture availability and quality, leading to low camel milk production. The project aims to improve camel feed by developing balanced supplements using underutilised agricultural by-products with high nutritional value.

In the project's first phase, a scoping study was conducted to:

1. Identify and analyse promising agricultural by-products for camel feed.
2. Identify opportunities and constraints in the camel value chain in Draa-Tafilalet.
3. Assess demand and consumer preferences for camel dairy products in Morocco.

Semi-structured interviews and focus group discussions were held with farmers, camel keepers, and consumers in Draa-Tafilalet and other regions. The nutritional value of agricultural by-products was also analyzed.

Results indicate that watermelon side-streams and argan press cakes are the most promising by-products due to their availability, nutritional quality, and acceptance by camel keepers. Argan press cakes are particularly high in crude proteins. Tomatoes and banana cultivation also offer potential by-products, but contaminants like pesticides and heavy metals need to be analysed.

In Draa-Tafilalet, camel keepers primarily feed their camels on rangeland, supplemented with watermelon by-products, barley, and small quantities of alfalfa. Milk production is non-existent in transhumant systems due to persistent drought and limited to 1–2 liters per female per day in peri-urban systems. There are no dairy cooperatives in the area, so milk is sold informally, directly to private clients at the milking spot or via WhatsApp orders to consumers in northern cities or abroad. In these cases, milk is sent frozen via trucks or buses. Most consumers order camel milk for medical purposes, with peak consumption in July-August when tourists visit for band baths to treat arthritis. Sales quantities vary seasonally and depend on forage availability, ranging from 10 to 50 liters per day. While most camel milk is sold fresh, consumers are interested in products like butter, fresh cheese (Jben), and fermented skim milk (Leben).

Keywords: Agricultural by-products, camel, dairy products, milk, morocco

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