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**Report on performance of feed processing technologies**

**i) Silage production**



“Tajdid Nutrition Animal” is a Tunisian company based in the semi-arid, central part of Tunisia, near the town of Kondar, Gouvernorate Kairouan. In 2013 three brothers (all engineers) and their father had the business idea of using mainly locally available, cheap resources to produce **high quality silage** for the national feed market, in particular for small scale dairy farmers. The project started as a research and development project, financed only with proper financial sources from one brother working in Saudi Arabia; neither a bank nor a development project was behind this idea.

The produced silage is a combination of different ingredients:

Ingredient	Hydroponic barley (green)	Luzerne hay	Grinded barley	Grinded Soy	Grinded maize	Wheat bran	Straw	CMV and salt
Percentage	20	30	15	10	5	10	5	5



The ration is made in such a way, that only 15 % come from imported ingredients (soy and maize). The inputs are always available. In particular the hydroponic green barley plants can be produced all year round in the company’s own premises and are harvested and used for silage after only 10 days of growth. Hydroponic forage has the advantage of being cheap in production and can be produced irrespective of weather conditions. Production is flexible and can be arranged according to need and demand. The unit in Kondar has a production capacity of 5 tons / day but isn’t fully used yet.



After chopping and grinding all the ingredients, they are mixed and packed into 50 kg double-bags by a semi-automatic machine. The silage process will start; anaerobic bacteria will need only two weeks to conserve the feed. This is due to the high dry matter content of 70 %. Commonly silage has around 35% dry matter.



## Market

This high quality feed with a protein content of 14%, a stable pH of 4, dry matter content of 70 % and 0.8 FU (feed units) has an average market price of 500 TD / ton (185 \$ /ton). This is quiet competitive as compared to locally produced concentrates, commonly sold at 700 TD / ton.

“Tajdid Nutrition Animal” produces around 3 – 4 tons of silage per day and sells the silage either directly at the warehouse or delivers it to dairy cooperatives in Sousse, Mehdia, Kairouan and Gabes. They target a daily production of 25 tons / day.

Their dairy farmer customers feed their cows about 15 – 25 kg / silage per day, adding soy, concentrates and fresh grass. Milk production reaches between 25 -35 l / day. Milk collecting cooperatives cooperating with the company receive besides the product also technical training on silage feeding and a regular backstopping. Major customers are small scale farmers with limited land for feed production.

ICARDA has recently organize a visit of the Innovation Platform members to the Tajdid Enterprise. The participating farmer cooperative “SMSA El Khir” discussed with the manager the option of supplying the company with Luzerne hay in exchange for silage bags.

## Challenges

The market is steadily growing and the company can no longer satisfy the demand, according to the manager Oussama Labiadh. To increase the production they need a stronger mixer with a capacity of 10 t / day and an automatic packaging device connected to the machine. At the moment the packaging is done manually. Their financial means don't allow this investment; contact to APIA to benefit from national support programs have not succeeded yet.

## ii) Feed blocks

Feed block production is one of the technologies ICARDA has tried to foster in Tunisia. "Tajdid Nutrition Animal" is one of the beneficiaries who have received a feed block manufacturing unit (FBMU), capable of producing 2- 3 tons / feed blocks per day.

Feed blocks are combined of different agro-industrial by-products like olive cakes, tomato and cactus fruit pulps as well as ingredients like wheat bran, grinded barley, chopped straw, Urea, CMV, chalk, etc. Several formula are available. It mainly depends on the availability on the local markets to decide which formula to use. As olive cakes are predominant in the Kondar region of the company, they intend to start with the following formula in November (olive harvesting time):

Ingredient	Olive cake	Straw	Wheat bran	Grinded Barley	Molasses	Chalk / Ciment	Urea	CMV	Salt
Costs per ton (TD)	70-80	250-300	270	470	200	200	800	600	250
Percentage	35	15	15	15	10	5	2	2	1
Costs (TD)	28	40	40	70	20	10	16	12	3

The total amount of ingredients to produce one ton of feed blocks of this formula will cost about **240 TD**.

The company estimates the cost for electricity per ton at 20 TD, additional labor at 15 TD / ton, and 25 TD for water, marketing and other minor costs. This leaves the total costs of production at **300 TD / ton**.

The intended sale price at the warehouse is 375 TD / ton, leaving a margin of 75 TD for the enterprise. The feed units will be around 0.65.