

Techno-economic study of ethanol production from low grade datesRealized by: *Bennouna Chahir*Supervised by: *Dr. Dokkar Boubakeur***Introduction:**

Algeria is one of the important dates-producing countries with a yearly production of about 850.000 tons. With more than one thousand varieties, however only 30% of this product is of good quality, and the rest is consumed locally or directly fed to the cattle . Our research shows that the area of study (Touggourt) so rich with date palms these trees are very resistant to hot climate and because of their **dates** proximity contain 50% of sugars compared to the dry weight of the fruit they are qualified to produce high-purity **ethanol**.

The global trend seeking to find a non-polluting energies and **environmentally** friendly such as the use of biofuels as an alternative to organic, puts **bio-ethanol** fuel on top of possible alternative energies.

Keywords: *Bio-ethanol, Dates, Fermentation, Photovoltaic pumping , Environment.*

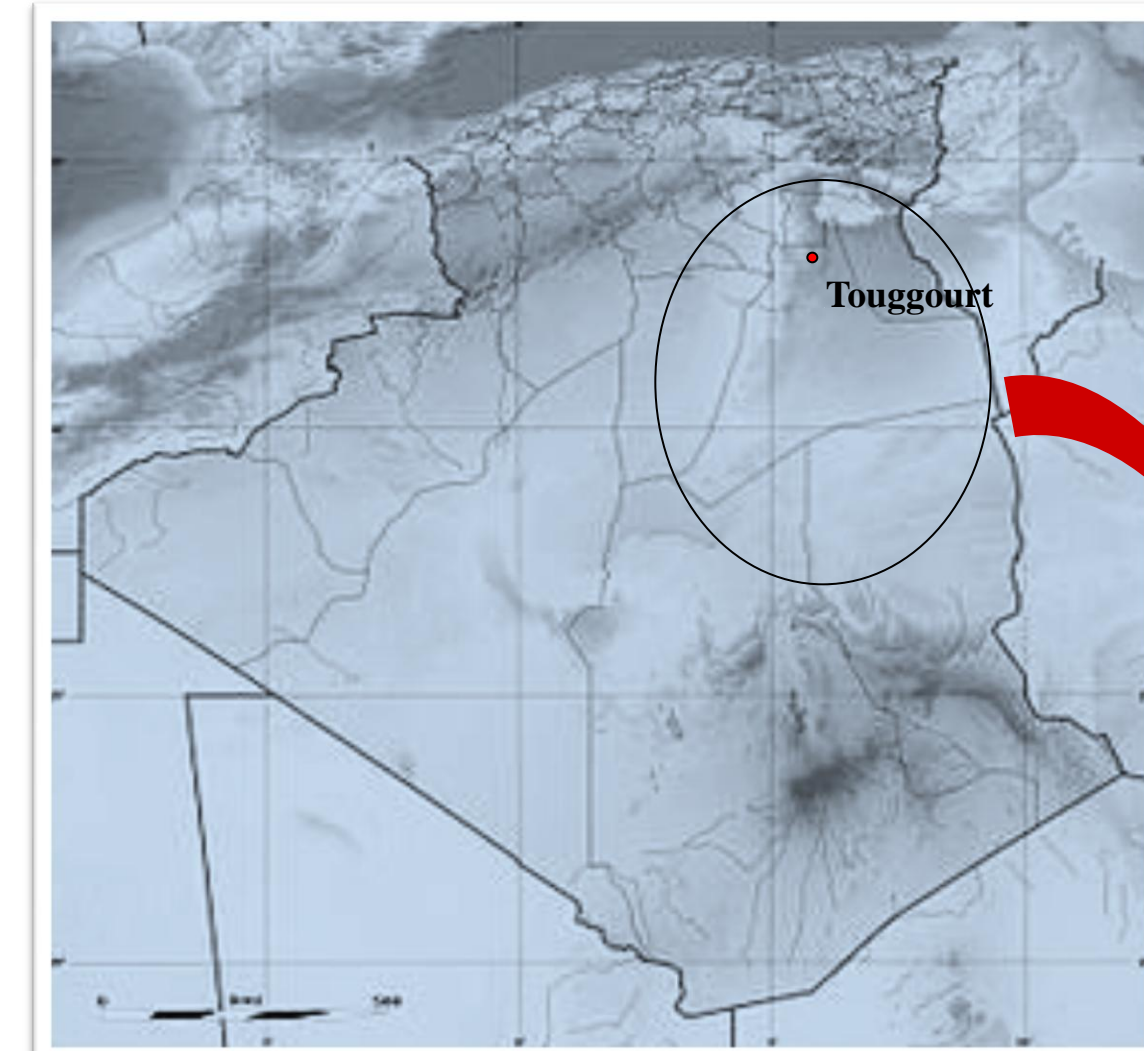
Objectif:

The main Objectives of this study are:

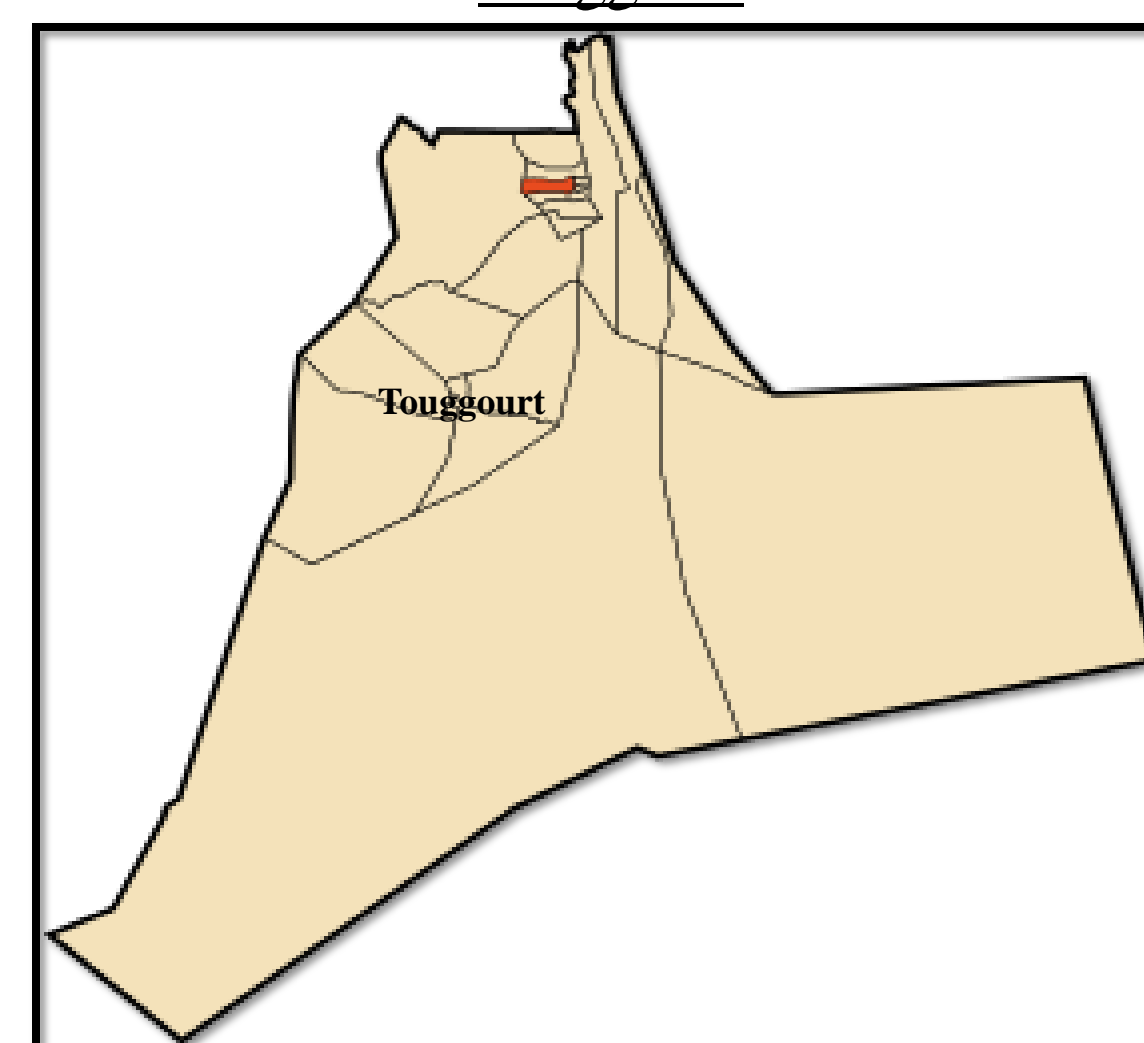
- transforming low quality types of **dates** and no consumed date (Deglet-Beida) into **bioethanol** using biotechnology technical.
- The application of a **photovoltaic pumping** system to reduce agriculture palms cost (mainly the irrigation cost)
- Estimation of **bio-ethanol** extraction from low grade **dates** (Deglet-Beida).

Methodology:

- By using Google Earth in Touggourt region, the surfaces planted by palms are determined with plotting their contours.
- Then, these contours are exported to Arcgis software to present them as geo-referenced surfaces with their parameters. The water resources are so necessary to present using Arcgis (this work is planned for the next stapes)
- eventually, an experience of **ethanol** extraction from Deglet-Beida we going to realized in the laboratory.



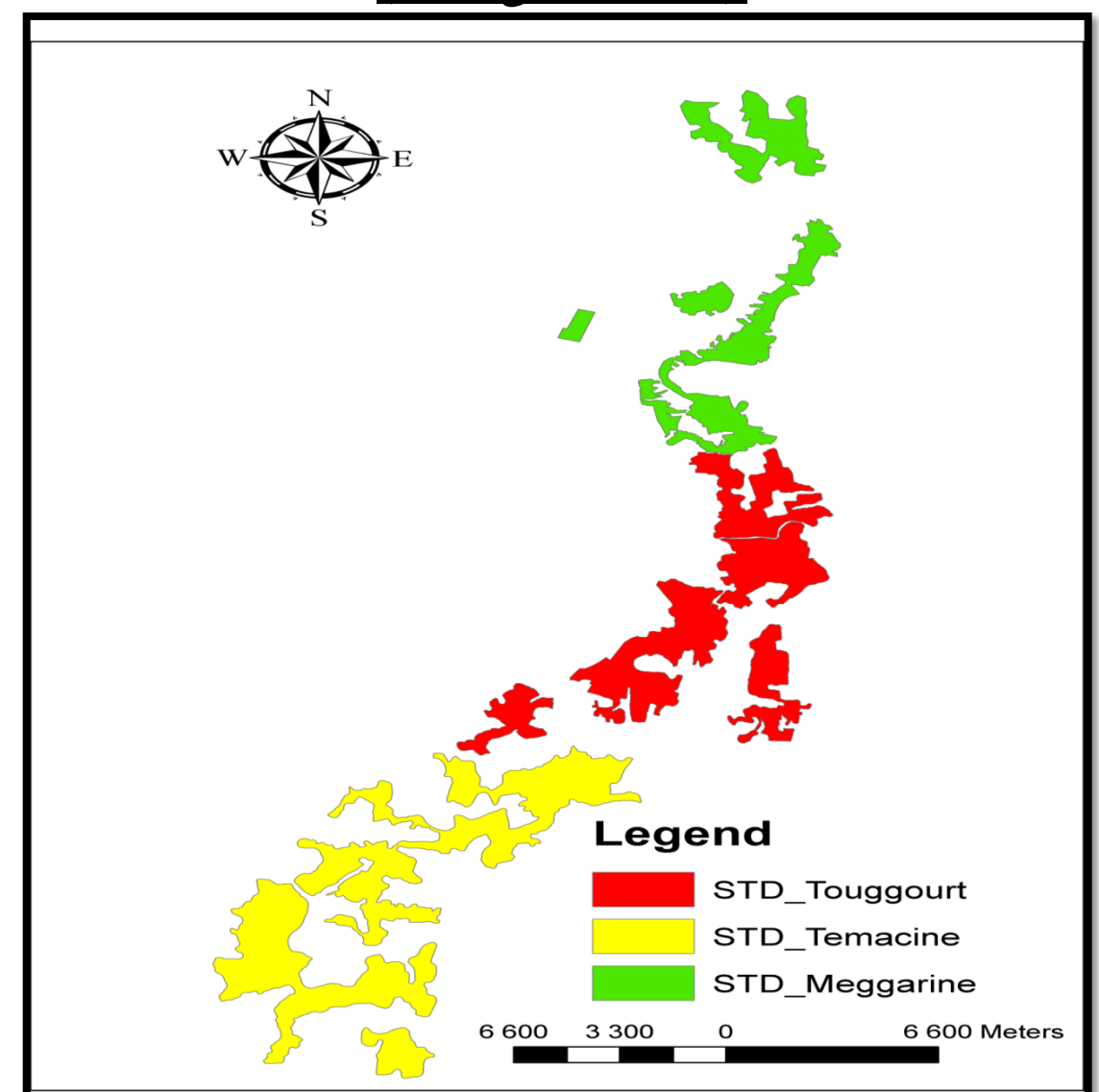
Geographical location of Touggourt



Administrative situation of Touggourt



Palms surfaces contours (Google Earth)

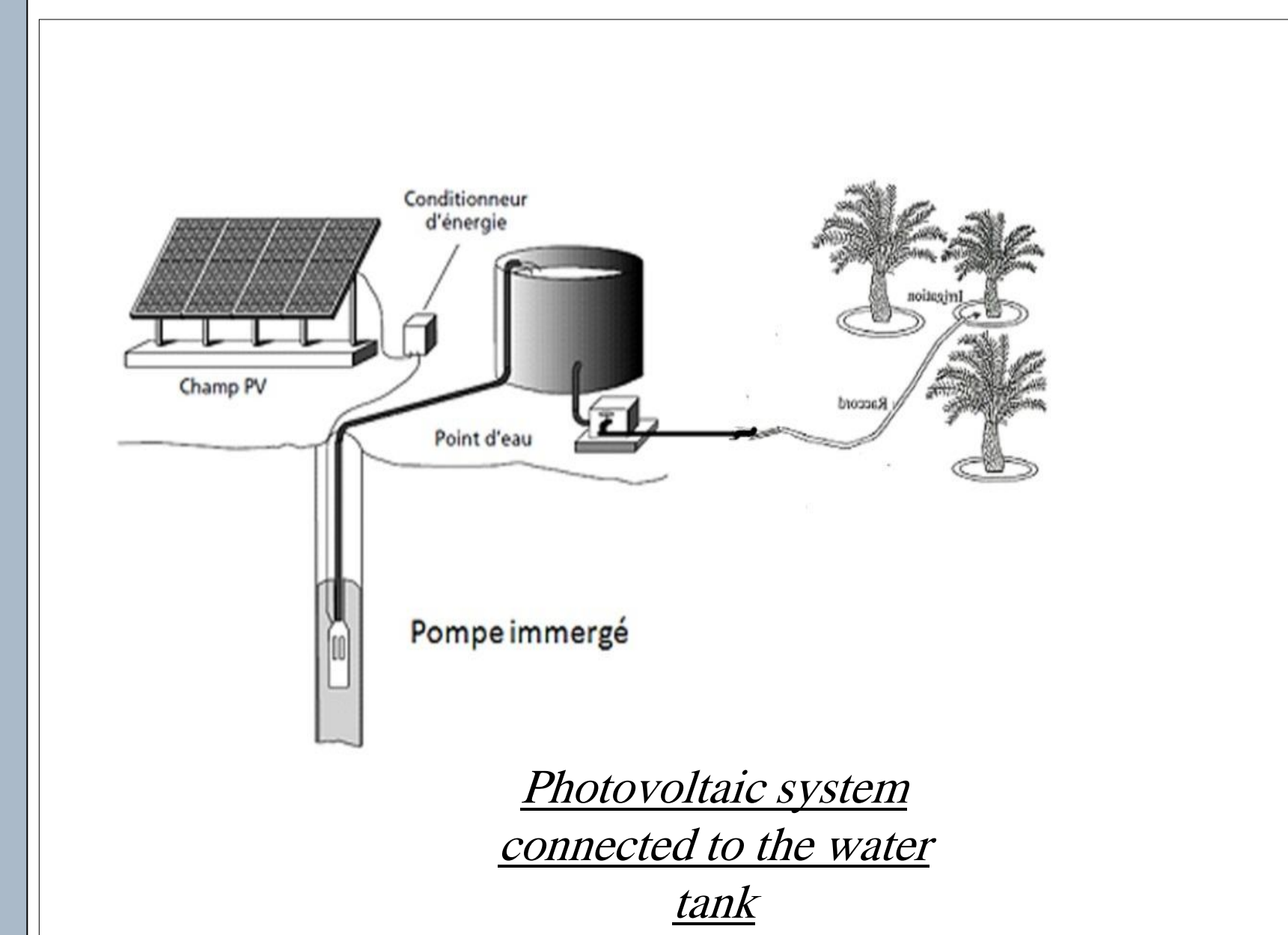


geo-referenced surfaces (Arcgis)

Photovoltaic pumping:

There are several potential can be exploited as an alternative electric energy as:

- Photovoltaic system connected to electrolysis + fuel cell.
- Photovoltaic system connected to the wind turbine. But as the study site, the solar energy is the best solution.



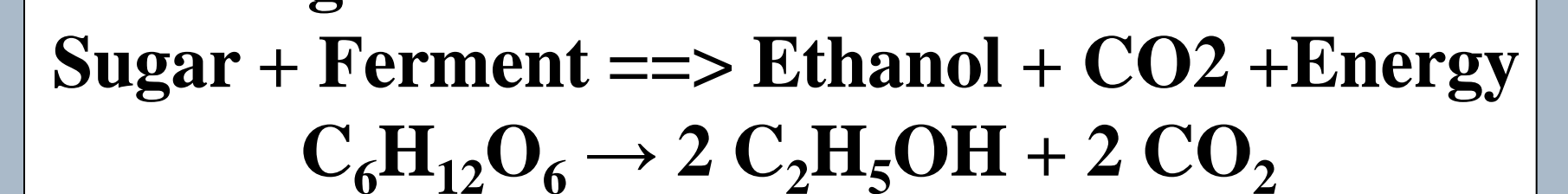
By using a trend model of **Photovoltaic pumping bio-ethanol** can reach competitive price in comparison to subsidized gasoline, provide a lot of jobs, keep the fossils resources and protect the **environment**.

Dates:

Deglet-Nour, Deglet-Beida and Ghars are The most important dates produced in Touggourt and are species that underpin this study For example Deglet-Beida is one of the dry **dates** kind, it have a spinning shape and a Brown-Blond to beige color, and it contains 74% sugar compared to the dry weight of the fruit. The price of Deglet –Beida is between 50 DA to 100 DA or 0.47 € and 0.95 € for Kg. Because of the dry consistence of this **dates**, it was not consumed locally and it export mainly to the south's African countries where it enters in many transformation and Agro-Alimentair industries.

Bio-ethanol:

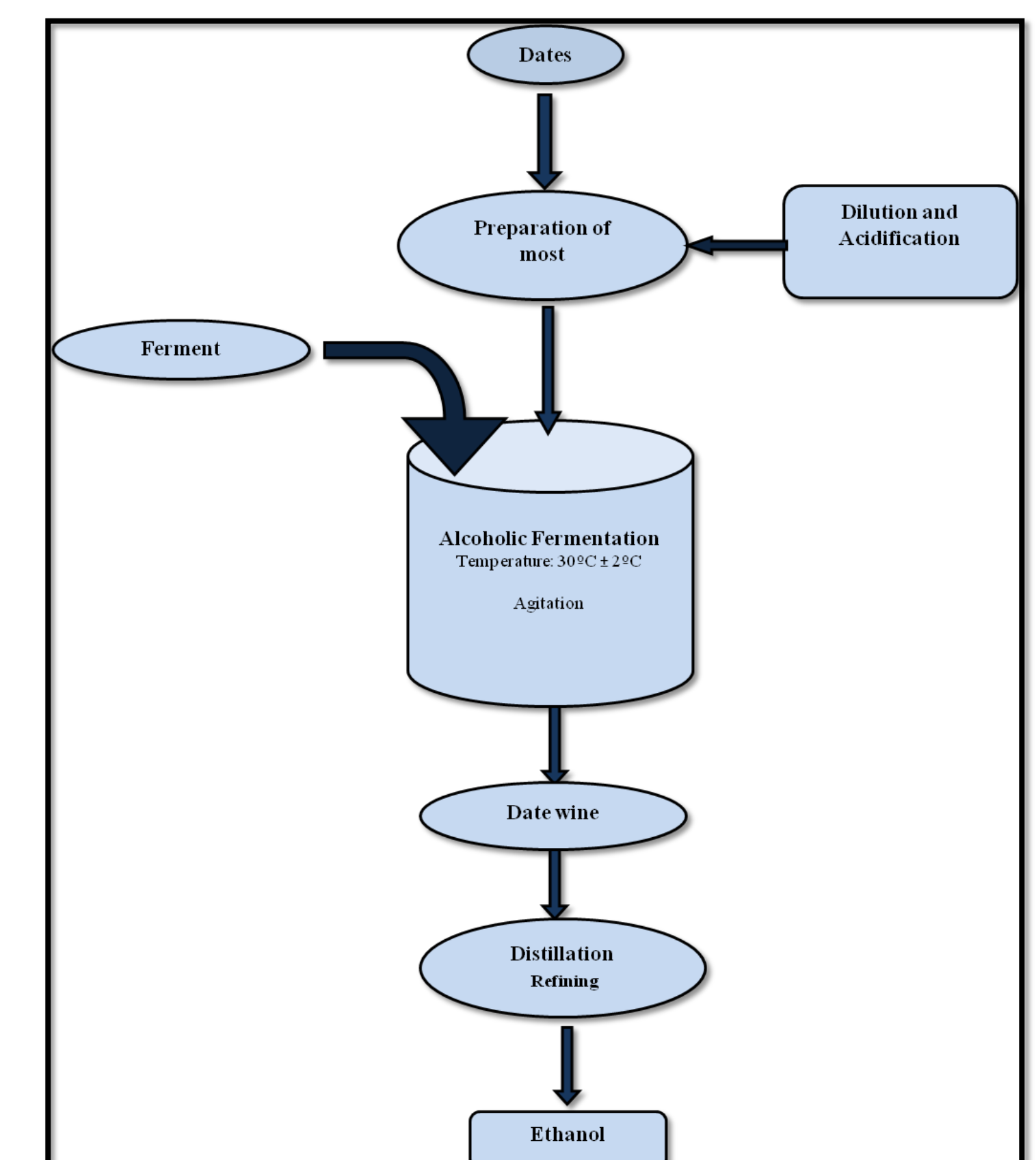
The **bio-ethanol** is extracted by the **fermentation** of sugars contained in some plants for example sugar cane and sweet potato or grain such as corn and wheat following the next reaction.



Bioethanol is used as fuel for production of heat and electricity. Also, it can be added to gasoline to use as fuel for cars.

Alcoholic production process:

The production of **ethanol** from **dates** is based on the following steps: The preparation of most of **dates**, the process of alcoholic **fermentation**, the distillation and rectification.



process diagramme