

# Automatic And Smart Composting Unit Achievement

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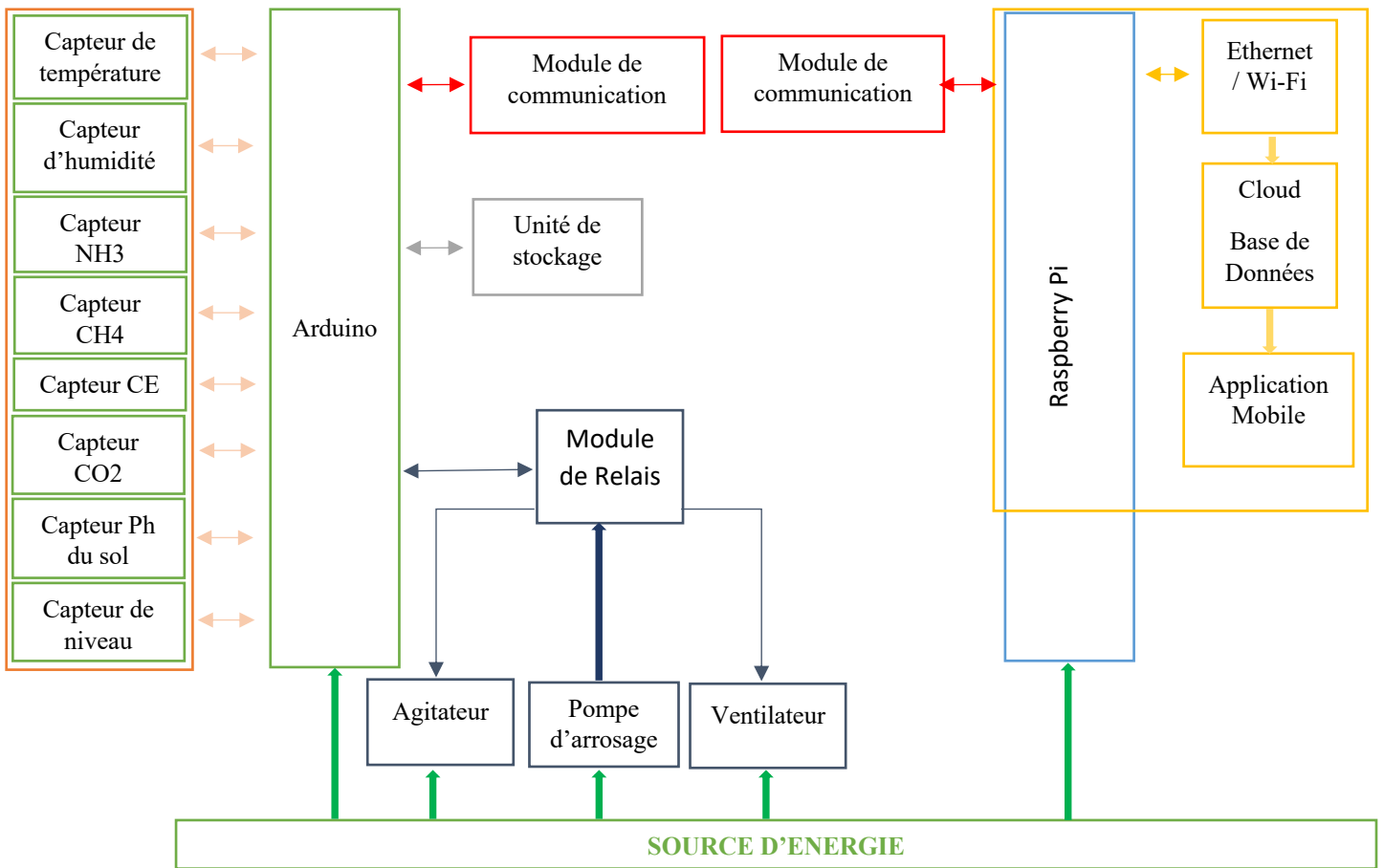
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## Abstract

During the last decades, the massive biodegradable organic waste production, that will continue increasing due to population growth across the world, is arising a pollution problem that should be solved. Indeed, various typologies of wastes such as green waste, food industries waste i.e. restaurants and olive oil mill industries are considered as polluting materials that disrupt various fields of human and natural activities, including water resources degradation and landfills over-saturation, not to mention the expensive and time-consuming treatment needed. The present research gives rise to other alternative for this waste reuse, instead of throwing it away or burning it. In fact, the composting may valorize such by-products but the classic composting process presents several problems, with the major difficulties are in finding the best proportions of feedstock to be used, leading to mature compost which respects the Standard (NF 44-051). Moreover, in classical composting, the final product is characterized by a good amendment quality, but its cost is relatively high when compared to the manure and it requires a great human effort to monitor the process progress.

- In order to solve these problems, we proceeded with the sizing, study and achievement of a smart, automatic and 100% autonomous composting unit with remote control designated to valorize all types of biodegradable organic wastes by transforming them into a useful product "mature compost" with high quality and low cost in a relatively short time. To realize this system, some sensors were used to ensure an optimized control of all operating parameters during the different process phases such as: temperature (T), humidity (H%), pH, electrical conductivity (EC), methane production (CH<sub>4</sub>), ammonia (NH<sub>3</sub>) and carbon dioxide (CO<sub>2</sub>), the diagram below (**Figure 1**) represents the general composition of the composting unit. To validate the prototype, we will use as the first experience a mixture of waste composed of 1/3 of green waste (GW), 1/3 of residues food, 1/3 of poultry dropping and olive mill wastewater for humidification. The next step is based on results obtained during the previous study optimizing the initial proportions of raw waste materials. Therefore, these are as follows: 1% of green waste, 47% of olive mill wastewater, 9% of olive mill solid waste, 31% of poultry manure, and 12% of exhausted olive cake.



**Figure 1.** General representation of the composting unit.