**Design of an agricultural nozzle: Experimental investigation of a round jet impacting vertically a horizontal disc**

**1** Flat fan nozzle

**2** Rotary atomizer (centrifugal forces)

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**Jet Break Up**

**1** Flat fan nozzle

Random liquid sheet break up

Extended droplet spectrum

**2** Rotary atomizer (centrifugal forces)

Rayleigh plateau regime (the most unstable perturbation breaks the jet in droplets of 1.89 times the jet diameter)

Narrow droplet spectrum

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**Goal**

This study is the first step to optimize a design of a hydraulic nozzle producing a narrow droplet spectrum based on the Rayleigh-Plateau break up mode.

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**Nozzle design**

1. **Generate a homogeneous liquid film**

\[ U = \frac{Q}{2\pi rh} \]

\[ Re = \frac{2Q}{\pi \nu R} \]

*Q*: flow rate

*r*: flow radial distance

*h*: film thickness

*R*: injector radius

*ν*: cinematic viscosity

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**Experimental setup**

**Top view of a tap water film bordering a motionless disk.**

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**Split the liquid sheet in multiple round jets using grooves**

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**Different scenarios of the liquid behavior on the disk depending on groove configurations.**

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**Percentages of grooves occupancies (calculated as the number of grooves multiplied by their widths and divided by the disk perimeter) as a function of the flow rate (Q).**