

**Call for application for research scholarships
for post-graduate international candidates**

RESEARCH PROJECT N. 49

Title
Food freeze-drying
Scientific responsible (name, surname, role)
Davide Fissore, Associate Professor (davide.fissore@polito.it)
Short description of the research activity (max 250 words)
<p>Drying is a key step in food manufacturing as, among the others, it allows increasing the shelf-life of foodstuff. In this framework, the freeze-drying process is generally used to avoid jeopardizing the final product quality. Unfortunately, the cost of the operation is usually very high, thus making it hardly applicable for consumer goods.</p> <p>The goal of the project is to overcome this drawback, identifying the optimal technology and developing a model-based framework for minimizing the energy cost of the operation, beside preserving product quality.</p> <p>The research activity will be focused on the vacuum freeze-drying and on the atmospheric freeze-drying (considering also the ultrasound assisted freeze-drying) of a suitable set of products, identified in such a way they can be representative of vegetables and fruits.</p> <p>From the experimental point of view, the effect of the operating conditions on food properties (vitamins, antioxidants,...) will be assessed, using a suitable design of experiments, aiming to identify the optimal technology.</p> <p>From the theoretical point of view, a mathematical model of the process will be developed, and validated, aiming to identify the optimal operating conditions, i.e. to minimize the drying time, beside preserving relevant food properties.</p>
Specific requirements (experiences, skills)
<ul style="list-style-type: none">- Scientific background: optimal knowledge of heat and mass transfer phenomena, thermodynamics, chemical process control;- Previous experience: mathematical modeling of chemical processes- Skills: good knowledge of MatLab (differential equations, non linear equations), lab activity.
Website of the research group (if any)
http://www.disat.polito.it/research/research_groups/musychen/process_system_engineering http://www.disat.polito.it/the_department/internal_structures/department_labs/laboratori_area_ingegneria_chimica/freeze_drying_laboratory
Keywords (min 3, max 6)
freeze-drying, modeling, monitoring, food properties.
Research Area (max 1)
Chemical Engineering