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**2024 年度 助成 海外調査研究終了報告書**

※ゴシック文字で記入下さい。

渡航目的	To attend and present my research topics at The 14 th Thai Society of Mechanical Engineers, International Conference on Mechanical Engineering (TSME-ICoME2024), December 10-13, 2024, Pattaya, Thailand. & The International Conference on Sustainable Energy and Green Technology (SEGT2024), December 15-18, 2024, Bangkok, Thailand.
渡航日程と 海外での成果 (発表・調査など)	<p>12/10 Departure from Mie University and then Chubu Centrair International Airport, Nagoya</p> <p>12/10 Arrival to Suvarnabhumi Airport, Bangkok and moved to Pattaya</p> <p>12/10-13 TSME-ICoME2024</p> <p>I attended and presented my research topic and exchanged my research ideas with participants. I met my old scholars as well as new scholars and broadened my communication network at this international conference.</p> <p>I have co-authored another presentation at this conference. He presented our research topic. Moreover, I attended parallel oral presentation sessions and I gained insights from several research fields. I have joined a banquet with my old scholars from Mahanakorn University of Technology as well as Chiang Mai University and shared our future research collaboration ideas.</p> <p>We attended the closing ceremony. My co-author presentation obtained the "Best Paper Award" at this conference.</p> <p>12/13 Arrival to Bangkok from Pattaya</p> <p>12/14 Visit Mahanakorn University of Technology, Bangkok, Thailand</p> <p>I visited the current facility and experimental laboratory provided for students in the Department of Mechanical Engineering and Electrical and Electronics Engineering.</p> <p>12/15-18 SEGT2024</p> <p>I attended and presented our research topic. The audience was interested in my research during my presentation and asked several questions. I communicated well with the audience, and I explained my research work thoroughly to them. Then, I attended the closing ceremony. Furthermore, I obtained "Best Presenter Award" at this conference.</p> <p>I attended parallel oral sessions and poster presentations during the conference. I met and interacted with some new researchers and professors from international such as United Kingdom, South Korea, Hong Kong, Malaysia and Philippines. We talked about possible collaboration on research in the future by sharing our research fields and ideas.</p> <p>I have attended the workshop on the preparation of a formatted conference paper and high-impact journal publication.</p> <p>I joined the technical tour to "Siam Power Co., Ltd. RDF (waste from landfill) to Energy Plant" organized by the conference.</p> <p>12/19 Departure from Suvarnabhumi Airport, Bangkok</p> <p>Arrival to Chubu Centrair International Airport, Nagoya</p> <p>Back to Mie University</p>
研究内容の概要	<p>Greenhouse cultivation increases crop yield and quality. Modern greenhouse cultivation can meet the increasing demand for food. Temperature-sensitive crops such as strawberries prefer an air temperature between 25 °C and 10 °C during the day and night, respectively. However, challenges remain, such as increased energy consumption associated with temperature control systems for greenhouse crop cultivation. In particular, energy consumption for greenhouse cooling is extremely high during the summer season in tropical regions. Thus, energy-saving climate control methods are important.</p> <p>The purposes of the studies were to analyze the local cooling performance of serpentine copper-pipe heat exchangers for greenhouse cultivation. The diameter of the copper pipe and the pipe spacings of the heat exchangers were chosen as parameters.</p> <p>At the TSME-ICoME2024, we focused on the evaluation of the two serpentine heat exchanger configurations for local cooling crop cultivation. In particular, this study highlighted the reduction in the local air temperature and described the characteristics of the heat exchangers. From this study, the effectiveness of each heat exchanger configuration was realized for crop cultivation in a greenhouse.</p> <p>In addition, at the SEGT2024, we focused on a comparative study between three shapes of serpentine heat exchangers for local area cooling of crop cultivation. From this study, the advantages and disadvantages of each heat exchanger configuration were figured out. Thus, the advantages and disadvantages must be considered when selecting a suitable heat exchanger shape for greenhouse cultivation.</p> <p>The suitable environment only near the crops is provided by the proposed temperature control method. Therefore, these researches will contribute to low energy consumption for control agriculture from the engineering point of view. Low energy consumption leads to reduced energy costs. Thus, low-cost crop cultivation can be achieved. As a result, the farmers may obtain a higher income. Moreover, it will satisfy the citizens and improve human lives by providing good quality food.</p>

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