

<b>Thesis Title</b>	Preparation of Encapsulating Agents from Tapioca Starch Modifications
<b>Name</b>	Wanpen Phetmaneeelumka
<b>Degree</b>	Master of Science (Biotechnology)
<b>Thesis Supervisory Committee</b>	Manop Suphantharika, Ph. D. Saiyavit Varavinit, Dr. Ing. Sujin Shobsngob, Ph. D.
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## ABSTRACT

Spray drying technique was used to encapsulate a flavor with various encapsulating agents. The spray dryer was operated under the operating conditions at an inlet and outlet temperature of 180°C and 90°C respectively. Many encapsulating agents such as gum arabic, maltodextrin, the mixture of gum arabic and maltodextrin with the ratio of 2:1 and 1:2, the mixture of native starch and gum arabic with the ratio of 2:1, and the mixture of cross-linked tapioca starch II and pre-gelatinised cross-linked tapioca starch II with the ratio of 4:1 gave the spray-dried powders with more than 95% retention of vanillin. The pre-hydrolyzed tapioca starch stearate (PHTSS) B5 could encapsulate 91% of vanillin.

The encapsulating capability of lemon oil with several encapsulating agents were evaluated by measuring the volume of lemon oil after steam distillation. The suitability of gum arabic, maltodextrin, N-LOK<sup>®</sup> starch and PHTSS for use as encapsulating agents was investigated in this study by determining their ability to encapsulate lemon oil and form physically stable emulsion after high-pressure homogenization. N-LOK<sup>®</sup> starch showed the highest encapsulating capability for lemon oil. The PHTSS B5 can encapsulate lemon oil higher than that of gum arabic and possesses better emulsion stability than other PHTSS. The microstructural properties of spray-dried encapsulated lemon oil powders were investigated by scanning electron microscopy (SEM). The SEM micrographs of spray-dried PHTSS B5 and washed PHTSS B5 encapsulated lemon oil powders revealed only a slight difference on the apparent of the agglomeration among the individual particles.