DOCTORAL CANDIDATE:	Victoria Jeaninne Valerón Bergh
DEGREE:	Philosophiae Doctor
FACULTY:	Faculty of Mathematics and Natural Sciences
DEPARTMENT:	School of Pharmacy
AREA OF EXPERTISE:	Pharmaceutics
SUPERVISORS:	Hanne Hjorth Tønnesen and Ellen M. Bruzell
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DISSERTATION TITLE: *Pharmaceutical preformulation and formulation of an alloxazine and a porphyrin-type photosensitizer*

Farmasøytiske produkter beregnet til behandling av lokale infeksjoner ved hjelp av fotodynamisk terapi er utviklet og karakterisert. Et tynn, porøs matriks (fast skum) fremstilt fra kryssbundet alginat viste gode egenskaper med hensyn på frisetting av virkestoff og brukervennlighet.

Pharmaceutical formulations intended for antibacterial photodynamic therapy (aPDT) of infected wounds has been developed. Antibiotic resistant strains of pathogenic bacteria are a growing worldwide health problem. Alternative treatments such as antibacterial photodynamic therapy (aPDT) is therefore of major interest. aPDT is a treatment modality that combines a photosensitizer (PS), radiation of appropriate wavelengths and oxygen. Development of suitable pharmaceutical formulations intended for aPDT is necessary to allow appropriate delivery of the PS to the infection site. In addition, the product should be convenient for application in a clinical setting. Two model hydrophobic PSs were used: the endogenous compound lumichrome and a porphyrin derivative (THPP) also a tentative candidate in the treatment of certain cancers. The preformulation studies included evaluation of the interactions between the PSs and selected excipients and biomolecules. The type of formulations investigated were solutions, a freeze-dried powder (nanosponge) and solid foams produced by crosslinking of the natural polymer alginate; the latter resulting in the most promising product. The mechanical strength of the foam was robust towards variation in type and amount of excipients. The foam was easy to handle and rapidly dissolving in aqueous media releasing the PS. Dry alginate foam could therefore be suitable as a drug delivery device for hydrophobic PSs in aPDT. The current formulation should be regarded as a prototype and further optimization is needed before this wound dressing can be applied in the clinics.