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LITERATURE REVIEW : SUSTAINED RELEASE IN LIPOSOM TECHNOLOGY ON EMULSION CREAM CURCUMIN FOR BURNS

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Abstract: **Preface :** Burns is an injury on tissue caused by overexposure to flame, steam, hot liquid, chemist substances, electrical objects and radiant. Burns are classified based on its region and degree. One of the most important factors that affect the process of burns treatment is the prevention of burns infection. Turmeric is a natural resource that may be used. Its extract helps to haste re-epithelialization, cell proliferation and collagen synthesis. Proper sustain to improve the therapy is topical sustain. Liposom is one of topical sustains which is developed in pharmacy to increase efficacy. One of the efforts is to reduce the size of particles by sonication. **Purpose :** This research is literature review by finding national and international journals as database. Method : Literature review is done based on inclusion requirements like journals which discuss *liposom* sustain in form of cream for burns, original research from 2011 until 2022, and pre-clinical or clinical research journals. **Result :** Based on the findings, there are 5 journals that fulfill the inclusion requirement. There are two google-scholar journals and three *Pubmed* journals. Analysis of journal includes the effectiveness of *liposom* sustain in emulsion cream to treat burns. **Conclusion :** *Curcumin* increases the growth of *beta* factor, stimulates *angiogenesis* and accumulates extracellular matrix so these factors may treat burns.

Keywords: *Curcumin, cream, liposome, burn therapy*

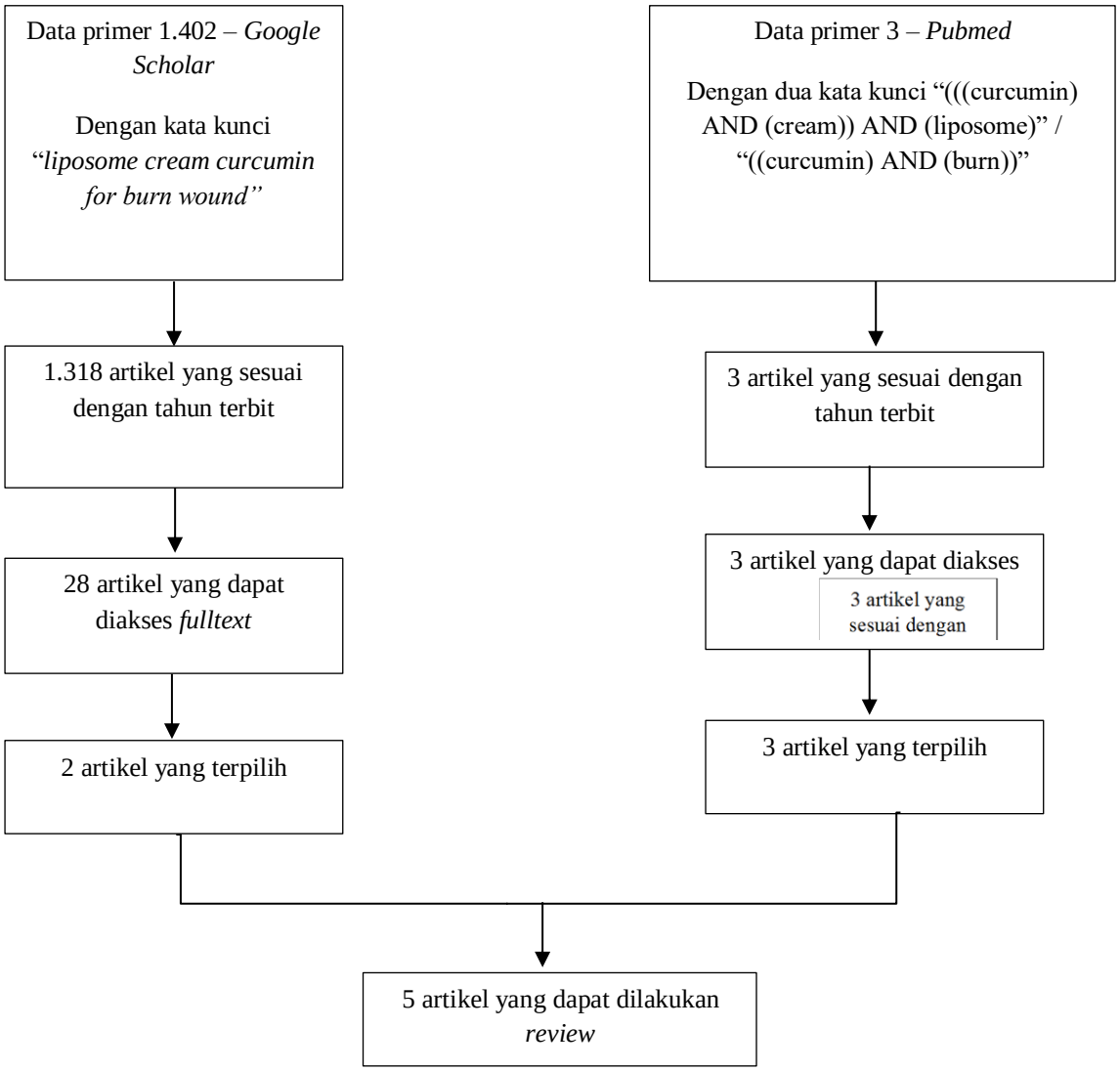
INTRODUCTION

Burns may be classified based on its region and degree. Treating burns is an effort from body system to return its structural integrity and normal function after interference in tissue. This treatment uses turmeric which is a natural resource. Active substance in turmeric can be used as anti-inflammation, antiseptic, anti-irritants and anorexia. From a research by Wientarsih et al (2012), extract of turmeric rhizome is found in treating burns. Curcumin compound in turmeric rhizome is toxic toward some bacteria like *Staphylococcus aureus*, *Micrococcus pyrogenes*.
Liposom as the system that carries medicine has potential to give continuous and controlled medicine-release that can be given topically (Amir, 2017). Liposom is pharmaceutical sustain that is develop in pharmacy because it increases efficacy, therapy index and medicine stability by encapsulation system. Based on the background, a review of articles about formulation and physical characteristics in liposom cream sustain must be done. contained in the seeds of trembesi fruit (Samanea saman). It is not yet known about the content of compounds from the extract of the trembesi plant.

Based on this description, so researchers are interested in conducting research to analyze the effectiveness of antioxidants and physical characteristics of carrot sunscreen preparations that have been added Virgin

Coconut Oil (VCO) so that all in one sunscreen moisturizer cosmetic preparations with natural ingredients are carrots (Daucus carota L.) and Virgin Coconut Oil (VCO).

METHODS



RESULT AND DISCUSSION

Based on the search of journal in *Pubmed*, there is one journal with keywords of curcumin, cream, liposome and burn therapy. There are two journals with keywords of curcumin and burn. The finding in Google Scholar that used keyword "liposome cream curcumin for burns" has 1402 journals. After analysis, there are two journals that can be include into inclusion requirement. Review is done by reading journal directly.

First journal entitled "The Effect of Topical Treatment with Curcumin on Burn Wound Healing in Rats". This research used experimental method. Result of this research is the existence of significant anti-inflammation in each group if it is compared with negative control group (only given to burns). In *immunohistochemical* observation, the epithelium growth is slightly rapid in each group. In outline, the process of recovery from burns occured significantly by doing curcumin therapy of burns to rats as testing-animals. This included the nature of anti-inflammation, collagen rejuvenation and *angiogenesis* (generated new blood vessels).

Second journal entitled “The Healing Effect of Curcumin on Burn Wounds in Rat”. This research used experimental method. This journal stated the work mechanism of re-epithelialization and the increase of growth in myofibroblast, fibroblast and macrophage with the result that shows improvement of burns. There is a significant result in giving curcumin with dosage 2% after 21 days if it is compared with other groups.

Topical sustain of curcumin with dosage 2% can be used as therapy to replace silver sulfadiazine and it does not have toxic effect.

Third journal entitled “Ethosomal Curcumin Promoted Wound Healing and Reduced Bacterial Flora in Second Degree Burn in Rat”. This journal used used experimental method. Based on histopathology observation, the result in group E had better result compared to other treatment groups (viewed by the nature of anti-inflammation, collagen growth, re-epithelialization, fibrosis and angiogenesis). The using of curcumin also gave effect of anti-bacteria. However, the result in group E is better than the group that got only curcumin. Conclusion in this journal is that *ethosomal-curcumin* had potential effect in treating first-degree burns. The nature of anti-bacteria has slight similarity with group that got *sulfadiazine cream*.

Fourth journal entitled “Evaluation of Propylene Glycol nanoliposomes containing curcumin on burn wound model in rat: biocompatibility, wound healing and anti-bacterial effect”. This research used experimental method. This journal used curcumin as its sample. On dosage 0.3%, the result shows that there was inhibition which is nearly equal with anti-bacteria. Besides, the concentration Cur-Pgl 0,3% also displayed the acceleration of burns treatment in 18 days compared to positive control group, negative control group and other dosages (1% and 3%). The percentage of decline in burns reached 98,8±2,28 %.

Fifth journal entitled “*Evaluation of the Healing Effect of Hypericum Perforatum and Curcumin on Burn Wounds in Rats”*. This research used experimental method. During observation on the growth of blood vessels, curcumin group showed higher result than control group and *Hypericum perforatum* group. Conclusion in this journal is that curcumin and hypericum perforatum are effective to treat burns.

Table 1. Review Journal from google scholar and Pubmed

No.	Title, Author, Year	Publisher	Method	Result	Conclusion
1.	Title : *the Effect of Topical Treatment with Curcumin on Burn Wound Healing in Rats* Researcher : Kulac M., *et al*. Year : 2012	*Springer science*	Experimental	The process of re epithelialization occurs in group A and B significantly. Nevertheless, group C show better result than other groups. During *immunohistochemical* observation, epithelium tissue grew quite fast in each group.	There is beneficial effect in using topical curcumin in treating burns in rats as testing-animals.

2	Title : The Healing Effect of Curcumin on Burn Wounds in Rat Researcher : Daavood Mehrabani, et al. Year : 2014	World Journal of Plastic Surgery	Experimental	Result showed the decline in size of burns on the 7th day and 14th day in all groups. There was no significant difference in each group. On the 21st day, a significant result was shown by group C (taking curcumin with dosage 2%)	Topical sustain of curcumin with dosage 2% can be used as therapy to substitute silver sulfadiazine and it did not have toxic effect.
3	Title : Ethosomal Curcumin Promoted Wound Healing and Reduced Bacterial Flora in Second Degree Burn in Rat Researcher : Partoazar, et al. Year : 2016	Drug ress (Stuttg)	Experimental	Group E (ethosomal curcumin) had better result than other treatment groups (observed from the nature of anti-inflammation, collagen growth, re-epithelialization, fibrosis and angiogenesis). The using of only curcumin gave effect to anti-bacteria. However, the result in group E is better than group with only curcumin	Ethosomal-curcumin has potential effect to the treatment of wound in the beginning level. The nature of anti-bacteria almost has similarity with group that got sulfadiazine cream.
4	Title : Evaluation of Propylene Glycol nanoliposomes containing curcumin on burn wound model in rat: biocompatibility, wound healing and anti-bacterial effect. Researcher : Nooshin Kianyash, et al Year : 2017	Drug Deliv Transl Res	Experimental	The dosage of 0.3% resulted inhibition that is almost similar with anti-bacteria. Besides, the concentration Cur-Pgl 0,3% also showed the acceleration in the recovery of burns in 18 days if it is compared with positive control group, negative control and other dosages (1% and 3%). This can be observed from the percentage that displays decline of burns reaching 98,8±2,28 %.	Formulation of nanoliposom with active substance content of curcumin with low dosage 0,3% is more effective in treating burns.

5	Title : Evaluation of the Healing Effect of Hypericum Perforatum and Curcumin on Burn Wounds in Rats Researcher : Nevra Seyhan Year : 2020	Hindawi Evidence-Based Complementary and Alternative Medicine	Experimental	There is no significant difference in group B (given curcumin) and C (given evaluation of observation in regenerating epithelium tissue and nature of anti-inflammation. However, there is significant difference if it is compared to control group. On the growth observation of blood vessel tissue, curcumin group showed higher result than control group and *Hypericum perforatum group*	Curcumin has better effect in treating burns in rat

CONCLUSION

Based on the observation in journals, it can be concluded that curcumin gives therapy effect in treating burns. Nevertheless, the research is still done on testing-animals. Mechanism of treating burns in curcumin compound is done by re-epithelialization and it improves the growth of myofibroblast, fibroblast and macrophage. The result showed improvement in burns. Curcumin becomes anti-inflammation and anti-free radical on skin. Besides, curcumin also increases the growth of beta factor, stimulates angiogenesis and accumulates extracellular matrix.

The making of curcumin nanoliposome sustain is done by the suspension of centrifugation toward curcumin for 30 minutes in the temperature of $4^{O}C$. Then, the result of sedimentation is heated in the temperature of $80^{O}C$ for 45 minutes. It is then dissolved in methanol solution for analysis in spectrophotometer with wavelength 430 nm.

SUGESTION

More observations, furthermore, related to the development of liposom sustain on emulsion cream for burns are needed. The development in research is also needed so curcumin sustain may be used as one of medicines in treating burns.

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