



**Formulation of cream & ointment for burns, scars, wounds and
diaper rash treatment using natural wheat germ oil**

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DEDICATION

*First and foremost, I'm thankful for **Allah** for having made everything possible by give me health, patience, strength, and a beloved family to support me for performing this work in the best way.*

*To **My father Prof. Dr. Zakaria M. Al- Douri**...for his inspiration, support, and motivation.... Who was and still my idol and the reason behind every successful step I made in my life so far.*

*To **My lovely Mother** The candle of my life.... Who has been a source of love, patience, support, motivation and prayer for me during the hardest moments.*

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List of Abbreviations

Code	Word
ALA	Alpha-linolenic-acid
API	Active pharmaceutical ingredient
WGO	Wheat germ oil
W/O	Water in oil emulsion
DWG	Defatted wheat germ
WHO	World and health organization
PDGF	Platelet-derived growth factor
EGF	Epidermal growth factor
TNF	Tumor necrosing factor
TGF	Transforming growth factor
TNF	Tumor necrosing factor
MUFA	Monounsaturated fatty acid
Sfa	Saturated fatty acid
S/U	Saturated/ Unsaturated fatty acid
SD	Standard deviation
Tg	Glass transition
ECM	Extracellular matrix
ED-A	Domain A
PDGF	Platelet derived growth factor
VEGF	Vascular endothelial growth factor
KGF	Keratinocyte growth factor

HGF	Hepatocyte growth factor
IGF	Insulin-like growth factor
PDGF-BB	Platelet-derived growth factor –BB
GAG	Glycosaminoglycan
PGs	Proteoglycans
PUFAs	Poly unsaturated fatty acids
TPS	Treatment with Physiological Saline
TBL	Blends
TSL	Structured Lipids
SL1	Structured Lipid 1
SL2	Structured Lipid 2
TBG	Topical betulin gel
STSG	Split-thickness skin graft
PPM	Part per million
USM	Unsaponifiable matter
SV	Saponification value
DWG	Defatted wheat germ
MDRs	Multidrug resistance pumps
MRSA	Methicillin-resistant Staphylococcus aureus
E. coli	Escherichia coli
S. enterica	Salmonella enteric

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Abstract

Burn, chronic wounds, scars and diaper rash are health problems that negatively affect the lives of millions of people worldwide. Wheat germ oil (WGO) is one of the richest natural sources of vitamin E and contains a number of other health-beneficial bioactive compounds, including: polyunsaturated fatty acids, policosanol, squalene, B vitamins, and other mineral content, it is used as dietary supplement and phytosterols (like cholesterol). Previous studies showed that wheat germ oil has anti-oxidant activity, anti-bacterial activity, which may promote wound healing in experimental animal.

The aim of this study is to assess the effectiveness, safety and cost effectiveness of using wheat germ oil as a cream or ointment formulation for burn, wounds, scars and diaper rash therapy. Formulation of wheat germ oil as a cream and ointment with two different percentages 10% and 20%. In-vitro evaluation was performed by studying the stability of the final product, and testing the finished products (formulated germ

wheat ointment and cream) on induced wounds of rat's skin. This study was performed on male Sprague rats divided into seven groups (four treatment groups each of which four rats compared to three control groups each of which 4 rats). Burn wound (2cm bottom diameter) was initiated in rats. The study and follow up were continued for almost 4 weeks.

The result of this study showed significant reduction in both percentage and time for wound healing in the treated groups (10%, 20% wheat germ oil cream and ointment) compared to cold cream & zinc oxide ointment groups and comparable to the control groups.

According the experimental data, this study proofed that topical administration of wheat germ oil in cream and ointment has tremendous therapeutic effect in the treatment of burns, wound, scars, and diaper rash.