

# Formulation and evaluation of antioxidant and anti-aging face lotion from oat meal containing $\beta$ -glucan

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**Abstract-** Majority of cosmetic products are applied over skin for various purpose like beautification, protection etc. Skin care preparations aren't new; it's the age old necessary of mankind. There for structure and performance skin is vital consideration for designing cosmetic. Now a day's, Herbal Cosmetic is growing rapidly as most ladies prefer natural products instead of chemicals products for his or her attention. Herbal Cosmetic contains natural nutrients to boost and supply consumer satisfaction because of relatively fewer side effects compared to synthetic cosmetic. Oats is characterized by the documented history of safe use in dermatological problems. Comprehensive use in traditional medicine is due to its efficiency, availability and lack of toxicity. Skin aging can be described as irregular pigmentation, increased wrinkling, loss of elasticity, dryness, and roughness. The oats meal contains large quantity of beta glucan which possess medicinal benefits including anti-aging, anti-wrinkle, anti-wound, antioxidant and hydrating properties. However, there is no formulation has been developed though it was reported for many biological properties. The aim of our study is to formulate and evaluate anti-aging cream containing beta glucan as an active ingredient. The formulated creams were consistent in quality and safe to be used on the skin. These results demonstrate that beta glucan isolated from oat meal has a good potential for cosmetic product development.

**Keyword:** - beta glucan, anti-aging, anti-wrinkle, anti-wound, antioxidant.

## 1. INTRODUCTION

### 1.1 Antioxidant

Skin facial creams restore a more youthful complexion, whitening the colour of skin, adds moisture and protective layer on the skin. The facial creams act as removal of the flaws from skin, maintaining the smoothness and moistness of skin. The skin is the largest external organ of body and also known as the cutaneous membrane that protects against mechanical trauma, UV light and infections. It protects the underlying structures from injury and from invasion by microbes. Free radicals, unstable oxygen molecules that damage skin cells and result in wrinkles, are neutralised by antioxidants, reducing cellular damage. They give defence against photodamage and skin cancer and suppress inflammation that causes collagen depletion. It may also reduce the effect of trace, smoke and pollution. Some skin expert believes that direct application of antioxidant cream to the skin might slow down the aging process. Because they are readily available and non-toxic, antioxidants made from natural herbal sources are now widely used in the creation of cosmetic products.(14)

The term antioxidant is a buzzword used throughout the health and beauty industry. However, many people aren't quite clear on what antioxidants actually are and why they're so beneficial to your health. Antioxidants are a group of naturally occurring compounds that protect your cells from damage. Although, there is some indication that antioxidant supplements aren't as effective as getting antioxidants through your diet. Antioxidants are especially plentiful in fresh fruits and vegetables. They are important for the health of your entire body, not just your skin.(2)

According to the free radical theory of aging, free radicals are responsible for creating inflammation and prematurely aging your body, including your skin. These unstable molecules go around stealing an electron from other molecules, damaging healthy cells in the process. Antioxidants are the foil opposites of free radicals. They clean up free radicals by donating an electron. This essentially deactivates the free radical and prevents it from damaging cells. Antioxidants give a protective effect against aging and disease.

Free radicals get a bad reputation, but they aren't entirely bad. For example, free radicals are used by the immune system to help fight off bacteria. So they are important to the way your body functions.(14)

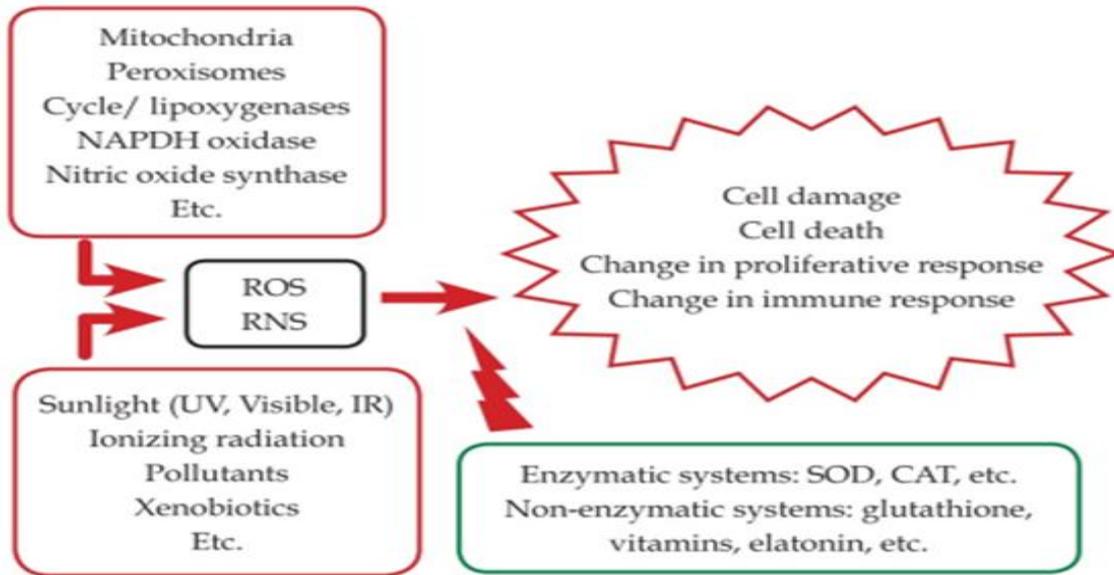
The problem occurs when there are too many free radicals compared to antioxidants. Without enough antioxidants to keep excess free radicals in check, they are free to damage cells Skin and mucous membranes have a contact and Défense barrier role against chemical, physical and biological aggressions continuously. Maintenance of cellular integrity, as well as of all immune mechanisms, whether inborn (cutaneous lipids and plasma membranes, for example) or specific (cytokine synthesis, enzymes or cell proliferation), involves a series of chemical reactions that generate reactive oxygen species - highly reactive molecules that can rapidly alter molecules fundamental to cutaneous homeostasis, such as proteins, lipids, or DNA. Endogenous or exogenous antioxidant mechanisms act by neutralizing these reactive molecules.(2) The imbalance of this neutralization has multiple consequences: free radicals are implicated in the etiopathogenesis of various dermatoses, as well as in the aging process and in the onset of cutaneous neoplasia's. Proper use of antioxidants should be considered in these situations where evidences of their benefits have been accumulating in the last decades.(5)

### 1.2 OXIDATIVE MECHANISMS AND SKIN PHYSIOLOGY

The main reactive oxygen species (ROS) are the hydroxyl radicals ( $\text{HO}\cdot$ ) and superoxide ( $\text{O}_2\cdot$ ), peroxy and alkoxy radicals ( $\text{RO}_2\cdot$  and  $\text{RO}\cdot$ ), the singlet oxygen ( $^1\text{O}_2$ )<sup>3-5</sup>, as well as hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) and organic peroxides ( $\text{ROOH}$ ). In addition to direct damage to molecules such as lipids, amino acids and DNA, ROS can activate enzymatic and non-enzymatic cellular responses, with the potential to modify other processes that end up interfering with gene expression.<sup>(4)</sup>

Antioxidants are substances that combine to neutralize reactive oxygen species preventing oxidative damage to cells and tissues.<sup>6</sup> The cutaneous antioxidant system consists of enzymatic and non-enzymatic substances. Among enzymatic antioxidants, glutathione peroxidase (GPx), catalase (CAT) and superoxide dismutase (SOD) can be highlighted.

Non-enzymatic or low molecular weight antioxidants also contribute to the maintenance of cellular redox balance. Here some hormones are grouped such as estradiol and, melatonin, as well as some vitamins, such as E and C.<sup>(5)</sup>



### 1.3 Skin Care Benefits of antioxidant

1. Antioxidants are abundant in fresh, healthy foods. There's plenty of research that confirms eating a diet rich in antioxidants can help stave off aging and keep you healthier for longer.<sup>4</sup>
2. Many skincare products incorporate antioxidants into their formulations to deliver the benefits of antioxidants directly to the skin. How effective topically applied antioxidants are is still a bit unclear. More in-depth research is currently being done, but so far, it seems that topical antioxidants may deliver a host of benefits.
3. Protection against UV damage: Sun damage is a huge aging factor of the skin. Antioxidants may help give a protective effect against UV damage when used along with sunscreen.<sup>5</sup>
4. Calm inflammation: Free radicals by their very nature create inflammation. Antioxidants can help reduce inflammation and may have a soothing effect on the skin.<sup>5</sup>
5. Slow premature aging: Topical antioxidants can make the skin look more youthful and protect against extrinsic aging (for instance, premature aging caused by external factors like chronic sun exposure, smoking, pollution, and more). Antioxidants don't seem to slow intrinsic (chronological) aging, however.<sup>(4)</sup>

### 1.4 Aging



Ageing or aging is the process of becoming older. The term refers mainly to humans, many other animals, and fungi, whereas for example, bacteria, perennial plants and some simple animals are potentially biologically immortal. In a broader sense, ageing can refer to single cells within an organism which have ceased dividing, or to the population of a species. In humans, ageing represents the accumulation of changes in a human being over time and can encompass physical, psychological, and social changes. Reaction time, for example, may slow with age, while memories and general knowledge typically increase. Ageing increases the risk of human diseases such as cancer, Alzheimer's disease, diabetes, cardiovascular disease, stroke and many more. Of the roughly 150,000 people who die each day across the globe, about two-thirds die from age-related causes. Current ageing theories are assigned to the damage concept, whereby the accumulation of damage (such as DNA oxidation) may cause biological systems to fail, or to the programmed ageing concept, whereby the internal processes (epigenetic maintenance such as DNA methylation) inherently may

cause ageing. Programmed ageing should not be confused with programmed cell death (apoptosis). Obesity has been proposed to accelerate ageing, whereas dietary calorie restriction in non-primate animals slows ageing while maintaining good health and body functions. In primates (including humans), such life-extending effects remain uncertain.(17)

### 1.5 Oats meal



The oat (*Avena sativa*), sometimes called the common oat, is a species of cereal grain grown for its seed, which is known by the same name (usually in the plural, unlike other cereals and pseudo cereals). While oats are suitable for human consumption as oatmeal and rolled oats, one of the most common uses is as livestock feed. Oats are a nutrient-rich food associated with lower blood cholesterol when consumed regularly.(6)

Avenins are oat gluten proteins, similar to gliadin in wheat. They can trigger celiac disease in a small proportion of people. Also, oat products are frequently contaminated by other gluten-containing grains, mainly wheat and barley.(7)



#### a) Scientific classification

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Monocots
Clade	Commelinids
Order	Poales
Family	Poaceae
Subfamily	Pooideae
Genus	<i>Avena</i>
Species	<i>A. sativa</i>

#### b) Origin

The wild ancestor of *Avena sativa* and the closely related minor crop – *A. byzantine* – is *A. sterilise*. *A. sterilise* is a wild oat that is naturally hexaploid. Genetic evidence shows the ancestral forms of *A. sterilise* grew in the Fertile Crescent of the Near East.(12) Oats are usually thought to have emerged as a secondary crop, i.e., derived from a weed of the primary cereal domesticates, then spreading westward into cooler, wetter areas favourable for oats, eventually leading to their domestication in regions of the Middle East and Europe.(6)

#### C) Cultivation

Oats are best grown in temperate regions. They have a lower summer heat requirement and greater tolerance of rain than other cereals, such as wheat, rye or barley, so they are particularly important in areas with cool, wet summers, such as Northwest Europe and even Iceland. Oats are an annual plant, and can be planted either in autumn/fall (for late summer harvest) or in the spring (for early autumn/fall harvest).(7)

#### d) Benefits of oat ingredients in your skincare routine

As the old adage goes – you are what you eat. In terms of staying fit and healthy, the ingredients in your food are an important consideration to make for everyone. And it's no different when it comes to taking care of your skin. Being aware of what goes into the skincare products you use can make all the difference in achieving a healthy complexion and happy skin.(9)

When choosing these skincare products, look out for the presence of beneficial ingredients like natural prebiotics. After all, your skin is your natural barrier against bacteria, UV rays and other hazardous external forces, so it makes sense to use gentle, natural treatments to keep in balance.

Oat ingredients have long been celebrated as one of the most effective at treating a number of minor skin conditions, balancing the bacterial ecosystem on your skin and moisturising to give you that healthy complexion. For centuries, those who suffered from

itchy or dry skin were recommended to take an oatmeal bath. The reputation that treatment garnered has survived – in many ways – to this day and has been clinically proven in a variety of studies.(12)

Colloidal oatmeal, oat extract and oat oil are found in Aveeno's Range of skincare products, from body washes and shampoos to moisturising lotions and ointments. Aveeno's triple oat complex help soothe and protect your skin while keeping the microbiome in balance. Learn how to care for sensitive skin with our guide on the benefits of oat ingredients in skincare. (8)

Clinical studies have shown that products making use of oatmeal ingredients can have a positive effect when used to relieve a number of skin conditions, including:

1. **Dry skin:** Dry skin is often caused by a lack of water in the upper layers of the skin. water. This gives skin a fuller, more radiant appearance and reduces areas of dry skin.(11)
2. **Eczema:** As well as causing dryness in the skin, eczema is a condition which can leave sufferers with patches of itchy and inflamed skin across their body. This is partially due to defects in the surface of the epidermis, which prevents it from retaining the moisture it needs. Oat ingredients are often recommended for eczema sufferers, adults and babies, to strengthen the outer barrier of your skin, as well as for the anti-inflammatory qualities that help to reduce itchiness<sup>6</sup>. The Aveeno Dermexa range and Aveeno Baby Dermexa range contain prebiotic triple oat formula and ceramides to relieve the symptoms of dry eczema-prone skin.
3. **Psoriasis:** Usually affecting the skin on around the elbows and other joints, this condition is caused by skin regenerating too quickly. The build-up of skin cells leads to dry, scaly skin that can be itchy or sore<sup>7</sup>. Oatmeal can help wash away layers of dead skin to reduce the impact of psoriasis.(9)
4. **Acne:** A condition usually seen in young adults, acne is caused by a build-up of natural oils on the skin, which clog the pores. However, it's believed that oat ingredients bind to these oils, making them easier to wash away and reducing clogged pores.(11)
5. **Nappy rash:** Irritation of the skin, caused by wearing nappies that are either wet or on for too long, this condition can cause discomfort to your baby and affects as many as a third of all infants<sup>9</sup>. The cooling and soothing qualities of oats can help to reduce irritation in little ones. Aveeno Baby offers a wide range of washes and lotions that help baby's skin become softer and smoother and relieve irritation from nappy rash.(8)

#### e) Oat micronutrients

micronutrients	amount
Iron	5mg / 100gr
Calcium	54mg / 100gr
Magnesium	117mg / 100gr
Zinc	4mg / 100gr
Phosphorus	523mg / 100gr
Potassium	429mg / 100gr
Sodium	2mg / 100gr
Manganes	4,9mg 7 100gr

Chemical constituent	Amount
Starch	60%
Protein	14%
Lipids	7%
β-glucan	4%

Table: -1

## 2. Method and result

### 2.1) Soxhlet extraction

A Soxhlet extractor is a piece of laboratory apparatus invented in 1879 by Franz von Soxhlet. It was originally designed for the extraction of a lipid from a solid material. Typically, Soxhlet extraction is used when the desired compound has a limited solubility in a solvent, and the impurity is insoluble in that solvent. It allows for unmonitored and unmanaged operation while efficiently recycling a small amount of solvent to dissolve a larger amount of material.(10)

### 2.2) Description

A Soxhlet extractor has three main sections: a percolator (boiler and reflux) which circulates the solvent, a thimble (usually made of thick filter paper) which retains the solid to be extracted, and a siphon mechanism, which periodically empties the thimble.(10)

### 2.3) Assembly

1. The source material containing the compound to be extracted is placed inside the thimble.
2. The thimble is loaded into the main chamber of the Soxhlet extractor.
3. The extraction solvent to be used is placed in a distillation flask.
4. The flask is placed on the heating element.
5. The Soxhlet extractor is placed atop the flask.
6. A reflux condenser is placed atop the extractor.(10)

### 2.4) Operation



The solvent is heated to reflux. The solvent vapour travels up a distillation arm, and floods into the chamber housing the thimble of solid. The condenser ensures that any solvent vapour cools, and drips back down into the chamber housing the solid material. The chamber containing the solid material slowly fills with warm solvent. Some of the desired compound dissolves in the warm solvent.(16)

When the Soxhlet chamber is almost full, the chamber is emptied by the siphon. The solvent is returned to the distillation flask. The thimble ensures that the rapid motion of the solvent does not transport any solid material to the still pot. This cycle may be allowed to repeat many times, over hours or days.(10)

During each cycle, a portion of the non-volatile compound dissolves in the solvent. After many cycles the desired compound is concentrated in the distillation flask. The advantage of this system is that instead of many portions of warm solvent being passed through the sample, just one batch of solvent is recycled.(16)

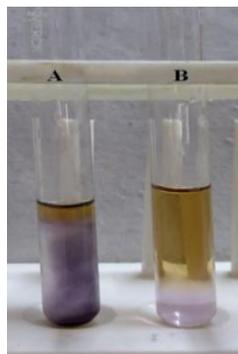
After extraction the solvent is removed, typically by means of a rotary evaporator, yielding the extracted compound. The non-soluble portion of the extracted solid remains in the thimble, and is usually discarded.(7)

## 2.5) Identification test for extract

### a) Test for starch

test	Procedure	Result
Iodine test	Iodine solution + extract	blue black color

Table: 3

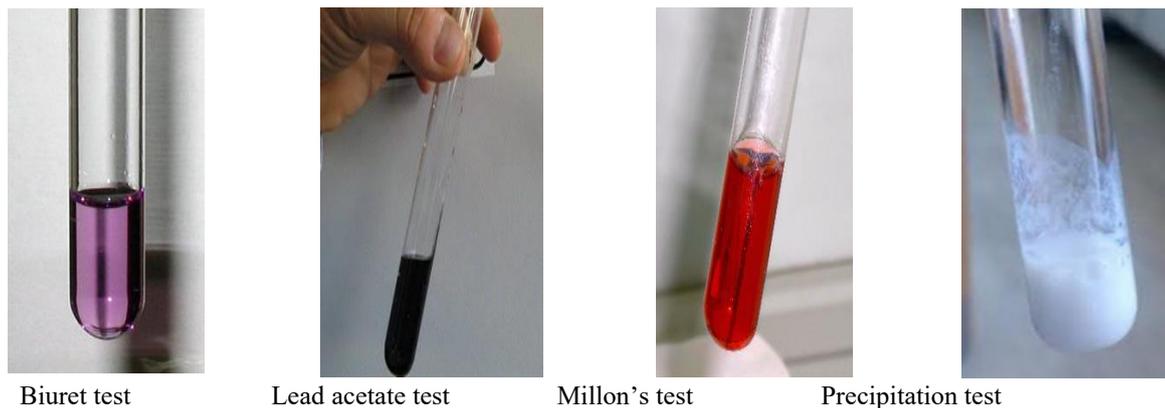


### a) Iodine test

### b) Test for protein

test	Procedure	Result
Biuret test	2ml test solution + 2ml biuret reagent and shake the solution and stand for 5 min	Purple color (protein present)
Lead acetate test	3ml test solution + ad drop of 2% Na <sub>2</sub> NO <sub>3</sub> +1ml of lead acetate solution	Black precipitate is obtained
Millon's test	2ml of sample solution + 2ml of millon's reagent	Red color precipitate
Precipitation test	Add few drop od conc.H <sub>2</sub> SO <sub>4</sub> and shake the test tube +heat the test tube gently on Bunsen burner	Yellow or white precipitate

Table: - 4



Biuret test

Lead acetate test

Millon's test

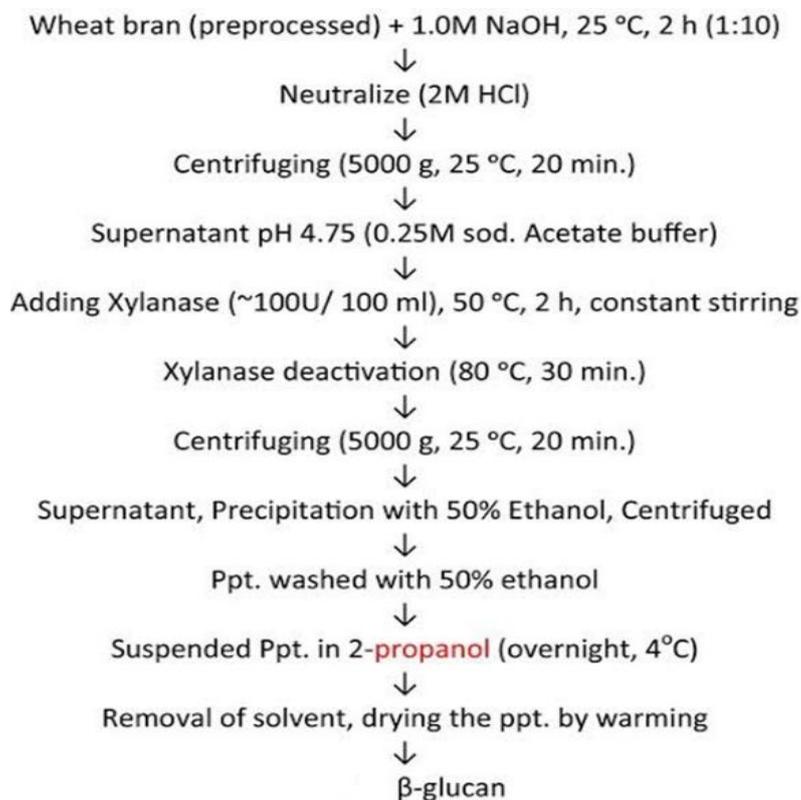
Precipitation test

## c) Test for lipids

Test	Procedure	Result
Saponification test	Add sample + add NaOH + boil the solution in water bath for 5 min	Formation of froth
Acrolein test	1ml of sample + add crystal of potassium hydrogen sulphate + heat the solution for few minutes	Give the pungent smell
Dichromate test	2-3 ml of sample + add a few drops of 5% of potassium dichromate solution + 5 ml of concentrated nitric acid	Blue colour is obtained
Free fatty acid test	Add a phenolphthalein solution + add test sample + add dilute alkali	Pink colour is obtained

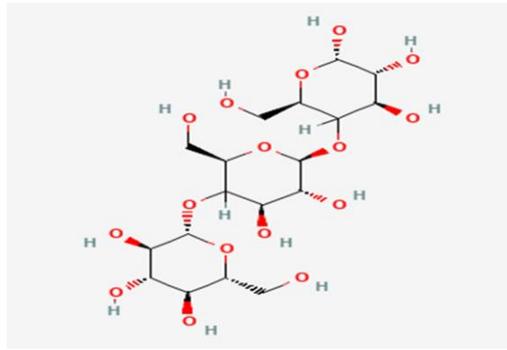
Table: -5

## 2.6) Isolation of beta glucan



### 3) Material

#### BETA GLUCAN



According to this figure, beta-glucan has various properties on health. They are prebiotic properties, hypocholesterolemic properties, immunomodulatory and anti-tumour properties, antioxidant properties and hypoglycemic properties, respectively.

A substance found in bacteria, plants, and certain foods, such as baker's yeast, cereal grains, and mushrooms. It is a type of polysaccharide that is made of a string of glucose (sugar) molecules joined together. the chemical formula for B glucan (C<sub>18</sub>H<sub>32</sub>O<sub>16</sub>)

Glucans are glucose polymers, classified according to their interchain linkage as being either  $\alpha$ - or  $\beta$ -linked.  $\beta$ -glucans are a heterogeneous group of nonstarch polysaccharides, consisting of D-glucose monomers linked by  $\beta$ -glycosidic bonds. Schizophyllan is a  $\beta$ -1,3 beta-glucan with  $\beta$ -1,6 branching. Schizophyllan is also known as sizofiran.(18)

#### 3.1) beta glucan skin benefits

In dermatology, beta-glucans are used in personal care products. They promote wound healing, moisturize the skin, and have anti-aging benefits. They improve the skin's resilience to infections (1). They are especially beneficial for sensitive skin, may help soothe symptoms of eczema and dermatitis, and protect the skin. Oat beta-glucan, mushroom beta-glucan, yeast beta-glucan are powerful natural ingredients that have gained significant attention in the beauty and cosmetics industry for their potential skincare benefits. These plant-based ingredients are renowned for their ability to nourish and soothe the skin, making them ideal for addressing many skin concerns such as psoriasis, rosacea, dry skin, and combination skin

You can use serums, moisturizers, creams, and other skin care products with beta-glucans. You can also consume foods rich in beta-glucans to maintain your skin and overall health and wellness. You can eat

##### 1. Creating a skin barrier

ICYMI, the world is full of environmental stressors that take a toll on your skin. Over time, smoke, sun, smog, and less-than-stellar cosmetics penetrate your skin's natural barrier, causing redness and irritation. Beta glucan skincare products help you build up that barrier to keep all that nasty stuff out. The same way The Leveler mattifying primer creates a humidity-proof barrier to lock makeup in place, beta glucan does that for your skin with moisture.(18)

##### 2. Decreasing the appearance of wrinkles and redness

In addition to plumping and smoothing skin like a pro, beta glucan is also full of anti-aging goodness. Because beta glucan is a unique type of molecule, it can bind to many receptors in your body, allowing it to have different effects depending upon where it lands.

If you use beta glucan skincare products on wrinkles, it will plump and hydrate. If you use beta glucan for skin that's irritated, it will go into master calming mode. That means you can use this jack of all trades anywhere you like and it will decide what needs to be done there. Talk about hands-off — and brains-off — skin care.(13)

##### 3. Acting as an antioxidant

Remember how we mentioned some doctors are keen on beta glucan for skin because it may improve immunity? Well, those bona fides happen to have big benefits for skin.

Not only does beta glucan fight off bacteria that could break through your skin's barrier, but it also recruits other immune cells to attack unwanted outsiders. And this antioxidant army is especially protective for people who have dry or cracked skin. Talk about being a good little soldier!

##### 4. Preventing damage and repairing skin

Just as beta glucan prevents outside stressors from penetrating your skin's barrier, it also happily goes to battle against cell damage caused by age or sun exposure. And once that war is won, it uses those reparative powers to alleviate redness, soothe irritation, and repair problem areas.

##### 5. Hydrate the Skin

Beta-glucans extracted from oats can hydrate and moisturize your skin. They can penetrate deep into the dermis (second layer of the skin), and reduce the skin roughness. It also increases the efficacy of the product.

##### 6. Reduce Signs of Aging

Oat-derived beta-glucan can rejuvenate the skin and minimize fine lines and wrinkles. It stimulates the fibroblast cells to promote collagen production and cell renewal process to tighten the skin and minimize crow's feet in eight weeks to give you a youthful appearance

##### 7. Have Anti-Inflammatory Properties

Beta-glucans derived from mushrooms have antioxidant and anti-inflammatory properties. This might help alleviate inflammation caused by skin conditions like eczema, burns, wounds, and dermatitis. Beta-glucans play an important role in treating and preventing

allergic reactions triggered by the immune system. These properties make them effective agents for soothing allergy symptoms like skin rashes, redness, and swelling.(18)

#### 8. Prevent UV Damage

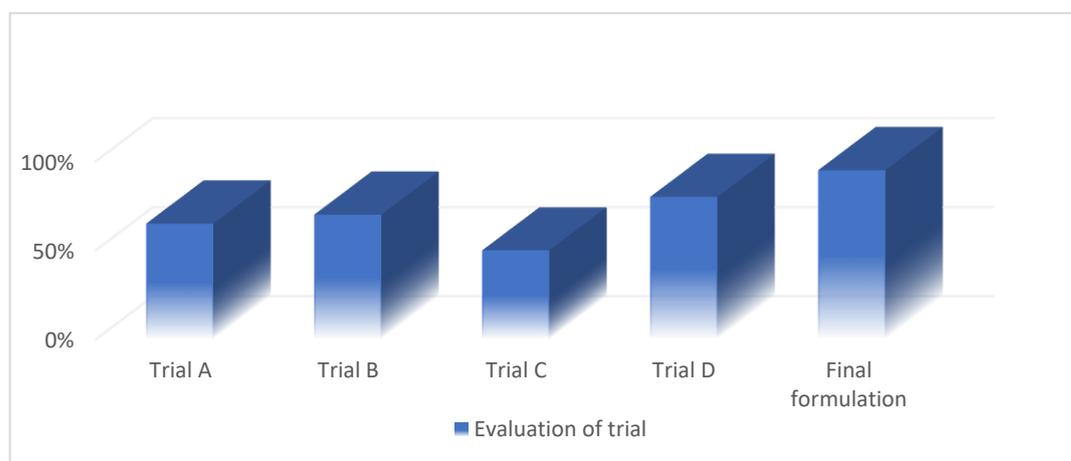
Excessive ultraviolet light exposure produces harmful free radicals in your body, one of the main factors that cause photodamage and photoaging. The antioxidative properties of beta-glucans protect the skin against free radical damages and prevent signs of aging, hyperpigmentation, and cell damage.(15)

### 3.2) Formulation table

Sr.no	Ingredient	Qty for 100% (Trial A)	Qty for 100% (Trial B)	Qty for 100% (Trial C)	Qty for 100% (Trial D)	Qty for 100% Final formulation	Use of ingredients
	Cetyl alcohol	2.5	4.0	5.5	3.0	2.0	Stabilising agent
	Glyceryl monostearate	8.5	6.5	4.0	6.0	7.5	Self emulsifying
	Mineral oil	6.0	4.0	10	9.0	8.0	Emollient
	Isopropyl myristate	3.0	4.0	2.0	2.5	1.0	Moisturising effect
	PEG-400 monostearate	8.0	12	5.0	7.0	10	Solubilizer
	Sodium lauryl sulphate	0.3	0.5	0.2	0.1	0.2	Surfactant
	oat meal extract	1.0	2.5	4.0	3.0	3.0	Antioxidant and anti-aging effect
	Dimethicone	0.5	0.1	0.3	0.2	0.2	Shiny appearance
	Triethanol amine	0.3	0.2	0.3	0.5	0.1	Emulsifier
	Glycerine	4.0	6.0	2.0	5.5	5.0	Humectant
	Propylene glycol	6.0	6.0	5.0	3.0	3.5	Humectant
	Water	To make 100%	To make 100%	To make 100%	To make 100%	To make 100%	Solvent
	Perfume and preservative	q.s.	q.s.	q.s.	q.s.	q.s.	Prevent the bad odour

Table: -6

#### Graphical representation of evaluation trial



### 3.3) Procedure: -



- 1) All of the equipment needs to be thoroughly cleaned and washed.
  - 2) The water phase ingredients go in one beaker while the oil phase ingredients go in another.
  - 3) The temperatures in both procedures range from 70 to 75 °C.
  - 4) The heating components are continually stirred.
  - 5) Carefully record the heated material's temperature.
  - 6) The heating is stopped and the combination is well stirred when the material reaches a temperature of more than 70°C.
  - 7) Combine the Water and Oil phases, then pour the resulting mixture into the mortar.
  - 8) Only one direction should be used for the trituration when adding essential ingredients like oil and extract.
  - 9) The color and perfume are added to the product when the temperature is 45°C.
  - 10) Prepare the product, fill the container with it, and label it.
- suitable container, label the container(15)

### 3.4) Evaluation parameters

The Lotion was evaluated based on the parameters listed below: Choosing the appropriate emulsion type, the lotion was combined with a crimson color. A few drops of the lotion were applied to a microscope slide for observation. The lotion is an oil in water (o/w) type if the dispersed globules appear red and the continuous phase is colorless. Water in oil (w/o) type lotion is the opposite situation.(3)

1. pH of the lotion: - In order to calibrate the pH metre, standard solution was used. The pH of the lotion, which was weighed and dissolved in 50 cc of water, was determined.(13)
2. Homogeneity Test: - A clean and dry object glass was smeared with the lotion, and a cover glass was sealed. The appearance under the light of some coarse particle/homogeneity was investigated. Lotion was tested by visual examination for homogeneity and tested for some lumps, flocculates, or aggregates
3. Appearance: - The lotion appearance was assessed according to its colour, pearlescence, and roughness.(1)
4. After feel Emolliency: -The lotion was evaluated for slipperiness and the quantity of residue left after application of a set amount.
5. Type of smear: - After applying the lotion, the type of film or smear that developed on the skin was examined.
6. Removal test: - By running the applied hand under water, it was possible to determine how easily the cream could be removed.
7. Stability study: - The lotion kept at three different temperatures—8°C, 27°C, and 40°C—for two months as part of the stability research.
8. Spreadability test: -Spread ability was measured by a parallel plate process typically used to assess and measure the spread ability of semi-solid preparations. One-gram lotion was pressed between two horizontal plates of dimension 20× 20 cm, the upper of which weighed 125 g. The spread diameter was measured after 1 min. Spread ability was calculated using the following formula:  $S = M \times L / T$   
Where, S= Spread ability, M= Weight in the pan (tied to the upper slide), L= Length moved by the glass slide, and T = Time (in sec) taken to separate the slides completely. Spreadability of lotion 3 to 5cm
9. Skin irritation test: - You can try a small amount on the inside of your hands and cover it. If rinse it off and apply again. Repeat this process for 7 days. If no reactions are seen, you should be ok with this product as mentioned before, it's always best to consult a physician about patch testing before using a new product.(13)



10. Determination of Viscosity: - Viscosity is a critical parameter for topical formulation. Topical solutions with low viscosity have faster clearance than viscous solutions. In addition, highly viscous solutions can have an undesirable effect on the skin. Viscosity of the lotion was found to be 424.20 mPa.s(3)

Final product

#### 4) Result: -



Sr. No.	Evaluation Parameters	Inference
1.	Colour	White
2	Odour	Pleasant
4	Consistency	Semi-solid
4	pH	4.9-5.3
5	Homogeneity	No lumps
6	Removal test	Easily remove
7	Stability study	No change in physical parameters
8	Type of smear	non-greasy
9	skin irritation test	No irritation
10	Viscosity	424.20 mPa.s

Table: -7

For the stability study, the antioxidant and anti-aging face lotion from oat meal containing  $\beta$ -glucan was stored for two months at three different temperatures: 8°C, 27°C, and 40°C. The pH of the cream's formulation was discovered to be in the lovely, skin-friendly range of 4.9 to 5.3. The developed antioxidant and anti-aging face lotion was subjected to a number of physical and chemical tests, and the findings were also provided.(15) After using both creams, the type of smear that was left on the skin was non-greasy. After use, washing with water made it simple to remove the lotion. The formulas were successful in distributing the extracts evenly throughout the lotion. This can be verified as present both visually and physically. Despite being stored for a considerable amount of time, there should be no color changes to the lotion.(1)

#### 5) CONCLUSION: -

In conclusion, the aim of the study Formulation and evaluation of antioxidant and anti-aging face lotion to formulate the lotion was found to be in compliance with all the properties of oats meal extract and other satisfactory results. significant ingredients for cosmetics application were included in the extracts of a, oat meal containing  $\beta$ -glucan. The extract showed anti-oxidation, anti-aging, and skin-brightening properties. But further research in the form of clinical studies would be required. The developed antioxidant and anti-aging face lotion was subjected to a number of physical and chemical tests, and the findings were also provided. After using both creams, the type of smear that was left on the skin was non-greasy. After use, washing with water made it simple to remove the lotion. The formulas were successful in distributing the extracts evenly throughout the lotion. From the given Study. It can be concluded that all the formulations of antioxidant and anti-aging face lotion prepared were good and had all the properties.

#### REFERENCES:

- Mithal BM, Saha RN. A Handbook of Cosmetic. 1st ed. Delhi: Vallabh Prakashan; 2002. p. 110-2.
- Glaser DA. Anti-Fungal products and cosmeceuticals. Facial Plastic Surgery, Clinics of North America; 2004;12(4):363-72.
- Sharma PP. Cosmetics Formulation, Manufacturing and Quality Control. 3rd ed. Delhi: Vandana Publications; 1998. p. 644-7.
- Mehta RM. Dispensing Pharmacy. 1st ed. Delhi: Vallabh Prakashan; 2008. p. 108.
- Gennaro AR. Remington: The Science and Practice of Pharmacy. 20th ed. Mary Land: Lippincott Williams and Wilkins; 2000. p. 437.
- Evans WC. Treas, Evans Pharmacognosy. 16th ed. New York: Harcourt Brace and Company Ltd.; 1997. p. 128.

7. AN Khandelwal KR. Practical Pharmacognosy. 2nd ed. Pune: Nirali Prakashan; 2012. p. 23. 69-
8. Kokate, CK (1994), "Practical Pharmacognosy", Vallabh Prakashan, New Delhi, 4th Edition, 123,
9. Text book of Pharmacognosy by C .K . Kokate , Purohit ,Gokhale (2007),37th Edition, Nirali Prakashan, New Delhi.
10. Jigna Parekh, Darshana Jadeja, Sumitra chanda, efficacy of aqueous and methanolic extracts of some medicinal plants for potential antibacterial activity Turk J Biol,2005.
11. Williamson EM Major herbs of Ayurveda . China: Churchill Livingstone,2002
- 12.Prajapati ND Purohit SS, Sharma AK, Kumar T. Handbook of medicinal plants. Jodhpur. India, Agarbios:2003
13. Srivastava A, Alam S, Shams S, Tiwari M, Mittal A, Sanjeev C. Formulation and evaluation of antiacne cream containing *Withania somnifera*. Journal of Pharmaceutical and Scientific Innovation. 2014; 3(4):348-352.
14. Moneruzzaman K, Jahan S, Nashriyah M, Boyce A. Bioactive constituents, antioxidant and antimicrobial activities of three cultivars of wax apple (*Syzygium samarangense* L.) fruits. Research Journal of Biotechnology. 2015;10(1):7-16.
15. Practical hand book cosmetic by Kamlesh D. Mali, Trupti K. Patil, Md. Rageeb Md. Usman, Dr . S. J. Surana (2018), Success publication.
16. <https://albrigiinherba.com/contacts/extraction/maceration/>
17. <https://www.urbandictionary.com/define.php?term=agging>
18. <https://www.peacehealth.org/medical-topics/id/hn-2805007>