



Fibers for Life.




WATER-FREE SOLUTIONS

An introduction to water-free formulation technologies.





AGENDA

- › **About JRS**
 - › **Introduction**
 - › **Challenges**
 - › **Formats**
 - › **Ingredients for tablet applications**
 - › **Tablet formulations**
 - › **Ingredients for powder applications**
 - › **Powder formulations**
 - › **Ingredients for bar applications**
 - › **Bar formulations**
 - › **The Future**
- 

ABOUT JRS



- Family-owned company since 1878
- Headquarters in Germany
- More than 3,500 employees worldwide
- Producer of INCI: Cellulose and INCI: Microcrystalline Cellulose worldwide
- Experts for Pharmaceutical Excipients for over 50 years
- Local support in your language
- Global regulatory, technical and service network support with local operational support



INTRODUCTION



DIFFERENT WORDINGS

Water-free cosmetics

anhydrous
cosmetics

*Water-less
cosmetics*

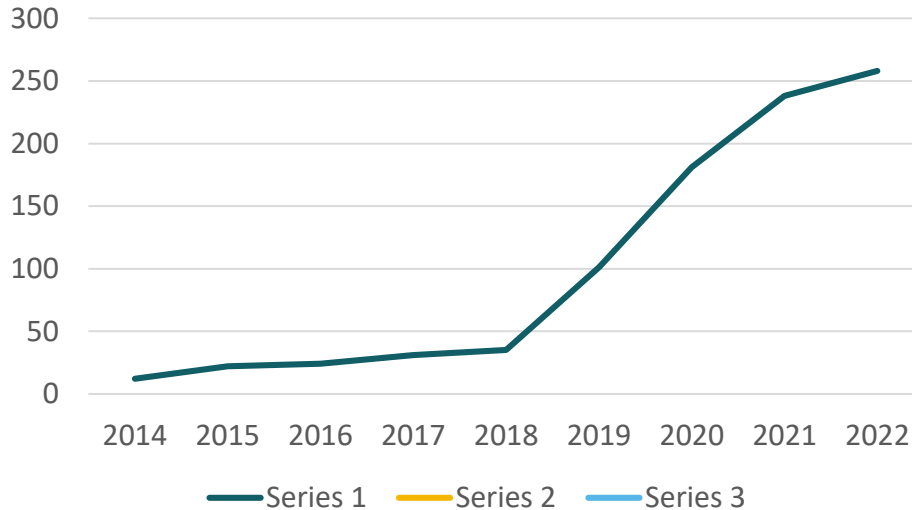
SOLID
COSMETICS

Water-saving
cosmetics

Water-conscious
cosmetics

Just add water

Shampoo Bars Launched



COMPARISON BETWEEN LIQUID & WATER-LESS FORMULATIONS



≈ 12 x Transport
Average per year per Person /
Approximately 12 shampoo bottles
per year



≈ 4 x Transport
Average per year per Person /
Approximately 4 shampoo bars
per year

ADVANTAGES OF WATER-LESS SOLUTIONS



Reduced transportation costs



Reduced carbon footprint



Innovative packaging



Reduced reliance of plastic packaging



Preservative free claim



Innovative format and concentrates



Longer product lifetime





CHALLENGES



CHALLENGES

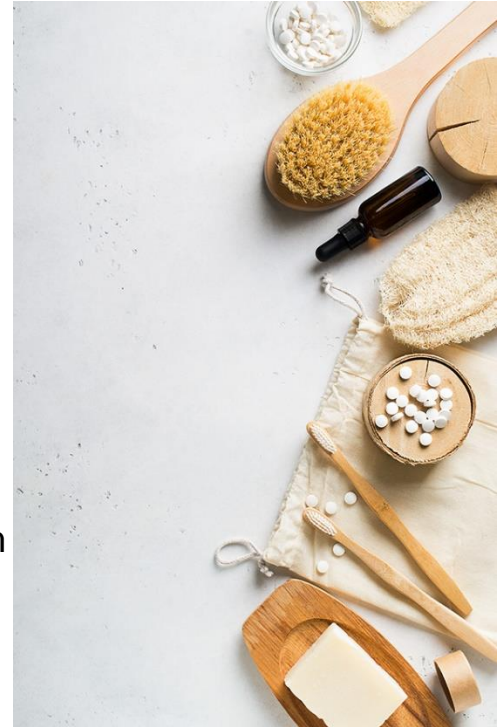
- Performance- typically solid formats as alternatives to liquid tend to under perform- shampoos and conditioners especially
- Ultimately due to lack of raw materials available in solid form as industry is historically skewed towards liquids
- Capacity for solid formats is extremely limited although this is slowly changing
- Preservation

FORMATS



TABLET FORMAT

- Single Dose
- Multi Dose
- Liquid content minimised
- High levels of “excipients” needed to carry active content
- Dependent on amount of active required
- Opportunities to get inventive- single dose serum
- Multi-dose serum?
- Packaging- neat!



POWDER FORMAT

- Single-dose
- Multi-dose
- Liquid content minimised
- Cleansers already on the market
- Wash products
- Effervescent products
- Face Masks
- Packaging- lots of options



BARS

- Shampoo currently growing in popularity
- Conditioner bars too although more Conditioning shampoo bars
- Hot pour or extruded/ stamped or pressed
- Liquid content minimised
- Formulation needs to be “bindable”
- Typically performance is an issue
- Manufacturing capacity?





INGREDIENTS FOR TABLET APPLICATIONS



ACTIVE

Functional/ Performance

- Typically active material and/or surfactant / blend of surfactants
- Needs to be in powder/ granular form
- Needs to perform at around 25% of total loading
- Needs to perform (based on tablet size)
- Needs to be stable in tablet form

MICROCRYSTALLINE CELLULOSE



Main functions:

- Filler & binder (water insoluble)
- excellent flowability & high compactability
- Anti-caking

INCI: Microcrystalline Cellulose

Ø particle size: 130 µm

ISO 16128: 100% natural origin

Natural origin: wood

Readily biodegradable



GMO free



vegan



Kosher



Halal



NATRUE



ECOCERT/
COSMOS

GLUCOSE- 200 MICRON



Main functions:

- Filler & binder (water soluble)
- excellent flowability & high compactability
- Anti-caking
- humectant

INCI: Glucose

Ø particle size: 200 µm

ISO 16128: 100% natural origin

Natural origin: corn starch

Readily biodegradable



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CROSCARMELOSE



INCI: Croscarmellose
 ISO 16128: 60% natural origin
 Natural origin: wood



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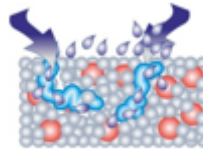


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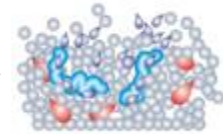
Main functions:

- Super disintegrant

Wicking Process



add water



Draw water into the tablet matrix like a wick

SODIUM CARBOXYMETHYL STARCH



INCI: Sodium Carboxymethyl Starch
 ISO 16128: 90.6% natural origin
 Natural origin: potato
 Readily biodegradable



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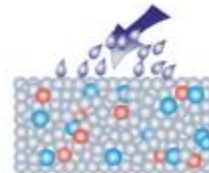


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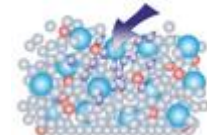
Main functions:

- Super disintegrant

Swelling Process



add water



disintegrants absorb water rapidly like a dry sponge

MAIN EXCIPIENT INGREDIENTS FOR TABLET APPLICATIONS

Main ingredients for tablets	Main Function
MCC 130 micron grade	Filler/Binder (Water insoluble)
Glucose 200 micron grade	Filler/Binder (Water soluble)
Sodium Carboxymethyl Starch	Super-Disintegrant
Croscarmellose	Super-Disintegrant

Additional products	Main Function
Sodium Stearyl Fumarate	Lubricant - Helps release of tablet from press – manufacturing efficient and aesthetics
Hydroxypropyl Methylcellulose	Coatings- protection and aesthetics



TABLET FORMULATIONS



JRS BASE FORMULATION SHAMPOO TABLET

Water free formulations are what people love right now. This JRS Base Tablet Formulation is easy to use when you want to save unnecessary wasted water or while travelling as it does not contain any water. **VIVAPUR® CS 130 FM** is a natural filler and binder and helps to compact the tablet. **VIVASTAR® CS Instant Powder** Instant Powder is stabilizing the liquid after dispersion. And **VIVASTAR® CS 40 DI** is the super-disintegrant, which is responsible for the dispersion of the tablet.

Product Name	INCI	%
Sulfopon 1216 G	Sodium Coco-Sulfate	24.0
VIVAPUR® CS 130 FM	Microcrystalline Cellulose	68.0
VIVASTAR® CS INSTANT Powder	Sodium Carboxymethyl Starch	5.0
VIVASTAR® CS 40 DI	Croscarmellose	2.0

Formulated by JRS

Process

Mix all ingredients except of the Magnesium Stearate together until it is homogenized. Then add the Magnesium Stearate.

Customer instruction

Place the JRS-Shampoo tablet in the palm of your hand. Add warm water to the palm of your hand and let the tablet rest in your palm for 4-5 seconds. The water temperature is not critical (between 20°C and 37°C). Crush the tablet gently with the fingers of your other hand. Rub the now liquid shampoo in your hands until it foams and then add it to your damp hair. Then rinse the shampoo thoroughly.

Tablet weight: 1.8 g
 Tablet diameter: 20 mm
 Tablet hardness: 70 N
 Compacting force: 10 kN

JRS BASE FORMULATION SHAMPOO TABLET

JRS Base Formulation Shampoo Tablet



JRS-TOOTH CLEANING TABLET

The easiest way to save natural resources is to avoid unnecessary water consumption. Using a tooth-cleaning tablet can save water during daily tooth brushing and is very suitable for traveling. The JRS Tooth Cleaning Tablet is perfect for this. The contained **VIVAPUR® CS 130 FM** is a natural filler and binder and helps to compact the tablet in the best possible way.

Raw Material	INCI	%
VIVAPUR® CS 130 FM	Microcrystalline Cellulose	46,0
Bicarbonate de Sodium extra fine	Sodium Bicarbonate	30,7
Sipernat 22 S	Silica	10,0
Sodium Lauroyl Glutamate	Sodium Lauroyl Glutamate	9,0
Magnesiumstearat	Magnesium Stearate	1,0
Frescolat Plus®	Menthol und Menthyl Lactate	1,3
Xanthan Gum FFCS-PC	Xanthan Gum	1,0
Stevia	Stevioside	0,5
Citric Acid Anhydrous CAA	Citric Acid	0,5

Formulated by JRS

Process:

Mix all the raw materials in a suitable mixer except of Frescolat Plus. Once everything is well mixed, add the Frescolat Plus. Mix again until everything is well blended. Then press the powder into a tablet.

Application:

Chew the tablet in your mouth and then brush your teeth with a wet toothbrush. Then rinse your mouth as usual.



PRODUCTS FOR POWDER APPLICATIONS



ACTIVE

Functional/ Performance

- Typically active material and/or surfactant / blend of surfactants
- Needs to be in powder/ granular form
- Needs to perform at around 60% of total loading
- Needs to perform (based on dose size)
- Needs to be stable in powder form

MICROCRYSTALLINE CELLULOSE



Main functions:

- Filler (water insoluble)
- excellent flowability
- Anti-caking

INCI: Microcrystalline Cellulose

Ø particle size: 130 µm

ISO 16128: 100% natural origin

Natural origin: wood

Readily biodegradable



GMO free



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COSMOS

GLUCOSE



Main functions:

- Filler (water soluble)
- excellent flowability
- Anti-caking
- humectant

INCI: Glucose

Ø particle size: 200 µm

ISO 16128: 100% natural origin

Natural origin: corn starch

Readily biodegradable



GMO free



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COSMOS

SODIUM CARBOXYMETHYL STARCH



INCI: Sodium Carboxymethyl Starch
ISO 16128: 90.6% natural origin
Natural origin: potato
Readily biodegradable



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Main functions:

- can absorb 1400% water of its own body weight
- -> creates a gel
- unique smooth skin feel

CAESALPINIA SPINOSA GUM, XANTHAN GUM



Main functions:

- Easy & quick dispersion (just by shaking)
- Instant gel builder

INCI: Caesalpinia Spinosa Gum,
Xanthan Gum

Viscosity (0,5%): ~ 30,000 mPas

ISO 16128: 100% natural origin

Natural origin: tara, polysaccharides

Readily biodegradable



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SODIUM ALGINATE



Main functions:

- Excellent film builder
- By adding Calcium ions you can increase the viscosity

INCI: Algin

Viscosity (2%): from low to high

ISO 16128: 100% natural origin

Natural origin: sea weed

Readily biodegradable



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MAIN EXCIPIENT INGREDIENTS FORT POWDER

JRS main ingredients for powders	Main Function
Microcrystalline Cellulose 130 micro grade	Filler (Water insoluble), Anti-caking
Glucose- 200 micron grade	Filler (Water soluble), Anti-caking, humectant
Sodium Carboxymethyl Starch	Swelling agent / Gel former
Caeselpinia Spinosa & Xanthan Gum	Instant Gel former
Sodium Alginate	Film former/ thickener



POWDER FORMULATIONS



BASE FORMULATION FOR MULTI-DOSE POWDER

The formulation is a powder mixture of different ingredients to generate a smooth liquid formulation when getting in contact with water. **VIVASTAR® CS 200 Glucose** is used as a water-soluble filler and binder, which easily disperse when water is added. **VIVASTAR® CS 3005 XV** helps the powder to generate the gel, as it is a thickener, which is easy and quick to disperse.

Product Name	INCI	%
VIVASTAR® CS 200 Glucose	Glucose	37.0
Amisoft® MS-11	Sodium Myristoyl Glutamate	24.7
Jordapon® SCI Powder	Sodium Cocoyl Isethionate	18.5
Glycerine	Glycerin	9.9
VIVASTAR® CS 3005 XV	Caesalpinia Spinosa Gum, Xanthan Gum	9.9

Formulated by JRS

Process

Mix all powder ingredients together until it is homogenously mixed.

Customer Instruction

Add 4g of the Multidose Powder made by JRS to 50ml of tab water in a closed container. Shake the mixture for 3-5 seconds. The formulation has now increased its volume up to 200 ml.

Multidose Wash Powder

Product Name	INCI	%
VIVASTAR CS 200 GLUCOSE	Glucose	37
Amisoft CS-11	Sodium Cocoyl Glutamate	21
Lathanol LAL Coarse	Sodium Lauryl Sulfoacetate	18.5
	Propanediol	9.9
VIVASTAR CS 3005 XV	Caesalpina Spinosa Gum, Xanthan Gum	9.9
	Sodium benzoate	2.5
	Potassium sorbate	0.6

Multidose Shampoo Powder

Product Name	INCI	%
VIVASTAR CS 200 GLUCOSE	Glucose	35
Amisoft CS-11	Sodium Cocoyl Glutamate	21
Jordapon SCI Powder	Sodium Cocoyl Isethionate	18.5
	Propanediol	9.9
VIVASTAR CS 3005 XV	Caesalpina Spinosa Gum, Xanthan Gum	9.9
	Sodium benzoate	2.5
	Potassium sorbate	0.6
	Sodium Dehydroacetate	0.6
	Parfum	0.2
Silk protein	Aqua, Propylene glycol, Hydrolyzed Silk	0.5
Niacinamide	Niacinamide	1.0
BIOCHEMICA BIOVERA 200X ALOE	Aloe Barbadensis Leaf Juice	0.3

BASE FORMULATION FOR MULTI-DOSE POWDER



BAKING SODA POWDER INSTANT CLEANSER

Baking Soda within in all kind of dry cleansing products is what people love right now. You just need to shate the powder mix with water and massage it onto your skin. After that, just wash it off.

VIVASTAR® CS INSTANT Powder, our water soluble starch product, serves as water binding and creamy thickener.

VIVASTAR® CS 130 FM, our Microcrystalline Cellulose, provides anticaking and absorption of oily skin particles.

Phase	Product Name	INCI	Functions	%
A	Sodium Bicarbonate Powder, Novacarb	Sodium Bicarbonate	Abrasive, Effervescent Agent	62.3
	BergaSoft SCI 80 Powder, Berg+Schmidt	Sodium Cocoyl Isethionate	Cleansing	12.0
	Citric Acid, Anhydrous, Jungbunzlauer	Citric Acid	Effervescent Agent	11.5
	VIVASTAR® CS INSTANT Powder	Sodium Carboxymethyl Starch	Water binding, Instant Effect, Creamy Touch, Thickener	5.7
	VIVASTAR® CS 130 FM	Microcrystalline Cellulose	Anticaking, Humidity Absorption, Flowability	5.5
	Trisodium Citrate, Anhydrous, Jungbunzlauer	Sodium Citrate	Buffering	2.0
	D-Panthenol USP, BASF	Panthenol	Skin Conditioning	0.5
	Hydra 233971, Symrise	Parfume	Perfume	0.3
	Sipernate 22S, EVONIK	Silica	Anticaking	0.1
	Frescolate Plus, Symrise	Menthol, Menthyl Lactate	Refreshing	0.1

Formulated by JRS, Germany

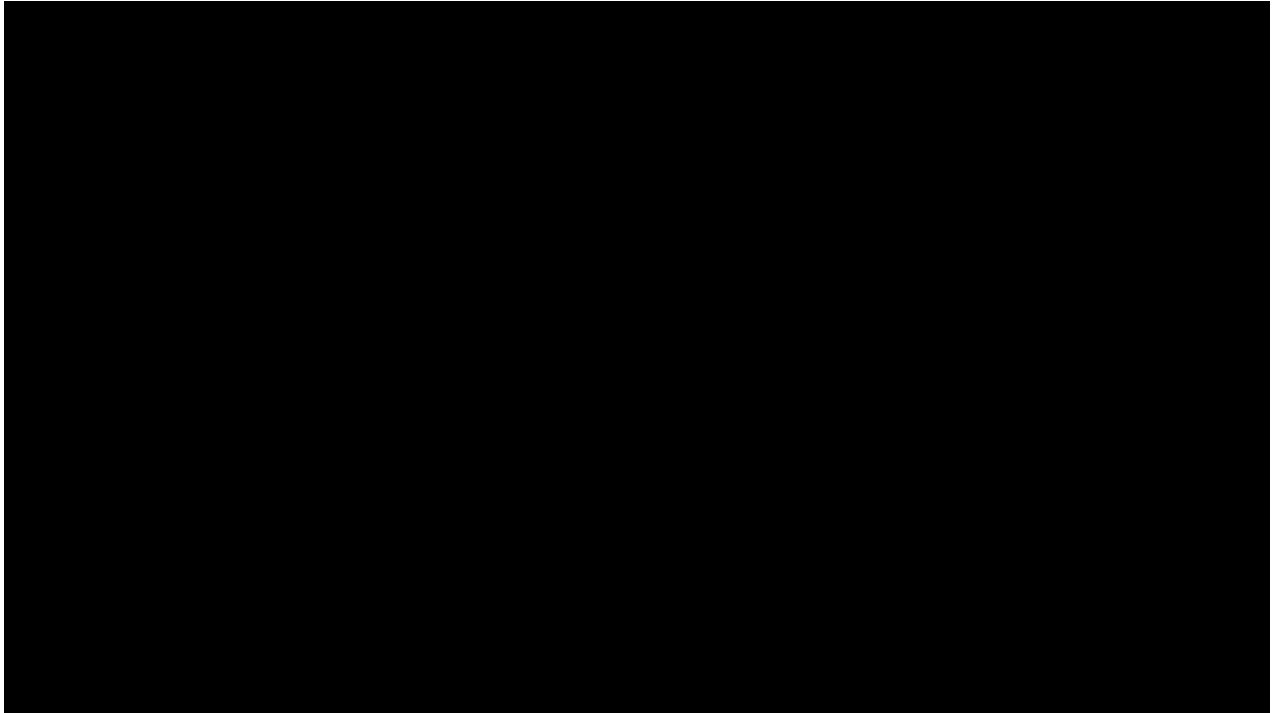
Process

Mix Sodium Bicarbonate **VIVASTAR®** and **VIVAPUR®** in a suitable mixer.

Then add step by step slowly under mixing Panthenol, Parfume, Frescolat and mix thoroughly until homogenous (at least 10 min).

Then add BergaSoft, Citric Acid, **VIVASTAR®**, Sodium Citrate, Silica nd mix for 5 min.

BAKING SODA POWDER INSTANT CLEANSER



CHARCOAL RUBBER MASK

SKC179.19.58

Phase	Product Name	INCI	Functions	%
A	VIVASTAR® CS 200 Glucose	Glucose	Humectant	58.70
	MEARLMICA® FF	Mica	Filler	8.00
	VIVASTAR® CS 002 Alginate	Algin	Rheology modifier	12.00
	SULFATE CALCIUM E516 SUPERFINE (Quaron)	Calcium Sulfate	Activator	13.00
	TETRASODIUM PYROPHOSPHATE (Adetis)	Tetrasodium Pyrophosphate	Chelate	1.00
	VIVASTAR® CS INSTANT Powder	Sodium Carboxymethyl Starch	Rheology modifier	1.00
	B	GEMTONE® MOONSTONE G004	Mica (and) Titanium Dioxide (and) Iron Oxides	Nacre
VIVAPUR® CS 150 Charcoal		Microcrystalline Cellulose (and) Cellulose (and) Charcoal Powder	Exfoliant	4.00
C	PARFUM COSMOS EXCESS (Robertet)	Parfum	Parfum	0.30

Formulated by AMI

Natural origin with water in formulation: 99.90 %

Process

Homogenize phase A with a mixer. Introduce phase B and then phase C and also homogenize with a mixer.



Application

Add 1/3 of powder to 2/3 of water and mix with a whisk until you obtain a homogeneous paste. Then apply in a thick layer and let dry for 15 minutes.



PRODUCTS FOR BAR APPLICATIONS



ACTIVE

Functional/ Performance

- Typically active material and/or surfactant / blend of surfactants
- Needs to be in powder/ granular form
- Needs to perform at between 60-95% of total loading (depending on type of bar (melt and pour/ extruded etc).
- Needs to perform based on bar use- instantly soluble etc.
- Needs to be stable in bar form

CELLULOSE



Main functions:

- Anti-cracking
- Strengthening
- Carrier for oil & perfums

INCI: Cellulose

Ø particle size: 20 µm

ISO 16128: 100% natural origin

Natural origin: wood

Readily biodegradable



GMO free



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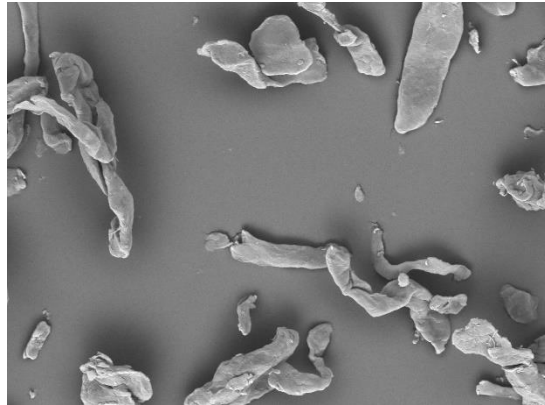
Halal



NATRUE



Approved by
ECOCERT
RAW MATERIAL
ECOCERT/
COSMOS



CELLULOSE- FROM OAT



INCI: Cellulose
 Ø particle size: 30 µm
 ISO 16128: 100% natural origin
 Natural origin: oat straw
 Readily biodegradable



GMO free



vegan



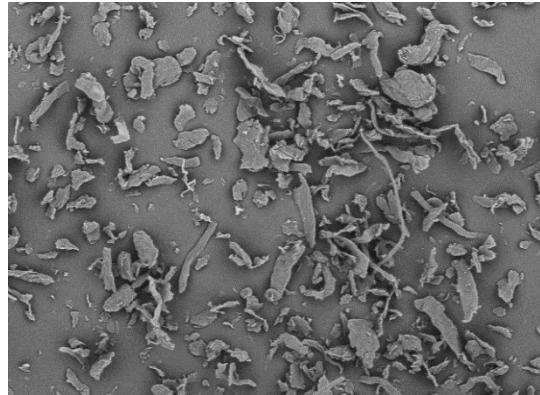
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Main functions:

- Anti-cracking
- Strengthening
- Carrier for oil & perfumes
- Upcycling



MAIN EXCIPIENT INGREDIENTS FOR BARS

JRS Main Ingredients for Bars	Main Function
Cellulose- 20 micron fibre	Anti-cracking, strengthening, carrier
Cellulose from Oat (upcycled)- 30 micron fibre	Anti-cracking, strengthening, upcycling
*Many more for Melt and Pour types	



BAR FORMULATIONS



SHAMPOO BAR

Phase	Product	INCI	Function	%
A	Cetearyl Alcohol	Cetearyl Alcohol	Emollient	20.9
	Cocamidopropyl betaine	Cocamidopropyl betaine	Surfactant	4
	Shea butter	Butyrospermum Parkii Butter	Emollient	7
	Sorbitan Olivat	Sorbitan Olivat	Emulsifier	5
	Vitamin E	Tocopherol	Active	0.8
B	D Panthenol	Panthenol & Aqua	Active	0.8
	Zemea	Propanediol	Humectant	2
C	Amisafe AL 01	Lauroyl Arginine	Conditioning	0.8
	Plantarem 2000 N UP	Decyl Glucoside	Surfactant	10
D	Amisoft MS 11	Sodium Myristoyl Glutamate	Surfactant	20
	Texapon ZACD	Sodium Lauryl Sulfate	Surfactant	20
	VITACEL® CS 20 FC	Cellulose	Strengthening Anti-cracking Absorbing agent	5
E	Preservative	DMDM Hydantoin	Preservative	0.7
	Glycerin	Glycerin	Humectant	1
	Fragrance	Perfume	Perfume	2



Add the ingredients of the phase A to a container and heat up to 80° C. Heat phase C to 80° C and homogenize. In a separate container mix the ingredients of phase B, then add with the ingredients of the ingredients of phase C and homogenize well. Add phase B/C to the ingredients of phase A and homogenize. Add the ingredients of phase D to the other ingredients and homogenize well. Add the ingredients of phase E one by one and homogenize well with each addition. Place in a mold.

CONDITIONING BAR

Phase	Product	INCI	Function	%
A	Cetearyl Alcohol	Cetearyl Alcohol	Emollient	28
	Ceteareth 20	Ceteareth 20	Emulsifier	2.5
	Carnauba wax	Copernicia Cerifera	Emollient	4
	Shea butter	Butyrospermum Parkii Butter	Emollient	17
	Sorbitan olivate	Sorbitan Oliviate	Emulsifier	10
B	Vitamin E	Tocopherol	Active	0.8
	D Panthenol	Panthenol & Aqua	Active	2
	Glycerin	Glycerin	Humectant	3
	Amisafe AL 01	Lauroyl Arginine	Conditioning	5
	Grape seed oil	Vitis Vinifera Seed Oil	Emollient	10
C	Corn starch	Zea Mays	Absorbing agent	10
	VITACEL® CS 20 FC	Cellulose	Strengthening Anti-cracking Absorbing agent	5
D	Preservative	DMDM Hydantoin	Preservative	0.7
	Perfume	Perfume	Perfume	2



Add the ingredients from phase A into a container and heat up to 80° C.
 After complete homogenization of the ingredients of phase A, add one by one the ingredients of phase B under stirring. In a separate container mix the ingredients of phase D, then add the previous mixture and homogenize. Under stirring add Phase C. Place in a mold and wait until completely cool to remove from the mold.

Don't forget:
perfume
preservatives
colours
Additional Actives



The Future



- Development of powder/ solid raw material grades
- Development of new manufacturing techniques for water-free products
- Continued move towards solid formats
- Innovations in packaging
- Quality and performance characteristics will match those of liquid countertypes
- Continued demand for water –free formats





Fibers for Life.



CONTACT

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