

Some Insights

Preface

The study uses trade indicators to analyse merchandise export and import data in a way that should be useful for the purpose of policy. The indicators provide a glimpse of the trade patterns of the world and the performance of India in comparison to various other countries. They have been used in the case of India's exports of **Household Glassware and Household Aluminium Articles** and imports of **Tubes or Pipes and Fittings of Nickel and Prepared Culture Media for Micro-Organisms Dvlpmnt** to indicate the possible directions policy may take.

The data used in this study has been sourced from the Export Import Data Bank of the DGCI&S, Department of Commerce, and Government of India and from the United Nations Comtrade Database. Introduction notes of each commodities has been sourced from the various sights –viz Wikipedia, Britannica, The Economic Times etc.

Computations are based on data at ITC-HS four-digit level (ITC-HS Code-7013 & 7615 for export and 7507 & 3821 for import) and the latest finalized data available on the UN Comtrade Database up to year 2021 and on the DGCI&S Database up to December'2022. So, trends from 2018 to 2021 have been shown when we extract the data from UN Comtrade and from 2018 to 2021 have been shown when we extract the data from DGCIS Data base.

In this report, we will see various analysis and aspects of India's Precious as well as International export trade of Household Glassware and Household Aluminium Articles and imports of Tubes or Pipes and Fittings of Nickel and Prepared Culture Media for Micro-Organisms Dvlpmnt. We will use both the 4 digit Commodity codes.

Trends in India's as well as International Trade i.e. Exports and Imports of above four Commodities are given below in different tables :

- Table 1 : India's top 10 Export destination of Household Glassware with their shares in percentage.
- Table 2 : World's top 10 Exporters of Household Glassware with their shares in percentage.
- Table 3 : World's top 10 Importers of Household Glassware with their shares in percentage.
- Annex- I : Top 3 sources of Household Glassware of World's top 3 Importers.
- Table 4 : India's top 10 destination of Household Aluminium Articles with their shares in percentage.
- Table 5 : World's top 10 Exporters of Household Aluminium Articles with their shares in percentage.
- Table 6 : World's top 10 Importers of Household Aluminium Articles with their shares in percentage.
- Annex-II : Top 3 sources of Household Aluminium Articles of World's top 3 Importers.
- Table 7 : India's top10 Sources of Tubes or Pipes and Fittings of Nickel with their shares in percentage.
- Table 8 : World's top 10 Importers of Tubes or Pipes and Fittings of Nickel with their shares in percentage.
- Table 9 : India's top 10 Sources of Prepared Culture Media for Micro-Organisms Dvlpmnt with their shares in percentage.
- Table 10 : World's top 10 Importers of Prepared Culture Media for Micro-Organisms Dvlpmnt with their shares in percentage.

EXPORT

Household Glassware

Glass is an organic solid material that is usually translucent or transparent to the natural elements. It is an amorphous solid. It is most often formed by the rapid cooling of the molten form : some classes such as volcanic glass are naturally occurring . It is made from abundant and natural raw materials that are melted of very high temperatures to form a new material.

It is one of the versatile and oldest human created tools by man. It is defined as objects or containers made from glass Scientifically, every solid with a non-crystalline amorphous structure which exhibits a glass transition when heated towards the liquid state is called glass. Glassware is manufactured from opaque sand but is completely transparent. It is widely used in various fields like decorative, laboratories, technological usage, and household products. Production of glassware involves two main methods.

Glass is an amorphous (with properties similar to solid and liquids) ceramic material. It is found in nature on rare occasions, so humans have been producing it on their own for many years. The first manufacture of glass as we know it dates from times close to the year 2000 B.C.E. The Egyptians and Mesopotamians were the forerunners in its development, and later the Romans were the ones who promoted the manufacture of this material.

Since then, it has been used for a myriad of manufactured and consumed items for everyday life, from jewellery and decorative objects to massive structures built almost entirely from glass. Manufactured glass is used in many ways. Its main uses lie in windows, lenses, bottles, screens, and many other products that incorporate it. Depending on its components and the use to which it will be manufactured, there are different types of glass.

The properties of glass can be divided into physical, chemical, mechanical, thermal, and optical. Glass is a solid inorganic material that is both hard (even when is very thin) and brittle (in case of being lightly hit). It is considered an amorphous solid since in its composition there is no regular distribution of atoms, ions, and molecules. This differentiates it from crystalline solids that do contain atoms, ions, and molecules that are repeated in an orderly and periodic manner in all directions.

Regarding its physical properties, some glasses need a temperature of 650°C (1202°F) to melt and others need up to 1650°C (3002°F). Its average density is 2500kg/m³ but varies depending on the type of materials that make up the different types of glass. Its relative density ranges from 2 to 8 times the density of water, which makes it sometimes lighter than aluminium (relative density 2.7) but sometimes heavier than steel (relative density 7.85). Glass is malleable material through different methods that allow a different finish to be achieved, such as tempered, annealed, thermo-acoustic, armoured, laminated glass, among others. The texture it obtains varies depending on the melting process and the materials with which it is made.

The list of glassware includes drinking vessels (drinkware) and tableware used to set a table for eating a meal, general glass items such as vases, and glasses used in the catering industry. It does not include laboratory glassware.

Drinkware, beverage ware (in other words, cups) is a general term for a vessel intended to contain beverages or liquid foods for drinking or consumption. Following are the example of household Glassware :

Beaker Beer glassware, Bottle, Coffee cup, Cup, Dwarf ale glass, Heavy baluster glass, Jar, Mazagran, Mug, Pythagorean cup, Quaich, Sake cup (*ochoko*), Stemware, Tazza, Teacup, Trembleuse,, Tumblers, Vitrolero

These are broadly classified under **H.S. Code-7013**.

Table - 1

India's Top 10 destination of Household Glassware (H.S Code-7013)

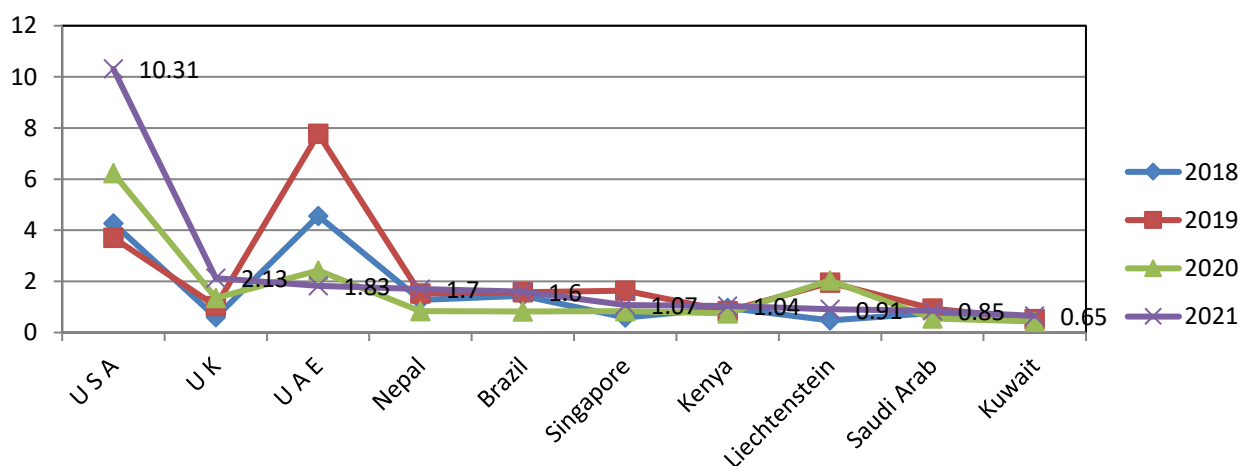
Rank	Countries	2018		2019		2020		2021	
		Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	U S A	4.27	14.52	3.71	9.25	6.23	27.55	10.31	32.49
2.	U K	0.60	2.04	1.04	2.60	1.35	5.98	2.13	6.70
3.	U A E	4.56	15.51	7.77	19.35	2.43	10.77	1.83	5.77
4.	Nepal	1.27	4.32	1.53	3.81	0.84	3.73	1.70	5.36
5.	Brazil	1.44	4.92	1.58	3.93	0.83	3.67	1.60	5.05
6.	Singapore	0.59	2.00	1.64	4.08	0.84	3.71	1.07	3.36
7.	Kenya	0.96	3.26	0.84	2.09	0.75	3.30	1.04	3.27
8.	Liechtenstein	0.47	1.59	1.95	4.87	2.04	9.02	0.91	2.88
9.	Saudi Arab	0.76	2.59	0.94	2.35	0.55	2.45	0.85	2.69
10.	Kuwait	0.46	1.56	0.53	1.32	0.43	1.90	0.65	2.06
	Others	14.02	47.69	18.61	46.36	6.31	27.92	9.64	30.37
	Total	29.39	100	40.16	100	22.61	100	31.74	100

Source: DGCI&S.

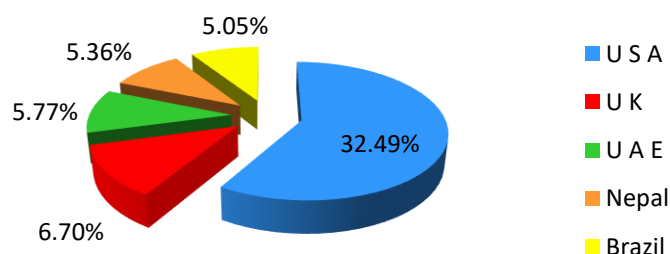
Note : India's Export including re-export

Leading importers of Household Glassware from India from 2018-2021(Values in million USD)

Data label given on the basis of 2021



India's top 5 destinations of Household Glassware by percentage India in 2021:



India Household Glassware exports to the world worth US \$ 31.74 million in 2021 while it was US \$ 22.61 million in 2020. In 2021 India export of Household Glassware is increased by 40.38% in value from 2020. India's Household Glassware export worth to USA is around US \$ 10.31 Million, which holds the top position with the share of 32.49% of the total. With the share of 6.70% , UK takes runner up position in the global importers of Household Glassware, which was followed by UAE with 5.77% share of India's export of Household Glassware.

Table-2

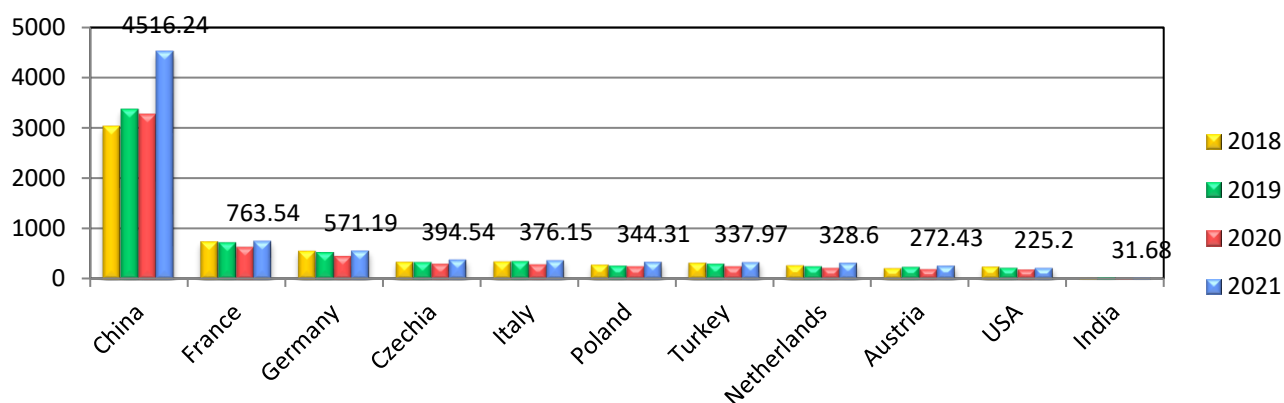
World's Top 10 exporter of Household Glassware (H.S Code-7013)

Rank	Countries	2018		2019		2020		2021	
		Value (million \$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	China	3026.75	35.18	3360.87	38.95	3269.13	42.23	4516.24	44.62
2.	France	751.42	8.73	727.38	8.43	643.42	8.31	763.54	7.54
3.	Germany	562.90	6.54	541.74	6.28	459.52	5.94	571.19	5.64
4.	Czechia	349.80	4.07	343.44	3.98	310.76	4.01	394.54	3.90
5.	Italy	351.43	4.08	362.64	4.20	298.88	3.86	376.15	3.72
6.	Poland	290.20	3.37	272.09	3.15	258.94	3.34	344.31	3.40
7.	Turkey	326.99	3.80	307.34	3.56	259.48	3.35	337.97	3.34
8.	Netherlands	276.81	3.22	259.66	3.01	228.16	2.95	328.60	3.25
9.	Austria	218.13	2.54	243.60	2.82	203.60	2.63	272.43	2.69
10.	USA	251.11	2.92	225.64	2.62	193.24	2.50	225.20	2.23
31.	India	29.54	0.34	39.94	0.46	22.55	0.29	31.68	0.31
	Others	2169.00	25.21	1944.36	22.53	1594.04	20.59	1958.58	19.35
	Total	8604.07	100	8628.71	100	7741.71	100	10120.44	100

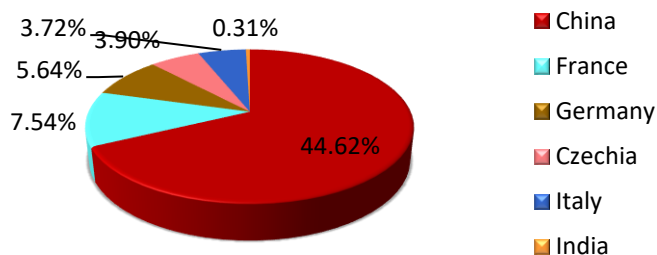
Source: UN Comtrade

World's Leading Exporters of Household Glassware from 2018 to 2021 (Values in million USD)

Data label given on the basis of 2021



Country wise world's top 5 exporter of Household Glassware by percentage in 2021 :



China was the world's leading exporter of Household Glassware as of 2021, with the country's exports amounting to a 44.62% share of worldwide Household Glassware exports, at a value of US \$ 4.51 billion. In a distant second and third place that year were France and Germany, accounting for a 7.54% and 5.64% share of global Household Glassware exports respectively. In the same year India has exported only 0.31% share of Household Glassware of total world export. In 2021 total global export of Household Glassware worth was US \$ 10.12 Billion which was almost 31% more than the year 2020.

Table-3

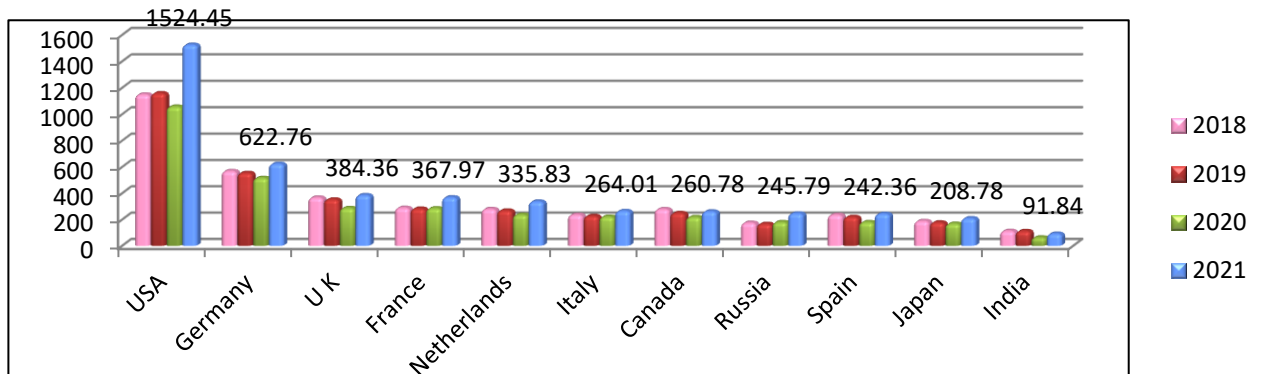
World's top 10 Importers of Household Glassware (H.S Code-7013)

Rank	Countries	2018		2019		2020		2021	
		Value (million \$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	USA	1148.39	14.93	1158.11	15.49	1056.48	16.13	1524.45	17.80
2.	Germany	567.97	7.39	553.36	7.40	515.54	7.87	622.76	7.27
3.	U K	366.35	4.76	352.02	4.71	286.67	4.38	384.36	4.49
4.	France	288.26	3.75	281.85	3.77	284.87	4.35	367.97	4.30
5.	Netherlands	279.30	3.63	267.76	3.58	235.87	3.60	335.83	3.92
6.	Italy	235.66	3.06	225.91	3.02	220.33	3.36	264.01	3.08
7.	Canada	278.50	3.62	248.63	3.33	217.91	3.33	260.78	3.05
8.	Russia	174.55	2.27	166.01	2.22	179.64	2.74	245.79	2.87
9.	Spain	235.23	3.06	219.07	2.93	179.24	2.74	242.36	2.83
10.	Japan	188.08	2.45	177.24	2.37	167.89	2.56	208.78	2.44
25.	India	112.85	1.47	111.80	1.50	62.51	0.95	91.84	1.07
	Others	3815.43	49.61	3715.49	49.69	3144.50	48.00	4014.18	46.88
	Total	7690.57	100	7477.25	100	6551.44	100	8563.12	100

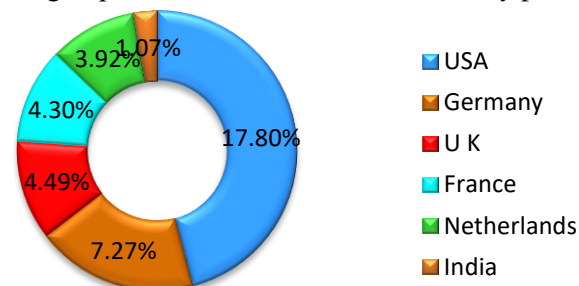
Source : UN Comtrade

Leading Household Glassware importers of world from 2018 to 2021 (Values in million USD)

Data label given on the basis of 2021



Country wise world's leading importers of Household Glassware by percentage in 2021

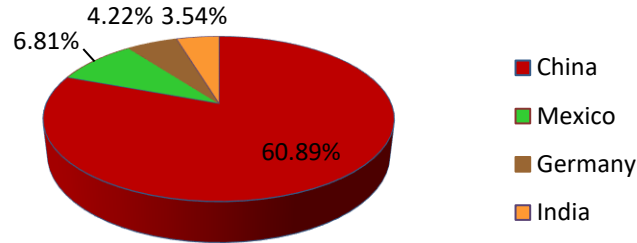


Global purchases of imported Household Glassware cost a total US \$ 8.56 Billion in 2021. In that year, imported of the commodity appreciated by 30.68% from 2020. USA consumed the highest dollar worth of imported Household Glassware during 2021 with purchases valued at US \$ 1.52 Billion or 17.80% of the world total. In second and third place were Germany and UK at 7.27% and 4.49% of globally imported of Household Glassware in 2021. In same year **India** holds the 25th largest importing country of Household Glassware import in the world with 1.07% share of world import.

Annexure-1

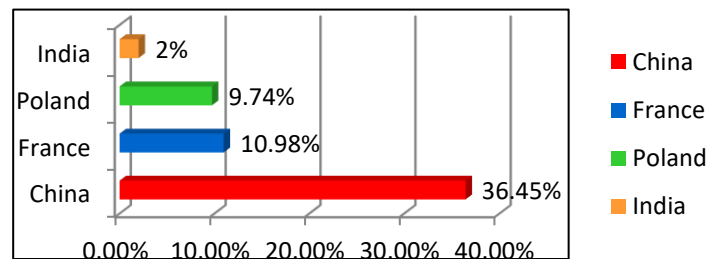
Sources of world's top 3 importers of Household Glassware (H.S Code-7013)

i) Top 3 Sources of Household Glassware to USA in 2021 by percentage:



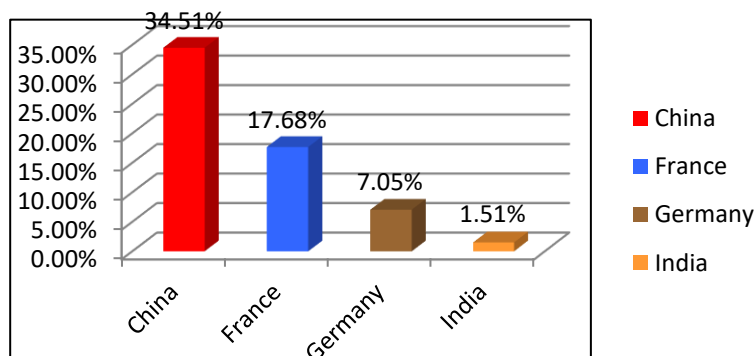
USA imports most of its requirements of Household Glassware from China with 60.89 % share of USA's total import in 2021, from Mexico with 6.81% and from Germany 4.22%. **India** exports 3.54% share USA's total import of Household Glassware in 2021. (Source : UN Comtrade)

ii) Top 3 Sources of Household Glassware to Germany in 2021 by percentage:



20.98% share of Household Glassware Imports by Germany in 2021 from China, Which was followed by France (10.98%) and Poland (9.74%). In that year India has exported 2% share of Household Glassware to Germany **Source : UN Comtrade**)

iii) Top 3 Sources of Household Glassware to UK in 2021 by percentage:



UK's 3 major source countries of Household Glassware in 2021 were China (34.51 %), France (17.68%) and Germany (7.05%). In the same year **India** has exported only 1.59 % share of Household Glassware to UK. (Source: UN Comtrade)

Household aluminium Articles

Aluminium has a broad range of physical and chemical properties and so it is called magical metal. It has low weight, around one-third wt. of iron. It is malleable and ductile. So it can be drawn into wires and beaten into sheets. It is corrosion-resistant. It is a good thermal and electrical conductor.

The main point to be noted is that aluminium is a highly reactive element and still it is used for making cooking utensils. The reason is that aluminium has a very high affinity for oxygen. So, it reacts with oxygen and forms a layer of aluminium oxide on its surface. Due to this layer, no reaction can occur further as the reactants are not able to make contact with aluminium. -The benefits of using aluminium are- High strength, less weight, high durability, good malleability and ductility, odourless, good conductivity and non-combustibility. Also, it can completely be recycled without losing its true natural properties. So, it can efficiently be used in all the industries.

For cooking, we need a metal which remains stable even at high temperature. It means that the metal should have a high melting point else it would not be able to retain its shape on heating. Also, if the food can be cooked without much heat loss, then it is more convenient. So, the metal should have good thermal conductivity for that purpose.

Aluminium is the third most abundant element present on earth. It is used in industries like architectural, transportational, consumer goods and electrical industries. It also has low density. It is also used as heat sinks in electrical appliances.

This is hardly a family in India where glittering aluminium utensils occupy significant place. Aluminium utensils of domestic use are of three broad categories- (1) cooking food, (2) storing and service utensil, (3) Table pot and utensils are used for eating food and drinking water, tea, coffee, milk and juice. Aluminium utensils are longer lasting; require less maintenance costs, these are light and hence handy, unbreakable, economical and attractive in appearance. The cooking range of aluminium utensil is fuel saving due to their high thermal conductivity. There is no contamination of any kind when food stuffs are cooked held or eaten in aluminium utensils. These entire extra qualities make aluminium utensil are highly acceptable for poor and middle class family of developing countries. Apart from indigenous vast market the aluminium utensil have an international market too. There is a great export potential for such product in many developing or developed countries. As a result of govt. policy in India has reached a level will not have to depend on import of raw materials. Since aluminium production from indigenous sources is sufficient to cater the industrial requirements. Thus aluminium related industries have good export potential. Since the demand of aluminium utensil is good, so there is wide scope for new entrepreneurs to venture into this field.

In our daily life, many of us cook in aluminium pans, drink water from aluminium bottles, and wrap food in aluminium foil. This metal is a part of our everyday life. There have been several research which highlight the part that using aluminium cookware in our daily life can pose a dangerous risk to our life.

When we cook in aluminium utensils, it reacts with acidic foods like vinegar, tomato, and even lime which makes the aluminium ions dissolve in the food. This can further lead to an excess of aluminium in the food, which can further cause health issues in our bodies. It is for this reason that aluminium food is unsuited for cooking acidic dishes.

These are broadly classified under H.S. Code-**7615**

Table - 4

India's Top 10 destination of Household Aluminium Articles (H.S Code-7615)

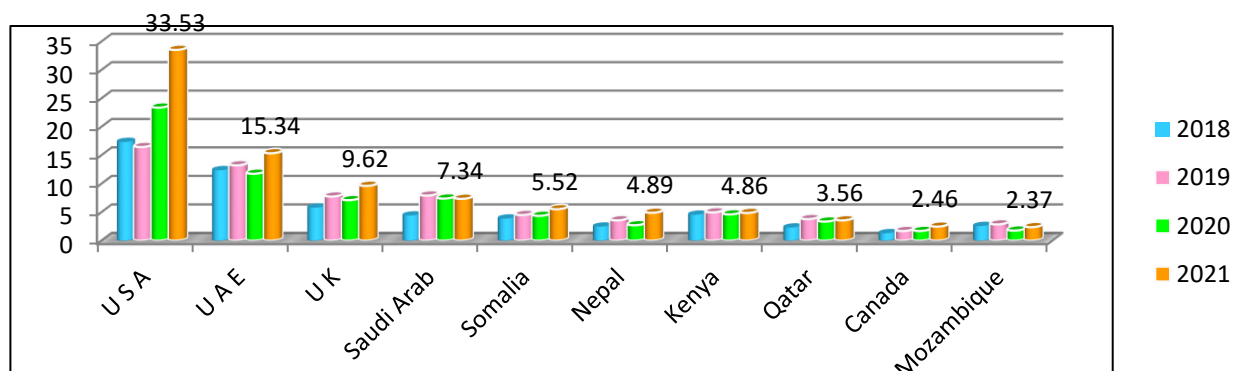
Rank	Countries	2018		2019		2020		2021	
		Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	U S A	17.31	21.35	16.43	17.57	23.37	25.30	33.53	26.14
2.	U A E	12.35	15.24	13.22	14.13	11.74	12.71	15.34	11.96
3.	U K	5.78	7.12	7.74	8.27	7.11	7.70	9.62	7.50
4.	Saudi Arab	4.40	5.43	7.91	8.46	7.39	8.01	7.34	5.73
5.	Somalia	3.86	4.76	4.50	4.81	4.36	4.72	5.52	4.31
6.	Nepal	2.45	3.02	3.57	3.82	2.70	2.92	4.89	3.81
7.	Kenya	4.54	5.60	4.96	5.30	4.61	4.99	4.86	3.79
8.	Qatar	2.29	2.83	3.78	4.04	3.35	3.62	3.56	2.78
9.	Canada	1.29	1.59	1.69	1.80	1.70	1.84	2.46	1.92
10.	Mozambique	2.55	3.14	2.85	3.04	1.77	1.91	2.37	1.85
	Others	24.26	29.92	26.89	28.75	24.26	26.27	38.77	30.23
	Total	81.08	100	93.53	100	92.36	100	128.27	100

Source: DGCI&S

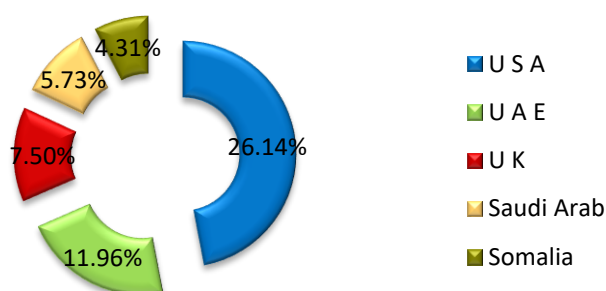
Note : India's Export including re-export

India's major destination Household Aluminium Articles from 2018-2021(Values in million USD)

Data label given on the basis of 2021



India's top 5 destinations of Aluminium Articles by percentage in 2021:



In 2021 the export of Household Aluminium Articles from India were valued at US \$ 128.27 Million. Year over year, the value of Household Aluminium Foil export from India rose by 38.88% from 2020 to 2021. The export reached an all time high of US \$ 128.27 Million during the year 2021. India's Household Aluminium Articles export value to USA is around US \$ 33.53 million, which holds the top position with the share of 26.14% of the total export from India. With the value of US \$ 15.34 million, United Arab Emirates takes runner up position in the global importers of Household Aluminium Articles. Which was followed by the UK with the value of US \$ 9.62 million.

Table - 5

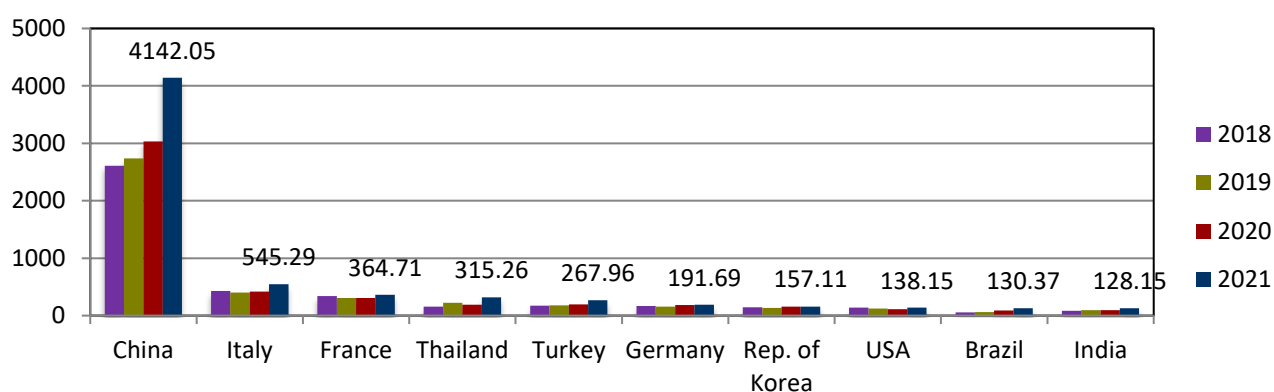
World's Top exporters of Household Aluminium Articles (H.S Code-7615)

Rank	Countries	2018		2019		2020		2021	
		Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	China	2610.60	50.63	2737.74	51.83	3029.88	52.71	4142.05	54.72
2.	Italy	427.07	8.28	401.66	7.60	415.74	7.23	545.29	7.20
3.	France	337.44	6.54	308.44	5.84	308.34	5.36	364.71	4.82
4.	Thailand	155.08	3.01	224.17	4.24	191.62	3.33	315.26	4.17
5.	Turkey	172.71	3.35	179.02	3.39	196.02	3.41	267.96	3.54
6.	Germany	166.10	3.22	158.27	3.00	182.25	3.17	191.69	2.53
7.	Rep. of Korea	146.24	2.84	135.73	2.57	155.71	2.71	157.11	2.08
8.	USA	139.75	2.71	123.86	2.34	111.05	1.93	138.15	1.83
9.	Brazil	57.17	1.11	62.37	1.18	90.33	1.57	130.37	1.72
10.	India	81.24	1.58	93.41	1.77	92.31	1.61	128.15	1.69
	Others	862.97	16.74	857.52	16.23	975.11	16.96	1188.34	15.70
	Total	5156.37	100	5282.18	100	5748.37	100	7569.08	100

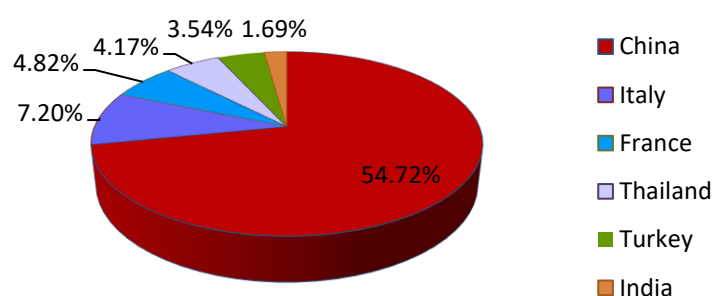
Source: UN Comtrade

Top world exporters of Household Aluminium Articles from 2018 to 2021 (Values in million USD)

Data label given on the basis of 2021



Export trends in world's leading Household Aluminium Articles exporters by percentage in 2021:



In 2021 total export of Household Aluminium Articles was US \$7.56 Billion. Between 2020 and 2021 the exports of Household Aluminium Articles increased by nearly 31.70%, from US \$ 5.74 Billion in 2020 to US \$ 7.56 Billion in 2021. In 2021 China was the top country by Household Aluminium Articles export in the world, exported US \$ 4.14 Billion that accounts for 54.72% of the world export. Italy and France were the 2nd and 3rd largest export of the commodity group in 2021. **India** constituted the 10th position in ranking of world export of Household Aluminium Articles, exported 1.69% share of world.

Table - 6

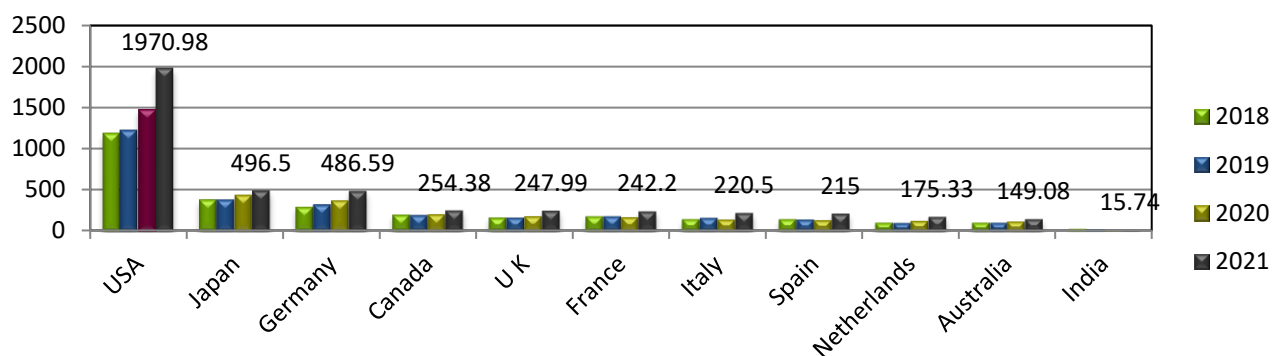
World's Top 10 Importers of Household Aluminium Articles (H.S Code-7615)

Rank	Countries	2018		2019		2020		2021	
		Value (million \$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	USA	1187.17	23.65	1223.40	23.81	1480.52	27.30	1970.98	27.40
2.	Japan	384.90	7.67	385.99	7.51	431.55	7.96	496.50	6.90
3.	Germany	293.97	5.86	325.03	6.33	366.66	6.76	486.59	6.76
4.	Canada	201.72	4.02	196.18	3.82	202.80	3.74	254.38	3.54
5.	U K	167.70	3.34	165.26	3.22	176.86	3.26	247.99	3.45
6.	France	183.23	3.65	181.21	3.53	166.34	3.07	242.20	3.37
7.	Italy	148.04	2.95	164.10	3.19	139.08	2.57	220.50	3.07
8.	Spain	145.51	2.90	143.29	2.79	133.19	2.46	215.00	2.99
9.	Netherlands	104.15	2.07	100.20	1.95	124.57	2.30	175.33	2.44
10.	Australia	102.83	2.05	103.24	2.01	114.49	2.11	149.08	2.07
57.	India	28.46	0.57	20.88	0.41	9.01	0.17	15.74	0.22
	Others	2072.94	41.29	2128.96	41.44	2077.12	38.31	2719.09	37.80
	Total	5020.61	100	5137.74	100	5422.19	100	7193.39	100

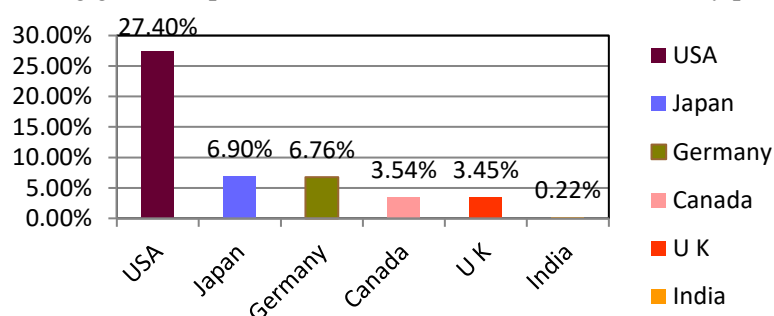
Source :UN Comtrade

Top world importers of Household Aluminium Articles from 2018 to 2021 (Values in million USD)

Data label given on the basis of 2021



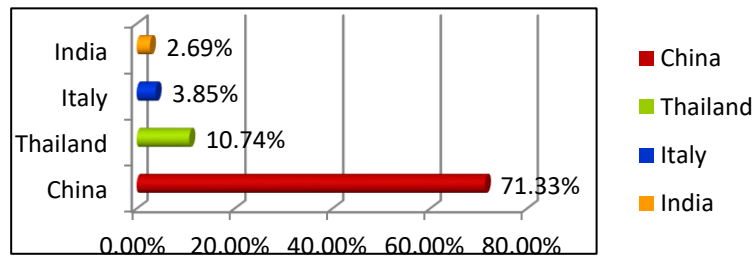
Country wise leading global Importer of Household Aluminium Articles by percentage in 2021



In the year 2021 total global import of Household Aluminium Articles was US \$ 7.19 Billion which was increased by 32.65% from 2020. The USA imported US \$ 1.97 billion worth of Household Aluminium Articles in 2021, making it the leading importer of Household Aluminium Articles worldwide that year. Japan followed in second place, importing US \$ 496.50 billion worth of the commodity and Germany stood at 3rd position in ranking in world largest importers Household Aluminium Articles, imported 6.76% of world import. The import value of Household Aluminium Articles into India amounted to US \$ 15.74 million in the year 2021.

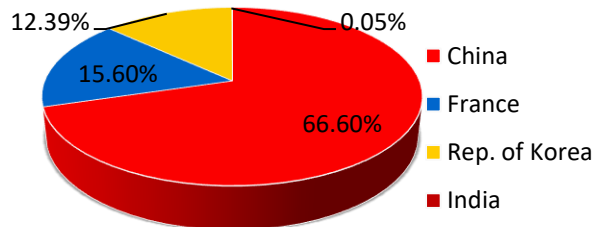
Sources of world's top three importers of Household Aluminium Articles (H.S Code-7615)

i) Top 3 Sources of Household Aluminium Articles to USA in 2021 by percentage:



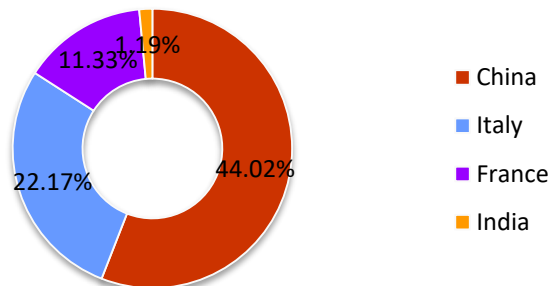
USA's source most of its Household Aluminium Articles came from China with 71.33% share of its import of the commodity in 2021. Which was distantly followed by Thailand (10.74%) and Italy (3.85%). **India** constituted good source of USA's import of Household Aluminium Articles, exported US \$ 2.69% share of USA's total import in 2021. (Source: UN Comtrade)

ii) Top 3 Sources of Household Aluminium Articles to Japan in 2021 by percentage:



66.60% share of Household Aluminium Articles imports to Japan came from China in 2021, it was followed by France (15.60%) and Rep. of Korea (12.39%). **India** has only 0.05% share to Japan. (Source: UN Comtrade)

iii) Top 3 Sources of Household Aluminium Articles to Germany in 2021 by percentage:



With 44.05% share of Germany's total import of Household Aluminium Articles, China became the largest source of it to Germany in 2021. Italy and France were the 2nd and 3rd largest source of the commodity group to Germany with 22.17% and 11.33% share respectively. **India** has exported only 1.19 % share of Germany's total import of Household Aluminium Articles in 2021. (Source : UN Comtrade)

IMPORT

Nickel Tubes and Pipes or Fittings

Nickel alloys are some of the most useful materials for manufacturing technically superior pipes and tubes for industrial applications. Their inherent properties make them viable for a wide range of uses. Nickel alloys are exceptionally corrosion resistant and can be used in high-temperature environments.

As nickel alloys are so ductile, they are very effectively machined to produce pipes and tubes, while retaining strength. This makes them good for use in heat exchangers in chemical processing, for example, which relies on tubing that can withstand both the hot and corrosive environment. Nickel-based tubes and pipes are also used in steam generators, aircraft systems, and in oil and gas extraction. Tubes and pipes can be manufactured using many of the key technical nickel alloys that Corrotherm stocks. For example, INCONEL alloy 625, which is a blend of nickel, chromium and molybdenum, offers a high-strength pipe or tube that can resist even highly corrosive environments. Due to its unique properties, it is often used in aerospace and marine applications, nuclear reactors, pollution control plants and chemical processing.

The MONEL range of nickel alloys can also be used for pipes and tubes. MONEL alloy 400 is a cost-effective option, but can be hardened through hot or cold working to give a very durable end product. It has been on the market for decades, and is a good choice for marine applications due to its resistance to seawater corrosion. It can also be used for heat exchanger piping and rocketry uses. Commercially pure nickel pipes, such as those made with Nickel alloy 200, contain at least 99% nickel and are useful in situations where it's important to maintain product purity, such as in the food production industry. They also have good thermal, electrical and magnetostrictive properties.

Nickel alloy pipes and tubes come in a range of specifications, with varying thickness and dimensions. Pipe sizes range from 1/8"NB (Nominal Bore Diameter, ie the inner diameter of the pipe) to 30"NB. They can be manufactured seamless, welded, fabricated, Electric Resistance Welded (ERW) or LSAW, depending on need, and can take the form of Round, Rectangular, Hydraulic or Square.

Pipes and tubes are versatile products, and there is usually a specification available to meet any requirement for any project.

View our latest products that are in stock here. Or get in touch to find out what other grades and specifications of tubes and pipes are available to your requirements.

These are broadly classified under **H. S. Code- 7507**.

Table - 9

India's Top 10 Sources of Tubes or Pipes and Fittings of Nickel (HS Code : 7507)

Rank	Countries	2018		2019		2020		2021	
		Value (million \$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	Italy	6.67	18.56	11.94	27.28	5.27	13.86	5.14	15.16
2.	China	7.22	20.09	4.49	10.26	5.79	15.23	4.90	14.46
3.	U S A	8.60	23.93	11.93	27.27	8.20	21.56	4.74	13.98
4.	U K	0.90	2.50	3.48	7.96	6.31	16.59	4.67	13.78
5.	U A E	1.01	2.81	3.32	7.58	2.25	5.92	3.99	11.75
6.	Germany	0.74	2.06	0.55	1.25	3.95	10.38	2.99	8.81
7.	Japan	2.09	5.81	0.75	1.71	1.96	5.15	1.75	5.15
8.	France	1.20	3.33	1.84	4.20	0.54	1.41	1.28	3.78
9.	Netherland	2.87	7.98	0.53	1.20	0.45	1.18	1.24	3.65
10.	Korea RP	0.44	1.23	0.93	2.13	0.24	0.63	0.66	1.95
	Others	4.21	11.70	4.00	9.14	3.07	8.09	2.56	7.53
	Total	35.96	100	43.75	100	38.02	100	33.92	100

Source: **DGCI&S****Note : India's Import including Re-import**

India's import of Tubes or Pipes and Fittings of Nickel in 2021 stood at US \$ 33.92 million which has decreased more than 10.79% from the year 2020. Major three source countries of Tubes or Pipes and Fittings of Nickel to India in 2021 were Italy (US \$ 5.14 million), China (US \$ 4.90 million) and USA (US \$ 4.74 million). These 3 countries in total sold US \$ 14.78 million worth value of Tubes or Pipes and Fittings of Nickel to India which rounds up to more than 43.60% of the total Tubes or Pipes and Fittings of Nickel import into India in that year.

Table - 10

World Top 10 Importer of Tubes or Pipes and Fittings of Nickel (HS Code : 7507)

Rank	Countries	2018		2019		2020		2021	
		Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	USA	121.43	10.14	198.25	15.14	169.33	15.15	168.38	16.62
2.	China	135.64	11.33	145.39	11.10	85.77	7.67	129.08	12.74
3.	France	166.29	13.88	210.49	16.08	143.60	12.85	84.63	8.36
4.	Germany	44.37	3.71	56.03	4.28	70.56	6.31	70.58	6.97
5.	Rep. of Korea	87.71	7.32	57.75	4.41	46.24	4.14	50.59	4.99
6.	U A E	41.21	3.44	54.49	4.16	44.23	3.96	35.15	3.47
7.	Italy	64.56	5.39	51.29	3.92	44.58	3.99	34.48	3.40
8.	India	36.23	3.03	43.82	3.35	38.15	3.41	33.99	3.36
9.	U K	97.20	8.12	72.04	5.50	34.86	3.12	30.59	3.02
10.	Canada	47.36	3.95	31.61	2.41	30.06	2.69	27.68	2.73
	Others	355.66	29.70	388.13	29.64	410.49	36.72	347.69	34.33
	Total	1197.64	100	1309.30	100	1117.87	100	1012.84	100

Source :UN Comtrade

According to the United Nation's COMTRADE database, global imports of Tubes or Pipes and Fittings of Nickel stood at amounting to US \$ 1.01 Billion in 2021. USA was the world's top importer of the commodity, with total value of US \$ 168.38 million in 2021, which represented almost 16.62% of global import of Tubes or Pipes and Fittings of Nickel, which was followed by China(US \$ 129.08) and France (US \$ 84.63). In that year India was the 8th largest importer of Tubes or Pipes and Fittings of Nickel in the world with 3.36% share of world import which was followed by the UK and Canada. In the year 2021 global import has decreased by more than 9% compare to that than 2020.

Prpd Cultr Media for Micro-Organisms Dvlp

Microbial culture media preparation is the process of mixing nutrients, agents for buffering and maintaining the osmotic balance, as well as selective inhibitors or indicators to create an agar or broth that supports the growth and the differentiation of microorganisms. Microbial culture media preparation is a routine task in the regular monitoring of spoilage and pathogenic microbes in microbiological testing.

The first medium prepared was meat-infusion broth. As most pathogenic microbes require complex food similar in composition to the fluids of the animal body, it was Robert Koch and his colleagues who used meat infusion and meat extracts as basic ingredients in their culture media for the isolation of pathogenic microbes, while one of his assistant named Petri designed and developed glass dishes, known today as Petri dishes, are used in microbiological work.

The liquid medium or broth is prepared by dissolving the known amounts of chemicals in distilled water; the pH is adjusted by adding N/10 HCl or 1N NaOH. The liquid medium is dissolved into either Erlenmeyer flasks or rimless clean test tubes.

In 15 ml capacity of test tube, 5 ml medium should be poured while in flask of 250 ml capacity, the amount of the medium should be 100 ml. These are then plugged with non-adsorbent cotton plugs. The plugged tubes or flasks should be wrapped by brown paper and placed for sterilization by autoclaving at a pressure of 15 lbs/inch² (at temperature 121°C), for 15 min.

The heat sensitive substances (protein or enzymes etc.) should be sterilized by using membrane filters (millipore). The agar agar is to be dissolved separately and dispensed after dissolving all ingredients of the medium. It is first to be noted that all the glassware in use should be sterilized in oven at 170°C for 3 h before using them. Such sterilized glassware is needed for pouring the medium used for culturing the microorganisms.

Each and every biological process requires energy for their vital activities. The basic cell building requirements are supplied by the nutrition, which is manipulated according to its requirement. Nutrition not only provides energy but also acts as precursors for growth of microorganisms.

Every microbe has its own specific minimal nutritional requirement. If it is not provided, they do not grow. This minimal requirement consists of a carbon source, nitrogen source, sulphur source, phosphorus source besides energy source.

They grown better in the presence of particular amino acids or vitamins or other compounds, so that the species could grow or develop better. Microbes can utilize a wide range of substrates from complex form of compounds (lignin etc.) that are generally not used by other forms of life.

Based on the way of harvesting energy, they are classified into two major groups. Those organisms that can make use of external energy sources and assimilate inorganic carbon are called as autotrophs. Blue green algae and some chemosynthetic bacteria belong to this group.

They can make use of sunlight/ redox potential as their energy source. CO₂ is the main and sole carbon source. Nitrogen is assimilated in the form of NH₄⁺, sulphur as SO₄⁻ and phosphorus in PO₄⁻ from their surroundings.

These are broadly classified under **H. S. Code 3128**.

India's Top 10 Sources of Prpd Cultr Media for Micro-Organisms Dvlp (HS Code :3821)

Rank	Countries	2018		2019		2020		2021	
		Value (million \$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	U S A	23.60	46.78	25.49	40.16	28.91	38.03	94.38	59.04
2.	Singapore	5.22	10.34	16.62	26.19	11.32	14.88	27.12	16.96
3.	Germany	2.92	5.78	3.62	5.71	6.85	9.00	7.03	4.40
4.	China	0.53	1.06	1.02	1.61	4.19	5.51	4.60	2.88
5.	France	2.57	5.09	2.87	4.52	2.76	3.62	3.93	2.46
6.	U K	0.77	1.52	1.22	1.92	1.13	1.49	3.34	2.09
7.	Japan	1.66	3.29	2.27	3.58	1.39	1.83	3.28	2.05
8.	Netherland	0.40	0.79	2.44	3.85	2.19	2.88	3.17	1.98
9.	Switzerland	2.77	5.49	1.89	2.98	1.32	1.74	2.94	1.84
10.	Korea RP	0.04	0.07	0.11	0.18	8.98	11.82	2.65	1.66
	Others	9.98	19.79	5.91	9.31	7.00	9.21	7.42	4.64
	Total	50.45	100	63.48	100	76.04	100	159.86	100

Source: **DGCI&S**

Note : India's Import including re-import

The value of imports of Prepared Culture Media for Micro-Organisms Development to India totalled US \$ 159.86 Million in 2021. Sales of Prepared Culture Media for Micro-Organisms Development to India increased by more than 2 times in value terms compared to 2020. Major five source countries of Prepared Culture Media for Micro-Organisms Development to India in 2021 are USA (US \$ 94.38 Million), Singapore (US \$ 27.12 Million), Germany (US \$7.03 M), China (US \$ 4.60 M) and France (US \$ 3.93 M). These 5 countries in total exported US \$ 137.06 Million value of Prepared Culture Media for Micro-Organisms Development to India which rounds up to over 85.74 % of the total Prepared Culture Media for Micro-Organisms Development import into India in 2021.

Table - 8

World Top 10 Importer of Prpd Cultr Media for Micro-Organisms Dvlp (HS Code :3821)

Rank	Countries	2018		2019		2020		2021	
		Value (million \$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)	Value (million\$)	Share (%)
1.	China	210.35	8.99	233.72	9.55	307.59	9.04	449.48	10.69
2.	USA	185.01	7.91	198.19	8.10	421.96	12.40	391.01	9.30
3.	Netherlands	168.24	7.19	183.45	7.50	209.32	6.15	283.74	6.75
4.	Germany	209.82	8.97	201.76	8.25	244.40	7.18	241.82	5.75
5.	Rep. of Korea	106.33	4.55	110.42	4.51	177.99	5.23	237.13	5.64
6.	France	164.58	7.04	166.66	6.81	240.25	7.06	229.01	5.44
7.	Ireland	56.34	2.41	62.31	2.55	111.84	3.29	216.88	5.16
8.	India	50.36	2.15	63.31	2.59	76.35	2.24	160.24	3.81
9.	Japan	109.45	4.68	114.89	4.70	118.86	3.49	144.99	3.45
10.	U K	85.61	3.66	83.98	3.43	129.65	3.81	139.71	3.32
	Others	992.53	42.44	1027.65	42.01	1365.15	40.11	1712.38	40.71
	Total	2338.61	100	2446.34	100	3403.37	100	4206.39	100

Source :UNComtrade

The imports of the Five major importers of Prepared Culture Media for Micro-Organisms Development, namely China, USA, Netherlands, Germany and Rep. of Korea represented 38.13% of total global imports in 2021. In value terms, China (US \$ 449.48M), USA (US \$ 391M), Netherlands (US \$ 283.74M), Germany (US \$ 241.82 M) and Rep. of Korea (US \$ 178 M) constituted the countries with the highest levels of imports in 2021. **India** stood at 8th position in the world with 3.81% share of Global import of Prepared Culture Media for Micro-Organisms Development in 2021.