It's sometimes essential to substitute a hop in a recipe if you can't get the variety, but it doesn't hurt to switch things up once in a while and try something different.

When substituting hops in a recipe you want to take in to account the alpha acids of the hops (and this applies to using the same hop as the alpha acid in each batch will vary significantly by a lot more than you'd expect) and make adjustments to the quantity of the hop you're using so that the IBU matches what you are aiming for, and of course the characteristics of the hop flavour and aroma.

Do you want something similar to your chosen recipe or try something with a different flavour profile to ring the changes? An often overlooked aspect of hop substitution is the Intensity of the hop character.

Breweries list the characters of the hops, and this can make a big difference to the impact which they have on the beer. Look at hops from different countries too, as hops are continually developed to match the trends in brewing.

Also bear in mind that T90 pelletised hops will give you approximately 10% more bittering than whole leaf hops.

<table>
<thead>
<tr>
<th>Hop</th>
<th>Characteristics</th>
<th>Intensity</th>
<th>Alpha Acid range</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admiral</td>
<td>Pleasant resinous +orange, citrus</td>
<td>9/10</td>
<td>13-17%</td>
<td>British ales works well with malty flavours</td>
</tr>
<tr>
<td>Ahtus</td>
<td>Citrus and spicy</td>
<td>9/10</td>
<td>11-14%</td>
<td>Clean high alpha platers, lagers, german ales.</td>
</tr>
<tr>
<td>Altairum</td>
<td>Floral, earthy + grapefruit</td>
<td>7/10</td>
<td>6-9%</td>
<td>Mit bittering but high aroma - pale ales. Light lagers</td>
</tr>
<tr>
<td>AlpkaAroma (rauku)</td>
<td>AKA Raiku - orchard fruit and some pine needle</td>
<td>9/10</td>
<td>6-11%</td>
<td>Dual purpose - pale ales and lagers, brush fruit and good bitterness.</td>
</tr>
<tr>
<td>Amarillo</td>
<td>Strong grapefruit/orange bitter +spicy+light floral</td>
<td>9/10</td>
<td>8-11%</td>
<td>US IPA, pale ales, Imperial IPA’s, Belgian pales</td>
</tr>
<tr>
<td>Amethist</td>
<td>Citrus, earthy, spicy</td>
<td>5/10</td>
<td>3-6%</td>
<td>Czech lagers and pale ales</td>
</tr>
<tr>
<td>Apollo</td>
<td>Resinous, strong, herbal</td>
<td>8/10</td>
<td>15-19%</td>
<td>High alpha bittering for IPA’s Strong grapefruit on late additions</td>
</tr>
<tr>
<td>Araris</td>
<td>Sweet spicy hints of citrus &amp; herb (strisselspalt/Iveg cross)</td>
<td>5/10</td>
<td>6-8%</td>
<td>Triples, Saisons, Pale Ales, Will Biers and Porters</td>
</tr>
<tr>
<td>Archer</td>
<td>Apricot, floral, lime and peach</td>
<td>6/10</td>
<td>4-6%</td>
<td>British aroama +citrus twist good for lagers and ales</td>
</tr>
<tr>
<td>Atlas</td>
<td>Floral, lime, pine (Brewers Gold/Snow wild hop cross)</td>
<td>9/10</td>
<td>9-11%</td>
<td>US pale, belgian pale ales + ahop</td>
</tr>
<tr>
<td>Aurora</td>
<td>Floral, lime -pine (bred from N brewer)</td>
<td>5/10</td>
<td>5-9%</td>
<td>5-9%</td>
</tr>
<tr>
<td>Azacca</td>
<td>Mango and pine</td>
<td>5/10</td>
<td>4-5.7%</td>
<td>Dry and late hopping big tropical aromatics dual purpose for IPA’s English Ales</td>
</tr>
<tr>
<td>Baron</td>
<td>Floral peach (CF113)</td>
<td>5/10</td>
<td>4.5-7.2%</td>
<td>Golden Ales and Blonds Plus English Bitters</td>
</tr>
<tr>
<td>Beata</td>
<td>Honey, apricot and almond, high Beata acids make this surprisingly good</td>
<td>6/10</td>
<td>6-9%</td>
<td>Try big quantities in a pale ale with a good citrus hoppy aroma</td>
</tr>
<tr>
<td>Belma</td>
<td>Floral, pineapple, Strawberry. use lots for best effect. Good with Citra, Calypso</td>
<td>7/10</td>
<td>6-8.1%</td>
<td>Pleasent british ale hop</td>
</tr>
<tr>
<td>Bishop</td>
<td>Earthy, honey</td>
<td>6/10</td>
<td>4.6-5.8%</td>
<td>light boked and rounded good for dry hopping</td>
</tr>
<tr>
<td>Bodekeia</td>
<td>Spicy light and floral</td>
<td>8/10</td>
<td>5-7.5%</td>
<td>UK and Belgian Ales, lagers and Pitters</td>
</tr>
<tr>
<td>Bobek</td>
<td>Stybom bobek - spicy floral, lemon +piney</td>
<td>8/10</td>
<td>3.5-7.2%</td>
<td>Saison or Pfisler bittering, UK and Belgian ale aroma hop.</td>
</tr>
<tr>
<td>Boulcer</td>
<td>Floral garssy hersty (strisselspalt/REKG cross)</td>
<td>4/10</td>
<td>7-9%</td>
<td>Great in cask, dual purpose and good in most beer styles</td>
</tr>
<tr>
<td>Bramling Cross</td>
<td>Strong spicy blackcurrant, American aroma</td>
<td>4/10</td>
<td>4.5-8%</td>
<td>High alpha bittering for IPAs Strong grapefruit on late additions</td>
</tr>
<tr>
<td>Bravo Gold</td>
<td>Good bittering pine and resin with pleasent fruity plum and floral aromas</td>
<td>8/10</td>
<td>8-11%</td>
<td>High resin for IPA’s</td>
</tr>
<tr>
<td>Bullion</td>
<td>The original Guinness hop, dark fruit and spicy</td>
<td>7/10</td>
<td>6-8.1%</td>
<td>Nicely in dark and mally</td>
</tr>
<tr>
<td>Calypso</td>
<td>Fruity pear and apple</td>
<td>6/10</td>
<td>6-8%</td>
<td>Dual purpose for fractures and complex aromas</td>
</tr>
<tr>
<td>Cascade</td>
<td>Floral spicy + lychee perfume like aromas</td>
<td>6/10</td>
<td>5-8%</td>
<td>IPA’s. AIPA’s.</td>
</tr>
<tr>
<td>Celeia</td>
<td>Floral, lime, Lemon</td>
<td>5/10</td>
<td>2.5-3%</td>
<td>Works well in lagers and pale malt ales</td>
</tr>
<tr>
<td>Centennial</td>
<td>Herbal, Lemon, resin - super cascade.</td>
<td>7/10</td>
<td>7-9.1%</td>
<td>IPA’s. IPA’s. AIPA’s. Bitters.</td>
</tr>
<tr>
<td>Challenger</td>
<td>Refreshing full bodied cedar, green tea, spicy.</td>
<td>7/10</td>
<td>5-9%</td>
<td>Good all round bitterness/ipacastan ahop aroma, good in blends. UK</td>
</tr>
<tr>
<td>Chelan</td>
<td>Blackcurrant, grapefruit, spicy</td>
<td>7/10</td>
<td>12-15%</td>
<td>Unusual aroma, spicy and pine with some grapefruit, IPA’s. AIPA’s. Good bittering for IPA’s</td>
</tr>
<tr>
<td>Chinook</td>
<td>Citrus, grapefruit, pine high aroma hop.</td>
<td>8/10</td>
<td>11-15%</td>
<td>Bright citrusy flavours nice in pale ales.</td>
</tr>
<tr>
<td>Citra</td>
<td>Lime, mango, tropical fruit</td>
<td>8/10</td>
<td>11-14%</td>
<td>Strong hop/fruit aroma good in darker brews.</td>
</tr>
<tr>
<td>Cluster</td>
<td>Well balanced bittering and deep fruity aroma - blackberry +spice.</td>
<td>6/10</td>
<td>6-9%</td>
<td>High alpha bittering for IPA’s Strong grapefruit on late additions</td>
</tr>
<tr>
<td>Columbus (tomahawk)</td>
<td>AKM Tomahawk, also same as Zeu. Pepper and liquorice.</td>
<td>8/10</td>
<td>14-20%</td>
<td>Good for lager bittering and possible US IPA’s.</td>
</tr>
<tr>
<td>Comet</td>
<td>Grapefruit, spicy.</td>
<td>8/10</td>
<td>14-20%</td>
<td>Flexible low alpha hop lets the aroma shine through.</td>
</tr>
<tr>
<td>Coza</td>
<td>Citrus, langan,</td>
<td>8/10</td>
<td>14-19%</td>
<td>High alpha bittering for IPAs Strong grapefruit on late additions</td>
</tr>
<tr>
<td>CTZ</td>
<td>Columbus, Tomahawk, Zeus - grouped together as similar super high ahl</td>
<td>9/10</td>
<td>14-15.6-18%</td>
<td>Developmental hop good for British Ales.</td>
</tr>
<tr>
<td>CTZ1202 - Floral, Spicy, Sweet.</td>
<td></td>
<td></td>
<td>8/10</td>
<td>16-19%</td>
</tr>
<tr>
<td>Dana</td>
<td>Floral, Lemon, Pine.</td>
<td></td>
<td>9/10</td>
<td>9-11%</td>
</tr>
<tr>
<td>Delta</td>
<td>Pear, pineapple</td>
<td>7/10</td>
<td>4-7%</td>
<td>Nice paired with Summer + anywhere you want resin, citrus and pine.</td>
</tr>
</tbody>
</table>
| Dr Ul | Grassy, lemon, pine needles. | 8/10 | 11-14% | British Ales. Saison.roupe 
| Duchess | CF103. Floral, peppery, spicy. | 8/10 | 4-7% | Good dual purpose in most British and some Belgean ales. |
| EKG | East Kent Goldings, Sweet and smooth and like, earthy and a little spil | 6/10 | 5-8% | Good dual purpose for IPAs and IPA’s. Pale ales. |
| El Dorado | Apricot, Peaches. | 7/10 | 13-17% | Dual purpose robust fruit aromas, IPA’s ARA’s. Spicy in the boil, fruity in late additions. |
| Ella | Apricot, citrus, peach. | 7/10 | 14-16% | Well rounded and fruity bitter. Great for all Uk ales. |
| Endevour | Blackcurrant, grapefruit, spicy. (cascade/heedgerow cross) | 7/10 | 5-9% | Adds fruity flavoers to lagers, IPA’s + IPA’s pale ales. Bitters.ports and white beer. |
| Eziis | Spicy + citrus - highly fruity /citrus + spiciness. | 7/10 | 9-15% | Diverse and pronounced aroma likely to suit IPA’s. Pale ales. |
| Egniquo | Citrus, tropical, floral and herbal - | 9/10 | 14-16% | Pronounced marmalade aromas good dual purpose in all beer styles. |
| Falconers Flight | Tropical, floral, lemon and grapefruit. | | 9-12% | Great intense flavour and good in darker beers |
| First Gold | Orange marmalade, slight spice. | 6/10 | 9-12% | Great all round bitterness and Belgean ales. |
| Flyer | Carrot, Citrus, 9-12% | | 7-10% | Strong and bright citrus aromas good for IPA’s |
| Fuggles | Malertly, slightly fruity | 8/10 | 4-7% | Quite intense floral and fruity aromas good in darker beers |
| Galaxy | Passiflorafruit, peaches. | 8/10 | 13-15% | All English styles and Belgean ales. |
| Galena | Most used US bittering hop - strong Tomcat/Blackcurrant aromas | 7/10 | 10-14% | Willamette, EKG, Styrian Goldergals. |
| Glacier | Citrus, earthy, grassy. | 7/10 | 4-7% | Pilsner, American ales. |
| Goldings | Earthy, honey, spicy. | 6/10 | 4-7% | Great Substitute for Kopparberg. |
| Green Bullet | Big pepper, lemon and pine aroses and punchy biting | 7/10 | 10-12% | Lagers and Tightly English Ales. |
| Hallertau Blanc | Floral, gooseberry, lemongrass | 7/10 | 4-7% | Mount Hood, Strisselspalt, Mittelfruith. |
| Hallertau Hertbuscher | Floral and herbal. | | 2-4% | Mount Hood, Strisselspalt, Mittelfruith. |
Hallertau Mittelfrüh
Floral, grassy, herbal. 6/10
Lagers and light English Ales. Liberty, hersbrucker.

Harome
Czech aroma hop 5/10
Lagers and light English Ales. Saaz

Herukulos Black pepper, pine, spice. 6/10
High bitterness German. Warsteiner

Huei Melon Apricot, melon, strawberry. 4/10
Belgian ales, and Hersfevets. Jarrylino, Belma.

Jaryko Orange, pear and spice. and banana. 4/10
Wealt beers, Saison, Pale Ales. Hueil Melon, 7/10

Jekipla Blackcurrant, grapefruit, lychee. 8/10
Bold ams for UK styles. Castle

Jungla Blackcurrant grapefruit spicy 8/10
Bittering for IPA’s and Lagers. Target, galena

Kaizok Grapefruit, lemon, spicy. 8/10
Pilsners, lagers, belgian ales, and dry hopping. Saaz

Kohatu Floral, pine, tropical fruit. 9/10
Pale ales and IPA. Roudly rounded tariffs and flvours. War-II, Wakatu, Motuoka. 9/10

Liberty Lemon, earthy, spicy. 3/5
Lagers and Pale ales. Mittelfrüh, Mount Hood

Lubelski Earthy, herbal, floral. 5/10
Lagers and belgian ales. Saaz

Magnum Herbal, Pine, Resin. 8/10
Great bittering with earl high alpha beer styles. Galena, Nugget, Horizon.

Maluinya Floral, herbal, Resinous. 6/10
Dual purpose for Pilfers and pale ales. Strissel, Tettang

Manzana Bavaria Tangerine, fruity and sweet. 7/10
Paleamt fruity. Hersbrucker, Liberty, Crystal, Strisselplpt.

Millenium Primarily bittering with high alpha capabilities, herb, +pineapple+resin 7/10
High alpha bittering for IPA’s Strong grapefruit on late additions. Nugget, CTZ

Minstrel Herbal, orange, spiced beines. 6/10
Mild bitterness similar to Challenger. Challenger.

Mosaic Blueberry, citrus, tropical 9/10
Versatile hop for IPA’s and APA’s and some lagers. Simcoe, Nugget, Tnt.

Motueka AKA B Saaz. Lively lemon and lime, some floral. 8/10
American ales. Tettang, EKG, Savinjski.

Mount Hood Grapefruit, herbal. 4/10
Magnum, Nugget, Galena.

Multihed (medusa) AKA Medusa. Mexican hop. Very floral. 7/10
Hersbrucker, Liberty, Crystal, Strisselplpt.

Nelson Sauvin goosberry aromas and grapefruit bitterness 9/10
Chinook, Brewers Gold.

Newport Cedar,esthery, herbal. 7/10
Magnum, Nugget. Galena.

Northdown Cedar, pine, spice. 7/10
Challenger, Northern Brewer.

Northern Brewer Herbal, Resinous, Spicy. 5/10
Chinook, Brewers Gold.

Nugget Peach, pear, spicy. 6/10
IPA’s, ESB’s, barley wines.

Otiana Grapefruit, mango, passionfruit. 9/10
Complex bitterness with citrus and tropical fruits + IPA’s and APA’s.

Opal Well balanced aromatic hop floral, fruity and happy. 5/10
Tettang, EKG, Savinjski.

Pacific Gem Blackberry, floral and oak. 7/10
Sazu.

Pacific Jade Black pepper, herb and lemon zest. 8/10
EKG, Centennial, Galena, Cluster.

Pacifica Citrus, herbal, orange. 6/10
Fuggles, Goldings.

Paleale Blackcurrant, citrus, grapefruit. 7/10
Fuggles, Tettnang, Savinjski, Glacier.

Perle Cedar, orange, spicy. 7/10
EKG, Centennial, Galena, Cluster.

Pilsner Cedar, raspberry, roses, spicy. 5/10
Willamette, Styria Goldings.

Primus Cedar, honey, spice. 6/10
Mittelfrüh, Northern Brewer.

Pilsner Lemon marmalade, spicy. 5/10
Challenger, Northern Brewer.

Pioneer cedar, grapefruit, herbal. 8/10
Tettang, EKG.

Polaris Pine, spicy, minty. 9/10
Hersbrucker, Liberty, Crystal, Strisselplpt.

Premiant earthy, floral, herbal. 5/10
Sazu.

Pride of Ringwood Cedar, herbal, oak. 9/10
EKG, Centennial, Galena, Cluster.

Pilsner
Granny, spicy, honey. 6/10
Fuggles, Goldings.

Raiatu Passionfruit, pine, tropical fruit. 9/10
Ambo, Summit.

Saaz earthy, floral, herbal. 6/10
Lublin, Hallertau, tettang, Mittelfrüh.

Spartan Herbal, lemon, peach. 5/10
Mittelfrüh.

Saphyr Floral, herbal. 5/10
Fuggles, Bock.

S Quarry Golding earthy, lemon, lime. 5/10
Salz, tettang, hersbrucker, spalt.

Select Earthy, herbal, floral. 5/10
Summit, Citra, Mosaic.

Simcoe Grapefruit, passionfruit, pine. 9/10
Northern Brewer, Perle, Mittelfrüh.

Stadler earthy, floral, spicy. 6/10
Northern Brewer, Perle.

Sonnet Herbal, honey, oak. 5/10
Sazu, EKG, Crystal.

Sorachi Ace Coconut, lemon, dill. 7/10
Northern Brewer, Saaz.

Southern Cross Lemon peel, pine. 7/10
Sazu, EKG, Crystal.

Sovereign earthy, floral, grassy. 6/10
Hersbrucker, Liberty, Crystal, Strisselplpt.

Sterling Lemon, pineapple, spice. 6/10
Sauer, Wyeast.

Stickelbrat Lemon, pine, resin. 7/10
Fuggles, Bock.

Strisselplpt floral herb. 4/10
Sazu, labout, mount hood.

Summer Apriicot, Melon. 9/10
Northern Brewer.

Thermal Great bitterness with earlthy aroma and citrus notes 7/10
Hallertau Mittelfrug.

Suzuky Earthy, grassy, minty. 5/10
High alpha bitterness. Liberty, hersbrucker.

Super Galena Great bitterness and pleasant aroma 5/10
Good bitterness. Liberty, hersbrucker.

Sydvia Floral, lemon, pine. 7/10
Belgian ales. Liberty, hersbrucker.

Target Cedar, Licoricerie, pine. 9/10
Sazu, Salter, St-augus.

Tettnang Earthy, floral, herbal. 5/10
Fuggles, Bock.

Toazza Fruit cake, resin, spicy. 5/10
Fuggles, Bock.

Tradition Floral, grassy, herbal. 5/10
Fuggles, Bock.

Trixel Fruity, spicey. 5/10
Fuggles, Bock.

Ultra Earthy, Floral, herbal. 5/10
Liberty, hersbrucker.

Vanguard Blackcurrant, floral, herbal. 5/10
Liberty, hersbrucker.

Wa-l Lemon, lime, mandarin. 4/10
IPA’s. Liberty, hersbrucker.

Wallina Citrus, pine, tangerine. 9/10
IPA’s. Liberty, hersbrucker.

Wakatu Floral, vanilla, lime. 7/10
IPA’s. Liberty, hersbrucker.

Warrat Herbal, pine, resin. 6/10
IPA, imperial’s. Liberty, hersbrucker.

WGV (whitebald goldings) earthy, herbal, spice. 7/10
Columbus, Mangium, Nugget.

Willamette Blackcurrant, floral, spicy. 6/10
EKG, Centennial, Chinook, Simcoe.

Wilde Fruity, floral, herbal. 3/5
More bite than Goldings, fresh earthy and botanical. Liberty, hersbrucker.

Wilders Tuia Blackcurrant, grapefruit, lychee. 8/10
Floral, vanilla, lime. Liberty, hersbrucker.